UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 40-F

[Check one]

☐ REGISTRATION STATEMENT PURSUANT TO SECTION 12 OF THE SECURITIES EXCHANGE ACT OF 1934

OR

☒ ANNUAL REPORT PURSUANT TO SECTION 13(a) OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended October 31, 2017 Commission File Number 001-13928

ROYAL BANK OF CANADA

(Exact name of Registrant as specified in its charter)

Canada	6029	Not Applicable
(Province or other jurisdiction of incorporation or organization)	(Primary Standard Industrial Classification Code Number (if applicable))	(I.R.S. Employer Identification Number (if applicable))

200 Bay Street
Royal Bank Plaza
Toronto, Ontario
Canada M5J 2J5
Attention: Karen E. McCarthy
Vice-President, Associate General Counsel & Secretary
(416) 974-2774
(Address and telephone number of Registrant's principal executive offices)

Royal Bank of Canada
30 Hudson Street
Jersey City, New Jersey, 07302-4699
Attention: Kevin Genirs
(212) 858-7111
(Name, address (including zip code) and telephone number (including area code) of agent for service in the United States)

copies of all correspondence should be sent to:

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200 Bay Street
Toronto, Ontario
Canada M5J 2J5
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125 Broad Street
New York, New York
USA 10004-2498
Tel: (212) 558-4000

Securities registered or to be registered pursuant to Section 12(b) of the Act.

Title of each class	Name of each exchange on which registered
Common Shares	New York Stock Exchange

Securities registered or to be registered pursuant to Section 12(g) of the Act.

Not Applicable
(Title of Class)

Securities for which there is a reporting obligation pursuant to Section 15(d) of the Act.

Not Applicable
(Title of Class)

For annual reports, indicate by check mark the information filed with this Form:

☒ Annual information form ☒ Audited annual financial statements

Indicate the number of outstanding shares of each of the issuer's classes of capital or common stock as of the close of the period covered by the annual report.

Common Shares	1,452,897,589
First Preferred Shares	
Series W	12,000,000
Series AA	12,000,000
Series AC	8,000,000
Series AD	10,000,000
Series AE	10,000,000
Series AF	8,000,000
Series AG	10,000,000
Series AJ	13,578,815
Series AK	2,421,185
Series AL	12,000,000
Series AZ	20,000,000
Series BB	20,000,000
Series BD	24,000,000
Series BF	12,000,000
Series BH	6,000,000
Series BI	6,000,000
Series BJ	6,000,000
Series C-1	82,050
Series C-2	20,385
Series BK	29,000,000
Series BM	30,000,000

Indicate by check mark whether the Registrant by filing the information contained in this Form is also thereby furnishing the information to the Commission pursuant to Rule 12g3-2(b) under the Securities Exchange Act of 1934 (the "Exchange Act"). If "Yes" is marked, indicate the file number assigned to the Registrant in connection with such Rule.

Yes ☐ 82-__ No ☒

Indicate by check mark whether the Registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Exchange Act during the preceding 12 months (or for such shorter period that the Registrant was required to file such reports) and (2) has been subject to such filing requirements for the past 90 days.

Yes ☒ No ☐

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 12b-2 of the Exchange Act.

Emerging growth company ☐

If an emerging growth company that prepares its financial statements in accordance with U.S. GAAP, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards† provided pursuant to Section 13 (a) of the Exchange Act. ☐

CONTROLS AND PROCEDURES

Information about disclosure controls and procedures and internal control over financial reporting can be found under "Controls and procedures" on page 107 of our Management's Discussion and Analysis set forth in Exhibit 2, and under "Management's Report on Internal Control over Financial Reporting" which can be found on page 118 of our Financial Review set forth in Exhibit 2, which sections are incorporated by reference.

AUDIT COMMITTEE FINANCIAL EXPERTS

The Registrant's board of directors has determined that it has four audit committee financial experts serving on its audit committee. Jacynthe Côté, David F. Denison, Thierry Vandal and Jeffery W. Yabuki have been determined to be such audit committee financial experts and are independent, as that term is defined by the New York Stock Exchange's listing standards applicable to the Registrant. The U.S. Securities and Exchange Commission (the "SEC") has indicated that the designation of Jacynthe Côté, David F. Denison, Thierry Vandal and Jeffery W. Yabuki as audit committee financial experts does not make any of them an "expert" for any purpose, impose any duties, obligations or liability on Jacynthe Côté, David F. Denison, Thierry Vandal and Jeffery W. Yabuki that are greater than those imposed on members of the audit committee and board of directors who do not carry this designation or affect the duties, obligations or liability of any other member of the audit committee.

CODE OF ETHICS

The Registrant has adopted a code of ethics (the "Code of Conduct") that applies to all employees, contract workers and members of the board of directors, including its principal executive officer, principal financial officer and principal accounting officer. The full text of the Code of Conduct is set forth in Exhibit 4 and is also available on our website at rbc.com.

PRINCIPAL ACCOUNTANT FEES AND SERVICES

Information about principal accountant fees and services and a brief description of our pre-approval policies and procedures can be found under "Audit Committee" beginning on page 22 of our Annual Information Form set forth in Exhibit 1, which section is incorporated by reference. A copy of our pre-approval policies and procedures can be found in Appendix D of our Annual Information Form, which section is incorporated by reference.

OFF-BALANCE SHEET ARRANGEMENTS

Information about off-balance sheet arrangements can be found under "Off-balance sheet arrangements" beginning on page 48 of our Management's Discussion and Analysis set forth in Exhibit 2, which section is incorporated by reference.

TABULAR DISCLOSURE OF CONTRACTUAL OBLIGATIONS

Tabular disclosure of contractual obligations can be found under "Transactional/positional risk drivers – Liquidity and funding risk" beginning on page 74 of our Management's Discussion and Analysis set forth in Exhibit 2, which section is incorporated by reference.

IDENTIFICATION OF THE AUDIT COMMITTEE

The Registrant has a separately-designated standing audit committee. Information about the audit committee can be found under "Audit Committee" beginning on page 22 of our Annual Information Form set forth in Exhibit 1, which section is incorporated by reference.

UNDERTAKING

The Registrant undertakes to make available, in person or by telephone, representatives to respond to inquiries made by the Commission staff, and to furnish promptly, when requested to do so by the Commission staff, information relating to: the securities in relation to which the obligation to file an annual report on Form 40-F arises; or transactions in said securities.

SUMMARY OF SIGNIFICANT DIFFERENCES FROM NYSE CORPORATE GOVERNANCE RULES

A summary of significant ways corporate governance practices followed by the Registrant differ from corporate governance practices required to be followed by U.S. Domestic Companies under the New York Stock Exchange's listing standards (disclosure required by section 303A.11 of the NYSE Listed Company Manual) is available on the Registrant's corporate governance website at rbc.com/governance.

DISCLOSURE PURSUANT TO SECTION 13(r) OF THE SECURITIES EXCHANGE ACT OF 1934

In accordance with section 13(r) of the U.S. Securities Exchange Act of 1934, we are required to disclose certain Iran-related activities. We maintain a robust economic sanctions compliance program which monitors compliance with economic sanctions requirements in the jurisdictions in which we operate and we believe we have been in compliance with relevant economic sanctions legislation throughout fiscal 2017.

We currently maintain certain non-U.S. dollar denominated accounts for the Embassy of the Islamic Republic of Iran in Canada (the "Iranian Embassy"). Any funds in these accounts are frozen by Ontario court order in connection with civil litigation, which is being monitored.

In fiscal 2017, these accounts generated less than $3,000 in gross revenue and less than $3,000 in net income.

SIGNATURES

Pursuant to the requirements of the Exchange Act, the Registrant certifies that it meets all of the requirements for filing on Form 40-F and has duly caused this annual report to be signed on its behalf by the undersigned, thereto duly authorized.

ROYAL BANK OF CANADA

By: /s/ David I. McKay
Name: David I. McKay
Title: President and Chief Executive Officer

Date: November 29, 2017

INDEX TO EXHIBITS

Exhibit	Exhibit No.
Royal Bank of Canada Annual Information Form dated November 28, 2017	1
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ROYAL BANK OF CANADA

ANNUAL INFORMATION FORM

November 28, 2017

CAUTION REGARDING FORWARD-LOOKING STATEMENTS

From time to time, we make written or oral forward-looking statements within the meaning of certain securities laws, including the "safe harbour" provisions of the *United States Private Securities Litigation Reform Act of 1995* and any applicable Canadian securities legislation. We may make forward-looking statements in this Annual Information Form and in the documents incorporated by reference herein, in other filings with Canadian regulators or the United States (U.S.) Securities and Exchange Commission (SEC), in reports to shareholders and in other communications. Forward-looking statements in this document and in the documents incorporated by reference herein include, but are not limited to, statements relating to our financial performance objectives, vision and strategic goals, the economic and market review and outlook for Canadian, U.S., European and global economies, the regulatory environment in which we operate, the outlook and priorities for each of our business segments, and the risk environment including our liquidity and funding risk as set out in the 2017 Management's Discussion and Analysis for the fiscal year ended October 31, 2017 (the 2017 Management's Discussion and Analysis). The forward-looking information contained in this Annual Information Form and in the documents incorporated by reference is presented for the purpose of assisting the holders of our securities and financial analysts in understanding our financial position and results of operations as at and for the periods ended on the dates presented, as well as our financial performance objectives, vision and strategic goals, and may not be appropriate for other purposes. Forward-looking statements are typically identified by words such as "believe", "expect", "foresee", "forecast", "anticipate", "intend", "estimate", "goal", "plan" and "project" and similar expressions of future or conditional verbs such as "will", "may", "should", "could" or "would".

By their very nature, forward-looking statements require us to make assumptions and are subject to inherent risks and uncertainties, which give rise to the possibility that our predictions, forecasts, projections, expectations or conclusions will not prove to be accurate, that our assumptions may not be correct and that our financial performance objectives, vision and strategic goals will not be achieved. We caution readers not to place undue reliance on these statements as a number of risk factors could cause our actual results to differ materially from the expectations expressed in such forward-looking statements. These factors – many of which are beyond our control and the effects of which can be difficult to predict – include: credit, market, liquidity and funding, insurance, operational, regulatory compliance, strategic, reputation, legal and regulatory environment, competitive and systemic risks and other risks discussed in the risks sections of our Annual Report for the fiscal year ended October 31, 2017 (2017 Annual Report) including global uncertainty and volatility, elevated Canadian housing prices and household indebtedness, information technology and cyber risk, regulatory change, technological innovation and new entrants, global environmental policy and climate change, changes in consumer behavior, the end of quantitative easing, the business and economic conditions in the geographic regions in which we operate, the effects of changes in government fiscal, monetary and other policies, tax risk and transparency, environmental and social risk.

We caution that the foregoing list of risk factors is not exhaustive and other factors could also adversely affect our results. When relying on our forward-looking statements to make decisions with respect to us, investors and others should carefully consider the foregoing factors and other uncertainties and potential events. Material economic assumptions underlying the forward-looking statements contained in this Annual Information Form are set out in our 2017 Management's Discussion and Analysis under the heading Economic, market and regulatory review and outlook and for each business segment under the headings Strategic priorities and Outlook. Except as required by law, we do not undertake to update any forward-looking statement, whether written or oral, that may be made from time to time by us or on our behalf.

Additional information about these and other factors can be found in the risks sections of our 2017 Management's Discussion and Analysis.

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*Notes 19, 21 and 26 to the 2017 Annual Consolidated Financial Statements for the fiscal year ended October 31, 2017 (the 2017 Annual Consolidated Financial Statements) for Royal Bank of Canada are incorporated by reference herein.

INFORMATION IS AT OCTOBER 31, 2017, UNLESS OTHERWISE NOTED.

CORPORATE STRUCTURE

Name, Address and Incorporation[1]

Royal Bank of Canada is a Schedule I bank under the *Bank Act* (Canada), which constitutes its charter. The Bank was created as Merchants Bank in 1864 and was incorporated under the "Act to Incorporate the Merchants' Bank of Halifax" assented to June 22, 1869. The Bank changed its name to The Royal Bank of Canada in 1901 and to Royal Bank of Canada in 1990.

The Bank's corporate headquarters are located at Royal Bank Plaza, 200 Bay Street, Toronto, Ontario, Canada and its head office is located at 1 Place Ville-Marie, Montreal, Quebec, Canada.

Intercorporate Relationships

Information about intercorporate relationships with principal subsidiaries, including place of incorporation and percentage of securities owned by the Bank, is provided in Appendix A.

GENERAL DEVELOPMENT OF THE BUSINESS

Three Year History

Through our business strategies and actions we pursue our vision, "To be among the world's most trusted and successful financial institutions." Our three strategic goals are:

- In Canada, to be the undisputed leader in financial services;
- In the U.S., to be the preferred partner to corporate, institutional and high net worth clients and their businesses; and
- In select global financial centres, to be a leading financial services partner valued for our expertise.

The Canadian economy showed moderate growth during 2015 driven by some recovery in energy production in the second half of the year and higher exports. Equity markets in Canada and the U.S., however, remained volatile throughout our fiscal year.

In 2015, RBC delivered solid operating results across most of our business segments and strong credit quality. In addition, on November 2, 2015, Royal Bank of Canada completed the acquisition of City National Corporation (City National), the holding company for City National Bank, which gives us an expansion platform for long-term growth in the U.S. and provides us with the opportunity to enhance and complement our existing U.S. businesses in line with our strategic goals.

The Canadian economy continued to show moderate growth during 2016, supported by solid consumer spending and housing activity in the first half of the year while oil and gas production normalized and non-energy exports recovered in the second half of the year. The U.S. economy also continued to show moderate growth. Global equity markets recorded minimal gains in 2016 amid several periods of heightened volatility due to global growth concerns and political uncertainly related to the Brexit vote to have the United Kingdom leave the European Union and the U.S. election.

[1] When we say "we", "us", "our", or "RBC", we mean Royal Bank of Canada and its subsidiaries, as applicable. References to "the Bank" mean Royal Bank of Canada without its subsidiaries.

RBC delivered solid results in 2016 driven by strong earnings in Wealth Management, which benefited from the inclusion of City National, solid results in Personal & Commercial Banking, and strong earnings in Investor & Treasury Services. In addition to closing the acquisition of City National in fiscal 2016, RBC also completed the sale of RBC General Insurance Company, our home and auto insurance manufacturing business, to Aviva Canada Inc., which included a 15 year strategic agreement between RBC Insurance and Aviva.

The Canadian economy continued to show growth in 2017, supported by robust gains in consumer spending amid strong employment growth, low interest rates and wealth effects from rising home prices. The U.S. economy also continued to show moderate growth supported by consumer spending and business investment. The Eurozone has experienced positive growth as a result of a strengthening global economic outlook despite heightened volatility related to the Catalonian referendum, Brexit negotiations and the success of populist parties in recent elections.

In 2017, RBC delivered solid operating results across most business segments driven by strong earnings in Personal & Commercial Banking, Capital Markets, Wealth Management and Investor & Treasury Services partially offset by lower earnings in Insurance.

In accordance with transition planning, Rod Bolger assumed the role of Chief Financial Officer and Jennifer Tory assumed the role of Chief Administrative Officer, following the retirement of Janice Fukakusa. Neil McLaughlin was appointed to the role of Group Head, Personal & Commercial Banking. Helena Gottschling was appointed to the role of Chief Human Resources Officer and Michael Dobbins was appointed Head, Strategy and Corporate Development.

We continue to monitor and prepare for regulatory developments in a manner that seeks to ensure compliance with new requirements while mitigating any adverse business or economic impacts. Such impacts could result from new or amended regulations and the expectations of those who enforce them. Significant developments include continuing changes to global and domestic standards for capital and liquidity, changes to federal mortgage rules, over-the-counter (OTC) derivatives reform and initiatives to enhance requirements for institutions deemed systemically important to the financial sector. We also continue to monitor changes to resolution regimes addressing government bail-in and total loss-absorbing capacity.

Our acquisitions and dispositions that have influenced the general development of our business over the past three years are summarized in the following table:

Business Segment	**Acquisition/Disposition**	**Key Characteristics**
Insurance	RBC General Insurance Company (2016)	• Disposition of our home and auto insurance manufacturing business which included a 15 year strategic distribution agreement allowing RBC Insurance to market and sell a full suite of property and casualty insurance products to Canadians.
Wealth Management	City National Corporation (2015)	• Acquisition enhances our U.S. presence and strategically compliments our U.S. Wealth Management and Capital Markets businesses creating a platform for long term growth.
	Royal Bank of Canada (Suisse) SA (2015)	• Disposition supports our long-term growth strategy to build a focused global wealth management business servicing clients from our hubs in North America, the British Isles and Asia.
Personal & Commercial Banking	RBC Royal Bank (Suriname) N.V. (2015)	• Disposition of this business was in support of the repositioning of our Caribbean business.

Additional information about our three year history can also be found in the “Overview and outlook” section beginning on page 12 of our 2017 Management’s Discussion and Analysis, which section is incorporated by reference herein.

DESCRIPTION OF THE BUSINESS

General Summary

Royal Bank of Canada is a global financial institution with a purpose-driven, principles-led approach to delivering leading performance. Our success comes from the 80,000+ employees who bring our vision, values and strategy to life so we can help our clients thrive and communities prosper. As Canada's biggest bank, and one of the largest in the world based on market capitalization, we have a diversified business model with a focus on innovation and providing exceptional experiences to our 16 million clients in Canada, the U.S. and 35 other countries.

Our reporting segments are Personal & Commercial Banking, Wealth Management, Insurance, Investor & Treasury Services, Capital Markets and Corporate Support. Additional information about our business and each segment (including segment results) can be found under "Overview and outlook" beginning on page 12 and under "Business segment results" beginning on page 21 of our 2017 Management's Discussion and Analysis, which sections are incorporated by reference herein.

Seasonality

Information about seasonality is provided under "Quarterly financial information" beginning on page 46 of our 2017 Management's Discussion and Analysis, which section is incorporated by reference herein.

Competition

Our competition includes the other Canadian Schedule I banks, and, as we expand into new lines of business, our competition has grown to include other Canadian banks, trust companies, foreign banks, credit unions, caisses populaires, auto financing companies, investment management companies serving retail and corporate customers and public institutions, and companies and non-traditional competitors that offer products and services traditionally offered by financial institutions including through internet and mobile banking, investment counselling firms, brokerages, investment dealers, self-directed brokers, mutual fund companies, global private banks, wealth managers, asset managers, traditional offshore private banks, U.S. investment-led private client operations, custody service providers, insurance companies, reinsurance companies, investment banks, virtual banks and specialty financial service providers. Key competitive factors include the range and features of financial products and services offered, pricing, distribution, and service quality. Additional information about our competition can be found under "Business segment results" beginning on page 21 of our 2017 Management's Discussion and Analysis, which section is incorporated by reference herein.

Government Regulation and Supervision – Canada

The Bank is a "Schedule I" bank under the *Bank Act* (Canada) (Bank Act), and, as such, is a federally regulated financial institution. Its Canadian trust, loan and insurance subsidiaries are also federally regulated financial institutions governed by (respectively) the *Trust and Loan Companies Act* (Canada) and the *Insurance Companies Act* (Canada). The activities of the Bank's Canadian trust, loan and insurance subsidiaries are also regulated under provincial and territorial laws in respect of their activities in the provinces and territories. In certain provinces, some of the Bank's capital markets activities are regulated under provincial securities laws (which are administered and enforced by securities regulatory authorities).

The Office of the Superintendent of Financial Institutions (OSFI), an independent agency of the Government of Canada, reports to the Minister of Finance (the Minister) for the supervision of the Bank, as well as its Canadian federally regulated trust, loan and insurance subsidiaries. OSFI is required, at least once a year, to examine the affairs and business of each institution for the purpose of determining whether statutory requirements are duly observed and the institution is in sound financial condition, and report to the Minister. The Bank and its Canadian trust, loan and insurance subsidiaries are also required to make periodic filings and reports to OSFI.

The Bank and its Canadian trust, loan and insurance subsidiaries are also subject to regulation under the *Financial Consumer Agency of Canada Act* (FCAC Act).[2] The Financial Consumer Agency of Canada (Agency), among other things, enforces consumer-related provisions of the federal statutes which govern these financial institutions. The Commissioner of the Agency must report to the Minister on all matters connected with the administration of the FCAC Act and consumer provisions of other federal statutes, including the Bank Act, *Trust and Loan Companies Act* and *Insurance Companies Act*. The Bank and its Canadian trust and loan subsidiaries are also subject to provincial and territorial laws of general application.

The Bank and its subsidiaries, Royal Trust Corporation of Canada, The Royal Trust Company, Royal Bank Mortgage Corporation and RBC Investor Services Trust are member institutions of the Canada Deposit Insurance Corporation (CDIC). CDIC insures certain deposits held at the member institutions.

Under the Bank Act, the Bank is prohibited from engaging in or carrying on any business other than the business of banking, except as permitted. The Bank can provide, amongst other services, any financial services, investment counselling services and portfolio management services, act as a financial agent and issue and operate payment, credit or charge card plans.

The Bank has broad powers to invest in securities, but is limited in making "substantial investments" in or in controlling certain types of entities. A "substantial investment" will arise through direct or indirect beneficial ownership of voting shares carrying more than 10 per cent of the voting rights attached to all outstanding voting shares of a corporation, shares representing more than 25 per cent of the shareholders' equity in a corporation, or interests representing more than 25 per cent of the ownership interests in any unincorporated entity. The Bank can make controlling, and in certain circumstances, non-controlling substantial investments in certain entities in accordance with the investment provisions under the *Bank Act*. Some substantial investments may be made only with the prior approval of the Minister or the Superintendent of Financial Institutions (the Superintendent).

The Bank and its Canadian trust, loan and insurance subsidiaries are also required to maintain, in relation to operations, adequate capital and liquidity and OSFI may direct financial institutions to increase capital and/or to provide additional liquidity.

The *Proceeds of Crime (Money Laundering) and Terrorist Financing Act* (the Act) is applicable to all of our businesses in Canada. The Act implements specific measures designed to detect and deter money laundering and the financing of terrorist activities. Further, the Act sets out obligations related to deterring and detecting money laundering and terrorist financing from a global perspective, in order to minimize the possibility that RBC could become a party to these activities. RBC has enterprise-wide anti-money laundering policies and procedures which assist in reducing the risk of facilitating money laundering and terrorist financing activities.

Broker-Dealer/Investment Management Subsidiaries

The activities of certain of the Bank's subsidiaries, such as RBC Dominion Securities Inc. (RBC DS), RBC Direct Investing Inc. (RBC DI), Royal Mutual Funds Inc. (RMFI), RBC Global Asset Management Inc., Phillips, Hager & North Investment Funds Ltd. (PH&N IF), and RBC Phillips, Hager & North Investment Counsel Inc., which act as securities dealers (including investment dealers, mutual fund dealers and exempt

[2] For the Bank's trust subsidiaries, only their retail deposit taking activities are subject to regulation under the FCAC Act.

market dealers), advisors (investment counsel/portfolio manager) or investment fund managers are regulated in Canada under provincial and territorial securities laws (which are administered and enforced by securities regulatory authorities) and, in some cases, by the rules of the applicable self-regulatory organization (the Investment Industry Regulatory Organization of Canada for investment dealers and the Mutual Fund Dealers Association of Canada (MFDA) for mutual fund dealers). Each of RBC DS and RBC DI are members of the Canadian Investor Protection Fund. Customers' accounts are protected by the Canadian Investor Protection Fund within specified limits. A brochure describing the nature and limits of coverage is available to customers upon request. RMFI and PH&N IF are each members of the MFDA Investor Protection Fund, which protects against certain losses of customer property held by an insolvent MFDA member; similarly, a brochure describing the nature and limits of coverage is also available to customers upon request.

Insurance

The activities of the Bank's regulated Canadian insurance subsidiaries, RBC Life Insurance Company (RBC Life) and RBC Insurance Company of Canada (RICC), are federally governed by the *Insurance Companies Act* and by provincial legislation in each province and territory in which they carry on business. In addition, the Bank is federally governed by the Bank Act for any insurance activities it is permitted to carry out. The Bank may administer, promote and provide advice in relation to certain authorized types of insurance and may conduct any aspect of the business of insurance, other than the underwriting of insurance, outside of Canada and in respect of risks outside Canada. However, in Canada, the Bank may not act as agent for any person in the placing of insurance. The Bank can promote an insurance company, agent or broker or non-authorized types of insurance (e.g. life and home and automobile insurance) to certain prescribed groups where the promotion takes place outside of physical bank branches. Additionally, and subject to applicable restrictions under the Bank Act, RBC Wealth Management Financial Services Inc., a wholly owned indirect subsidiary of the Bank, is licensed under applicable provincial and territorial laws to sell insurance products, including life and benefits insurance along with money products such as annuities and segregated funds, on both an individual and group basis, for both related and independent insurance companies in Canada.

RBC Life is a member of Assuris which is a not-for-profit organization that protects Canadian life insurance policyholders against loss of benefits due to the financial failure of a member company. RICC is a member of the Property and Casualty Insurance Compensation Corporation which is the corporation protecting Canadian property and casualty policyholders against loss of benefits due to the financial failure of a member company.

RBC Insurance Agency Ltd. is a licensed insurance agency that distributes insurance products underwritten by non-RBC entities. These products include home and auto insurance that is underwritten by an unaffiliated insurance company.

Government Regulation and Supervision – United States

Banking

In the U.S., the Bank is characterized as a foreign banking organization (FBO). Generally, the operations of an FBO and its U.S. subsidiaries and offices are subject to the same comprehensive regulatory regime that governs the operations of U.S. domestic banking organizations. The Bank's U.S. businesses are subject to supervision and oversight by various U.S. authorities, including federal and state regulators, as well as self-regulatory organizations.

In 2000, the Bank became a U.S. "financial holding company" (FHC), as authorized by the Board of Governors of the Federal Reserve System (Federal Reserve). On November 2, 2015, RBC USA Holdco, Corporation (USA Holdco), RBC's top tier U.S. holding company, became a bank holding company (BHC) and an FHC. Pursuant to the *Gramm-Leach-Bliley Act*, an FHC may engage in, or acquire companies engaged in, a broader range of financial and related activities than are permitted to banking organizations that do not maintain FHC status. To qualify as an FHC, the Bank, as a FBO and BHC, and USA Holdco, as a

BHC, must meet certain capital requirements and must be deemed to be "well managed" for U.S. bank regulatory purposes. In addition, any U.S. depository institution subsidiaries of the FBO or BHC must also meet certain capital requirements and be deemed to be "well managed" and must have at least a "satisfactory" rating under the *Community Reinvestment Act of 1977*.

An FBO must meet several conditions in order to maintain "well managed" status for U.S. bank regulatory purposes: (i) the FBO must have received a composite regulatory rating of "satisfactory" or better for its U.S. branch, agency and commercial lending company operations following its last regulatory examination, (ii) the FBO's home country supervisor must consent to it expanding its activities in the U.S. to include activities permissible for an FHC, (iii) the FBO's management must meet standards comparable to those required for a U.S. bank subsidiary of an FHC, and (iv) each U.S. depository institution subsidiary of the FBO and/or BHC must be deemed to be "well managed", which requires both a "satisfactory" composite regulatory rating and a "satisfactory" rating on the "management" component of their last regulatory examination.

Under the *International Banking Act of 1978* (IBA) and the *Bank Holding Company Act of 1956* (BHCA), all of the Bank's U.S. banking operations are subject to supervision and regulation by the Federal Reserve. Under the IBA, the BHCA, and related regulations of the Federal Reserve, the Bank generally may not open a branch, agency or representative office in the U.S., nor acquire five per cent or more of the voting stock of any U.S. bank or bank holding company, without notice to or prior approval of the Federal Reserve.

The Federal Reserve is the U.S. "umbrella regulator" responsible for regulatory oversight of the whole of the Bank's U.S. activities. The Federal Reserve consults with and obtains information from other functional U.S. regulators that exercise supervisory authority over the Bank's various U.S. operations. Reports of financial condition and other information relevant to the Bank's U.S. businesses are regularly filed with the Federal Reserve.

On July 21, 2010, the Dodd-Frank Act was enacted. The statute requires significant changes to U.S. financial regulations, with material cross-border implications. Some provisions of the Dodd-Frank Act have taken effect automatically. Other provisions require adoption of rules by one or more U.S. regulatory authorities to become operative and such rules are in various stages of completion.

Under the Dodd-Frank Act, the Bank is registered as a "Swap Dealer" with the U.S. Commodity Futures Trading Commission (CFTC) and the National Futures Association (NFA).

Regulation YY of the Federal Reserve issued under the Dodd-Frank Act (the Enhanced Prudential Standards) required the Bank to establish, by July 1, 2016, an intermediate holding company (IHC) organized under the laws of the United States. The IHC is required to hold directly or indirectly the Bank's entire ownership interest in its U.S. insured depositary institution (IDI) subsidiaries and other U.S. subsidiaries (excluding so called section 2(h)(2) companies and Debt Previously Contracted branch subsidiaries). The Bank designated USA Holdco as its IHC. The Bank as an FBO and USA Holdco as an IHC are subject to Subpart O of the Enhanced Prudential Standards, which includes capital adequacy, capital planning and stress testing, risk management and governance, liquidity and liquidity stress testing, financial regulatory reporting and other requirements that are similar to or the same as those applicable to large U.S. domestic bank holding companies.

The Bank maintains two branches in New York which are licensed and supervised as full federal branches with fiduciary licenses by the Office of the Comptroller of the Currency (OCC), the U.S. supervisor of national banks. In general, the Bank's branches may exercise the same rights and privileges, and are subject to the same restrictions, as would apply to a U.S. national bank at the same location(s). The Bank's branches may accept wholesale deposits but may not take U.S. domestic retail deposits outside of an available exemption. Deposits in the Bank's branches are not insured by the Federal Deposit Insurance Corporation (FDIC). The Bank also maintains a limited federal branch in Jersey City, New Jersey which may exercise the same rights and privileges as the Bank's New York federal branches except that it can only take deposits from non-U.S. sources.

The OCC examines and supervises the Bank's U.S. branch office activities and annually examines and assesses their operations. In addition, the Bank's U.S. branches are required to maintain certain liquid assets on deposit in their state(s) of residence, which deposits are pledged to the OCC. Furthermore, the Bank is subject to supervisory guidance based on the examiners' assessment of risk management, operational controls, compliance and asset quality.

The Bank also maintains a state-licensed agency in Texas and state-licensed representative offices in Delaware, Texas and Washington (where it is called an alien bureau). In general, the activities conducted at the Bank's agency include a broad range of banking powers, including lending and maintaining credit balances, but agencies are limited in their ability to accept deposits from citizens or residents of the U.S. Further limitations may be placed on such agencies' activities based on state laws. The activities conducted at the Bank's representative offices are limited to representational and administrative functions; such representative offices do not have authority to make credit decisions and may not solicit or contract for any deposit or deposit-like liability. The Bank's representative offices are examined and assessed by both the Federal Reserve and state regulators and are required to adhere to any applicable state regulations.

Banking activities are also conducted at City National Bank (CNB) and RBC Bank (Georgia), National Association (RBC Bank), both of which are national banking associations chartered by the OCC. CNB and RBC Bank are members of the Federal Reserve System. The primary federal regulator of CNB and RBC Bank is the OCC. As U.S. banks, CNB and RBC Bank are allowed to take retail deposits, and they offer retail and commercial banking services, including deposit and credit services, such as consumer lending products (including credit card and mortgage loans), and business and commercial loans. CNB and RBC Bank are subject to capital requirements, dividend restrictions, limitations on investments and subsidiaries, limitations on transactions with affiliates (including the Bank and its branches), deposit reserve requirements and other requirements administered by the OCC and the Federal Reserve. Deposits at CNB and RBC Bank are FDIC-insured to the extent permissible. As a national bank in the U.S., CNB also has fiduciary powers and exercises investment management under those powers.

Trust company activities are conducted at RBC Trust Company (Delaware) Limited (RBC Trust), the Bank's U.S. trust company subsidiary. RBC Trust is a Delaware trust company chartered and supervised by the Delaware State Banking Commission and, as a subsidiary of a bank holding company, is subject to oversight by the Federal Reserve. RBC Trust is subject to dividend restrictions, limitations on investments and other applicable state banking law requirements.

The *USA PATRIOT Act*, which amended the *Bank Secrecy Act*, requires U.S. banks and foreign banks with U.S. operations to maintain appropriate policies, procedures and controls relating to anti-money laundering compliance, suspicious activity and currency transaction reporting and due diligence on customers to prevent, detect and report individuals and entities involved in money laundering and the financing of terrorism.

Broker-Dealer Activities and Broker-Dealer Subsidiaries

The principal securities brokerage, trading, advisory and investment banking activities are conducted in the following U.S.-registered broker-dealer subsidiaries:

- RBC Capital Markets, LLC (RBC CM LLC),
- RBC Capital Markets Arbitrage S.A. (RBC CMA),
- City National Securities, Inc.,
- RIM Securities LLC, and
- Symphonic Securities LLC.

The SEC, state securities regulators, the Financial Industry Regulatory Authority and other self-regulatory organizations regulate these broker-dealer subsidiaries. Certain activities of RBC CM LLC and RBC CMA are also subject to regulation by the CFTC and the NFA. Pursuant to the Dodd-Frank Act, RBC CM LLC is registered as a "Swaps Firm" with the NFA. Certain activities of RBC CM LLC are subject to regulation by the Municipal Securities Rulemaking Board.

Investment Management and Other Fiduciary Activities

The Bank's New York branches have fiduciary powers, and certain branches conduct investment management and custody activities for certain customers. In addition, other affiliates are involved in the business of investment management. In many cases, these activities require that the affiliates be registered with the SEC as investment advisers under the U.S. *Investment Advisers Act of 1940* (Advisers Act). The Advisers Act and related rules regulate the registration and activities of investment advisers. Although the regulatory regime for investment advisers is similar to that for broker-dealers, the standard of conduct is higher due to the advisers' status as fiduciaries. This status as a fiduciary limits the investment adviser's ability to make use of affiliates and requires that it avoid or manage and disclose conflicts of interests with respect to the conduct of its business.

The following entities are the Bank's subsidiaries that are registered as "investment advisers" with the SEC:

- RBC CM LLC,
- RBC Global Asset Management (U.S.) Inc. (GAM),
- RBC Global Asset Management (UK) Limited,
- Royal Bank of Canada Investment Management (USA) Limited,
- RBC Private Counsel (USA) Inc.,
- BlueBay Asset Management LLP,
- BlueBay Asset Management USA LLC,
- City National Rochdale, LLC,
- City National Securities, Inc.,
- Convergent Wealth Advisors, LLC,
- LMCG Investments, LLC,
- Mid-Continent Capital, L.L.C. and
- Symphonic Financial Advisors LLC.

GAM is also the advisor to several U.S. mutual funds sponsored by it. The U.S. *Investment Company Act of 1940* and related rules regulate the registration and operation of mutual funds and the activities of the funds' advisers and other affiliates, and certain of the funds' other service providers.

ERISA and the Internal Revenue Code

The U.S. *Employee Retirement Income Security Act of 1974*, as amended (ERISA), and the related rules regulate the activities of the financial services industry with respect to pension plan clients. Similarly, the U.S. *Internal Revenue Code* and the regulations thereunder impose requirements with respect to such clients and also individual retirement accounts (IRAs). Brokers, dealers and investment advisers to pension plans and IRAs must conduct their business in compliance with both ERISA and applicable tax regulations.

Risk Factors

A discussion of risks affecting us and our businesses appears under the headings "Risk management", "Transactional/positional risk drivers", "Execution risk drivers", "Strategic risk drivers", "Macroeconomic risk drivers" and "Overview of other risks" from pages 51 to 91 of our 2017 Management's Discussion and Analysis, which discussions are incorporated by reference herein.

Environmental and Social Risk Policies

RBC has a long history of environmental leadership dating back to 1991 when we launched our first corporate environmental policy. RBC is committed to transparent disclosure and we report annually on our key environmental performance metrics and targets in our Corporate Citizenship Report and Carbon Disclosure Project submissions (responder since 2003 and a signatory since 2007). We are a signatory to the Equator Principles since 2003, and a number of companies in our RBC Global Asset Management business, and BlueBay Asset Management LLP are signatories to the United Nations Principles of Responsible Investment since 2015. RBC Europe Limited is a signatory to the Green Bond Principles and they report annually on green bond underwriting activities.

RBC has a suite of environmental and social risk management policies, which include policies that are enterprise-wide, business-specific, product- and/or service-specific, sector- and/or issue-specific, and that address our business activities. These policies focus on environmental and social risk issues including, but not limited to: site contamination, waste management, land and resource use, biodiversity, water quality and availability, climate change, environmental regulation, human rights, Indigenous Peoples' rights and consultation, and community engagement. Our environmental and social risk policies seek to identify sectors, clients, and business activities exposed to environmental and social risk; apply enhanced due diligence and escalation procedures; and establish requirements to manage, mitigate and monitor environmental and social risk. Business segments and corporate functions are responsible for incorporating environmental and social risk management requirements within their operations.

Additional information about our environmental and social risk policies can be found under "Overview of other risks – Environmental and social risk" beginning on page 90 of our 2017 Management's Discussion and Analysis, which section is incorporated by reference herein.

DESCRIPTION OF CAPITAL STRUCTURE

General Description

The Bank's authorized share capital consists of an unlimited number of common shares without nominal or par value and an unlimited number of first preferred shares and second preferred shares without nominal or par value, issuable in series, which classes may be issued for a maximum consideration of $20 billion and $5 billion, respectively. The following summary of share capital is qualified in its entirety by the Bank's by-laws and the actual terms and conditions of such shares.

Common Shares

The holders of the Bank's common shares are entitled to vote at all meetings of shareholders, except meetings at which only holders of a specified class, other than common shares, or series of shares are entitled to vote. The holders of common shares are entitled to receive dividends as and when declared by the board of directors, subject to the preference of the preferred shares. After payment to the holders of the preferred shares of the amount or amounts to which they may be entitled, and after payment of all outstanding debts, the holders of the common shares will be entitled to receive any remaining property upon liquidation, dissolution or winding-up.

Preferred Shares

First preferred shares may be issued, from time to time, in one or more series with such rights, privileges, restrictions and conditions as the board of directors may determine, subject to the Bank Act and to the Bank's by-laws. Currently, Non-Cumulative First Preferred Shares Series W, AA, AC, AD, AE, AF, AG, AJ, AK, AL, AZ, BB, BD, BF, BH, BI, BJ, BK, BM and C-2 are outstanding. We redeemed all of our issued and

outstanding Non-Cumulative First Preferred Shares Series AB on September 27, 2017 and all of our issued and outstanding Non-Cumulative First Preferred Shares Series C-1 on November 13, 2017.

The Non-Cumulative First Preferred Shares Series W are, subject to the consent of the Superintendent, the requirements of the Bank Act and the approval of the Toronto Stock Exchange, redeemable or exchangeable by the Bank into common shares. The first preferred shares are entitled to preference over any second preferred shares (discussed below) and common shares and over any other shares ranking junior to the first preferred shares with respect to the payment of dividends and in the distribution of property in the event of liquidation, dissolution or winding-up.

Effective January 1, 2013, in accordance with capital adequacy requirements adopted by OSFI, non-common capital instruments issued after January 1, 2013, including first preferred shares, must include terms providing for the full and permanent conversion of such securities into common shares upon the occurrence of certain trigger events relating to financial viability (the Non-Viability Contingent Capital or NVCC requirements) in order to qualify as regulatory capital. As of January 1, 2013, all outstanding capital instruments that do not meet the NVCC requirements will be considered non-qualifying capital instruments and will be phased out beginning January 1, 2013 at the rate of 10 per cent each year for 10 years. The Non-Cumulative First Preferred Shares Series AZ, BB, BD, BF, BH, BI, BJ, BK and BM contain non-viability contingent capital provisions necessary for the shares to qualify as Tier 1 regulatory capital under Basel III and are therefore convertible into common shares upon the occurrence of a non-viability contingent capital trigger event.

We are prohibited by the Bank Act from declaring any dividends on our preferred or common shares when we are, or would be placed as a result of the declaration, in contravention of the capital adequacy and liquidity regulations or any regulatory directives issued under the Bank Act. We may not pay dividends on our common shares or redeem, purchase or otherwise retire common shares or preferred shares at any time without the approval of the holders of outstanding First Preferred Shares unless all dividends to which First Preferred Shareholders are then entitled have been declared and paid or set apart for payment.

On November 2, 2015, in connection with the merger of City National with and into USA Holdco, the Bank issued Non-Cumulative First Preferred Shares Series C-1 and C-2 (the Series C Preferred Shares) in exchange for two series of outstanding City National preferred stock. Currently, only the Non-Cumulative First Preferred Shares Series C-2 remain outstanding.

In the event the Bank fails to pay, declare, or set aside for payment, dividends on any of the Series C Preferred Shares or any other series of preferred shares of the Bank for six quarterly dividend periods, or their equivalent, whether or not consecutive, the number of directors of the board of directors shall be increased by two at the Bank's first annual meeting of shareholders held thereafter. The holders of the Series C Preferred Shares shall have the right, together with holders of any shares that, by their terms, expressly provide that they rank *pari passu* with the Series C Preferred Shares (the Series C Parity Shares) and that have similar voting rights, if any, to elect, as a class together, such additional two members to the Bank's board of directors for a term of one year. Upon the payment, or the declaration and setting aside for payment, in full, of all the cumulative dividends payable for all past dividend periods and continuous noncumulative dividends for at least one year on all outstanding preferred shares of the Bank, the terms of such two directors shall terminate and the number of directors of the Bank's board of directors shall be reduced by two and the voting rights of the holders of the Series C Preferred Shares and the Series C Parity Shares shall cease (subject to the revesting of such voting right in the event of each and every additional failure in the payment of dividends for six quarterly dividend periods).

Second preferred shares may be issued, from time to time, in one or more series with such rights, privileges, restrictions and conditions as the board of directors may determine, subject to the Bank Act and to the Bank's by-laws. There are no second preferred shares currently outstanding. Second preferred shares would rank junior to the first preferred shares. Second preferred shares would be entitled to preference over the common shares and over any other shares ranking junior to the second preferred shares with respect to the payment of dividends and in the distribution of property in the event of our liquidation, dissolution or winding-up.

Except as outlined above with respect to the Series C Preferred Shares and the Series C Parity Shares, holders of the first and second preferred shares are not entitled to any voting rights as a class except as provided under the Bank Act or the Bank's by-laws. Under the Bank Act, the Bank may not create any other class of shares ranking equal with or superior to a particular class of preferred shares, increase the authorized number of, or amend the rights, privileges, restrictions or conditions attaching to such class of preferred shares, without the approval of the holders of that class of preferred shares.

Any approval to be given by the holders of the first and second preferred shares may be given in writing by the holders of not less than all of the outstanding preferred shares of each class or by a resolution carried by the affirmative vote of not less than 66 2/3 per cent of the votes cast at a meeting of holders of each class of preferred shares at which a quorum is represented. A quorum at any meeting of holders of each class of preferred shares is 51 per cent of the shares entitled to vote at such meeting, except that at an adjourned meeting there is no quorum requirement.

Additional information about the Bank's share capital can be found under the "Capital management" section beginning on page 91 of our 2017 Management's Discussion and Analysis, which section is incorporated by reference herein.

Prior Sales

For information about the Bank's issuances of subordinated debentures since October 31, 2016, see the "Capital management" section beginning on page 91 of our 2017 Management's Discussion and Analysis and "Subordinated debentures" in Note 19 on page 181 of our 2017 Annual Consolidated Financial Statements, which section and note are incorporated by reference herein.

Constraints

The Bank Act contains restrictions (which are subject to any orders that may be issued by the Governor in Council) on the issue, transfer, acquisition, beneficial ownership and voting of all shares of a chartered bank. The following is a summary of such restrictions.

Subject to certain exceptions contained in the Bank Act, no person may be a major shareholder of a bank having equity of $12 billion or more (which includes the Bank). A person is a major shareholder if:

(a) the aggregate of the shares of any class of voting shares of the Bank beneficially owned by that person, by entities controlled by that person and by any person associated or acting jointly or in concert with that person is more than 20 per cent of that class of voting shares, or

(b) the aggregate of shares of any class of non-voting shares of the Bank beneficially owned by that person, by entities controlled by that person and by any person associated or acting jointly or in concert with that person is more than 30 per cent of that class of non-voting shares.

Additionally, no person may have a significant interest in any class of shares of a bank (including the Bank) unless the person first receives the approval of the Minister of Finance. For purposes of the Bank Act, a person has a significant interest in a class of shares of a bank where the aggregate of any shares of the class beneficially owned by that person, by entities controlled by that person and by any person associated or acting jointly or in concert with that person exceeds 10 per cent of all of the outstanding shares of that class of shares of such bank.

In addition, the Bank Act prohibits a bank from purchasing or redeeming any of its shares or paying any dividends if there are reasonable grounds for believing the bank is, or the payment would cause the bank to be, in contravention of the Bank Act requirement to maintain, in relation to its operations, adequate capital and appropriate forms of liquidity and to comply with any regulations or directions of the Superintendent in

relation thereto. Under the Bank Act, the Bank cannot redeem or purchase any shares for cancellation unless the prior consent of the Superintendent has been obtained.

Subject to certain exceptions, the Bank Act also prohibits the registration of a transfer or issue of any shares of a Canadian bank to any government or governmental agency of Canada or any province of Canada, or to any government of any foreign country, or any political subdivision, or agency of any foreign country.

Ratings

Our ability to access unsecured funding markets and to engage in certain collateralized business activities on a cost-effective basis is primarily dependent upon maintaining competitive credit ratings. Our credit ratings are largely determined by the rating agencies' assessment of the quality of our earnings, the adequacy of our capital and the effectiveness of our risk management programs. There can be no assurance that our credit ratings and rating outlooks will not be lowered or that ratings agencies will not issue adverse commentaries about us, potentially resulting in adverse consequences for our funding capacity or access to capital markets.

A lowering of our credit ratings may also affect our ability, and the cost, to enter into normal course derivative or hedging transactions and may require us to post additional collateral under certain contracts. However, we estimate, based on periodic reviews of ratings triggers embedded in our existing businesses and of our funding capacity sensitivity, that a minor downgrade would not materially influence our liability composition, funding access, collateral usage and associated costs.

As at November 28, 2017, the Bank received the following solicited ratings from the rating agencies listed below:[3]

		RATING	RANK*
Moody's Investors Service	Long-term Senior Debt	A1	5 of 21
	Short-term Debt	P-1	1 of 4
	Subordinated Debt	Baa1	8 of 21
	NVCC Subordinated Debt	Baa2	9 of 21
	Preferred Shares	Baa3	10 of 21
	NVCC Preferred Shares	Baa3	10 of 21
Standard & Poor's	Long-term Senior Debt	AA-	4 of 22
	Short-term Debt	A-1+	1 of 6
	Subordinated Debt	A	6 of 22
	NVCC Subordinated Debt	A-	7 of 22
	Preferred Shares	BBB+	8 of 22
	NVCC Preferred Shares	BBB	9 of 22
Fitch Ratings	Long-term Senior Debt	AA	3 of 23
	Short-term Debt	F1+	1 of 8
	Subordinated Debt	AA-	4 of 23
	NVCC Subordinated Debt	-	-
	Preferred Shares	-	-
	NVCC Preferred Shares	-	-
DBRS	Long-term Senior Debt	AA	3 of 26
	Short-term Debt	R-1 (high)	1 of 10
	Subordinated Debt	AA (low)	4 of 26
	NVCC Subordinated Debt	A (low)	7 of 26
	Preferred Shares	Pfd-2 (high)	4 of 16
	NVCC Preferred Shares	Pfd-2	5 of 16

* Relative rank of each rating within the organization's overall classification system.

A definition of the categories of each rating as at November 28, 2017 has been obtained from the respective rating agency's website and is outlined in Appendix B, and a more detailed explanation may be obtained from the applicable rating agency.

[3] On August 17, 2016, Kroll Bond Rating Agency (Kroll), which is registered with the SEC as a nationally recognized statistical rating organization, affirmed the senior unsecured long-term debt and deposit ratings of AA (ranking 3 of 22) and the short-term rating of K1+ (ranking 1 of 7) for RBC. Kroll's outlook on all long-term ratings for RBC was revised to negative from stable on August 17, 2016. These ratings were unsolicited and RBC did not participate in the ratings process.

On June 6, 2016, S&P revised our outlook to negative from stable.

On May 10, 2017, Moody's lowered our senior long-term debt rating one notch, along with our large Canadian peers due to Moody's change to Canada's macroeconomic profile. Moody's also affirmed our negative outlook.

On July 31, 2017, DBRS revised our outlook to stable from negative.

On October 27, 2017, Fitch Ratings revised our outlook to stable from negative.

Credit ratings, including stability or provisional ratings (collectively, Ratings) are not recommendations to purchase, sell or hold a financial obligation inasmuch as they do not comment on market price or suitability for a particular investor. Ratings may not reflect the potential impact of all risks on the value of securities. In addition, real or anticipated changes in the rating assigned to a security will generally affect the market value of that security. Ratings are determined by the rating agencies based on criteria established from time to time by them and are subject to revision or withdrawal at any time by the rating organization. Each Rating listed in the chart above should be evaluated independently of any other Rating applicable to our debt and preferred shares. As is customary, RBC pays rating agencies to assign Ratings for the parent company as well as our subsidiaries, and for certain other services.

Additional information about Ratings is provided under "Transactional/positional risk drivers – Liquidity and funding risk – Credit ratings" on pages 79 and 80 of our 2017 Management's Discussion and Analysis, which section is incorporated by reference herein.

MARKET FOR SECURITIES

Trading Price and Volume

The Bank's common shares are listed on the Toronto Stock Exchange (TSX) in Canada, the New York Stock Exchange (NYSE) in the U.S. and the SIX Swiss Exchange (SIX) in Switzerland. The Bank's preferred shares, except the Series C Preferred Shares, are listed on the TSX. The Bank's Depositary Shares (representing interests in the Series C Preferred Shares) are listed on the NYSE.

The following table sets out the price range and trading volumes of the common shares on the TSX and the US Composite for the periods indicated. Prices are based on the reported amounts from the TSX Historical Data Access (TSX HDA) and NYSEConnect.

Month	Common Shares (TSX)			Common Shares (NYSE)		
	High ($)	Low ($)	Volume	High (US$)	Low (US$)	Volume
November 2016	90.16	81.82	51,064,972	67.11	60.92	21,098,940
December 2016	92.29	86.83	50,439,438	69.70	64.92	17,618,857
January 2017	94.90	91.11	45,900,084	72.25	67.85	19,817,072
February 2017	99.90	93.25	51,016,647	76.01	71.37	20,050,086
March 2017	99.39	94.30	67,624,913	74.24	70.36	25,556,628
April 2017	98.26	93.11	76,308,499	73.27	68.19	22,337,175
May 2017	94.85	90.73	94,151,676	70.75	66.66	24,496,786
June 2017	96.20	92.51	71,795,510	73.71	68.56	24,984,938
July 2017	95.83	92.30	34,272,979	75.86	72.18	19,394,568
August 2017	94.88	91.55	41,771,892	75.27	72.61	20,788,421
September 2017	96.98	90.13	49,973,581	77.78	73.10	15,739,032
October 2017	102.15	96.60	41,111,076	80.98	77.35	18,145,910

The following tables provide the price range and trading volumes of the First Preferred Shares on the TSX for the periods indicated. Prices are based on the reported amounts from the TSX HDA.

Month	Series W			Series AA		
	High ($)	Low ($)	Volume	High ($)	Low ($)	Volume
November 2016	25.22	24.30	102,859	25.15	24.85	219,199
December 2016	24.89	24.49	72,862	25.17	24.96	195,446
January 2017	25.15	24.54	136,855	25.30	25.00	185,301
February 2017	25.12	24.84	189,937	25.31	25.10	170,388
March 2017	25.24	24.97	127,262	25.23	25.10	249,630
April 2017	25.50	25.10	118,063	25.49	25.10	164,957
May 2017	25.33	25.02	107,112	25.33	25.11	101,239
June 2017	25.40	25.16	66,193	25.29	25.16	240,843
July 2017	25.35	24.92	136,565	25.40	25.12	66,882
August 2017	25.05	24.52	69,772	25.34	25.11	174,323
September 2017	25.11	24.76	159,558	25.37	25.15	336,663
October 2017	25.34	24.96	91,820	25.66	25.24	118,446

Month	Series AB*			Series AC			Series AD		
	High ($)	Low ($)	Volume	High ($)	Low ($)	Volume	High ($)	Low ($)	Volume
November 2016	25.34	25.03	150,246	25.23	24.92	60,311	25.15	25.00	165,844
December 2016	25.25	25.05	94,441	25.16	24.98	49,592	25.16	24.94	250,107
January 2017	25.38	25.08	138,327	25.33	25.05	37,075	25.34	25.04	71,534
February 2017	25.42	25.20	128,986	25.44	25.17	82,343	25.28	25.11	60,053
March 2017	25.48	25.22	136,589	25.34	25.22	177,717	25.25	25.10	202,699
April 2017	25.74	25.27	104,065	25.52	25.14	141,489	25.48	25.16	122,631
May 2017	25.62	25.24	148,937	25.59	25.22	56,456	25.37	25.17	161,661
June 2017	25.51	25.29	168,971	25.37	25.22	128,802	25.35	25.20	138,328
July 2017	25.50	25.18	196,278	25.46	25.16	539,770	25.43	25.19	102,556
August 2017	25.46	25.07	1,192,423	25.32	25.19	62,191	25.37	25.20	154,821
September 2017	25.11	25.08	736,717	25.37	25.20	483,223	25.43	25.18	458,346
October 2017	-	-	-	25.54	25.20	79,154	25.74	25.33	61,207

* All issued and outstanding Non-Cumulative First Preferred Shares Series AB were redeemed on September 27, 2017.

	Series AE			Series AF			Series AG		
Month	**High ($)**	**Low ($)**	**Volume**	**High ($)**	**Low ($)**	**Volume**	**High ($)**	**Low ($)**	**Volume**
November 2016	25.13	24.88	119,715	25.13	24.97	120,604	25.14	24.72	192,568
December 2016	25.15	24.97	66,387	25.14	24.97	108,971	25.14	24.90	212,451
January 2017	25.33	25.06	96,170	25.31	25.00	112,671	25.33	25.02	175,286
February 2017	25.31	25.10	98,663	25.25	25.10	100,383	25.26	25.07	136,646
March 2017	25.24	25.12	159,902	25.25	25.07	146,241	25.26	25.12	521,100
April 2017	25.45	25.14	134,581	25.45	25.10	89,276	25.41	25.10	198,318
May 2017	25.51	25.17	361,123	25.50	25.15	87,901	25.36	25.04	81,867
June 2017	25.29	25.20	127,012	25.27	25.16	473,336	25.28	25.20	66,471
July 2017	25.40	25.15	66,599	25.36	25.07	100,347	25.40	25.11	56,148
August 2017	25.32	25.18	95,717	25.28	25.12	81,632	25.30	25.16	64,414
September 2017	25.40	25.18	238,458	25.36	25.17	323,804	25.35	25.17	212,803
October 2017	25.59	25.23	101,934	25.64	25.28	51,452	25.75	25.30	88,886

	Series AJ			Series AK			Series AL		
Month	**High ($)**	**Low ($)**	**Volume**	**High ($)**	**Low ($)**	**Volume**	**High ($)**	**Low ($)**	**Volume**
November 2016	24.60	24.00	383,514	23.68	23.04	12,445	25.50	25.11	204,603
December 2016	24.95	24.00	134,003	23.47	22.99	40,151	25.71	25.11	166,515
January 2017	24.98	24.57	109,500	24.04	23.35	26,181	26.18	25.15	88,875
February 2017	24.99	24.40	174,814	24.00	23.75	10,669	25.64	25.18	71,991
March 2017	24.80	24.41	244,056	23.97	23.77	47,628	25.58	25.20	62,131
April 2017	25.00	24.61	273,646	24.00	23.88	13,515	25.85	25.34	121,304
May 2017	24.98	24.45	327,241	24.47	23.90	16,625	25.68	25.31	98,710
June 2017	24.98	24.50	148,351	24.45	24.00	37,200	25.90	25.30	75,399
July 2017	24.90	24.60	323,077	24.58	24.39	25,400	25.46	25.20	225,550
August 2017	24.89	24.62	127,584	24.55	24.25	42,950	25.30	25.16	562,593
September 2017	25.01	24.68	65,548	24.81	24.36	35,480	25.47	25.22	254,536
October 2017	25.17	24.83	386,123	24.84	24.55	23,625	25.77	25.35	72,998

	Series AZ			Series BB			Series BD		
Month	**High ($)**	**Low ($)**	**Volume**	**High ($)**	**Low ($)**	**Volume**	**High ($)**	**Low ($)**	**Volume**
November 2016	19.54	18.73	613,940	19.50	18.75	623,344	21.45	20.04	614,775
December 2016	19.64	18.79	840,265	19.73	18.76	656,825	21.56	20.30	691,194
January 2017	21.18	19.58	796,445	21.37	19.64	678,847	23.19	21.50	488,229
February 2017	22.15	20.92	541,081	22.14	21.06	540,352	23.55	22.63	398,778
March 2017	22.69	21.87	563,576	22.69	21.84	524,599	23.79	22.93	554,671
April 2017	22.79	21.90	619,637	22.91	21.82	320,403	23.98	23.00	450,834
May 2017	22.06	20.89	255,146	21.97	20.80	354,072	23.16	22.14	300,241
June 2017	21.85	20.55	753,759	21.85	20.54	617,809	23.73	22.01	393,016
July 2017	22.31	21.75	640,151	22.40	21.81	460,396	23.98	23.55	265,700
August 2017	22.34	21.34	256,458	22.40	21.43	212,794	23.94	23.02	160,062
September 2017	22.50	21.79	534,589	22.57	21.82	440,458	24.23	23.43	197,688
October 2017	24.36	22.45	725,024	24.22	22.57	260,452	25.00	24.00	417,663

Month	Series BF			Series BH			Series BI		
	High ($)	Low ($)	Volume	High ($)	Low ($)	Volume	High ($)	Low ($)	Volume
November 2016	21.15	19.76	208,021	25.15	24.23	75,659	25.12	24.18	168,298
December 2016	21.50	19.95	180,257	24.70	24.15	40,534	24.75	24.10	130,084
January 2017	22.98	21.45	330,904	25.01	24.41	83,019	25.00	24.45	193,232
February 2017	23.42	22.67	176,112	25.25	24.86	56,625	25.10	24.67	140,607
March 2017	23.58	22.83	265,625	25.60	24.96	56,818	25.39	25.00	110,656
April 2017	23.50	22.59	321,195	25.75	25.02	67,184	25.56	25.12	117,320
May 2017	22.81	21.60	157,806	26.00	25.36	90,856	25.49	25.15	100,089
June 2017	23.25	21.43	169,211	25.99	25.52	81,299	25.70	25.32	46,017
July 2017	23.45	23.12	217,012	25.64	25.23	30,070	25.51	25.08	57,122
August 2017	23.49	22.68	77,211	25.79	25.14	37,176	25.47	25.00	53,524
September 2017	23.85	23.04	214,047	25.43	25.13	25,470	25.22	24.94	84,154
October 2017	24.83	23.85	195,538	25.72	25.30	135,587	25.60	25.11	127,624

Month	Series BJ			Series BK			Series BM		
	High ($)	Low ($)	Volume	High ($)	Low ($)	Volume	High ($)	Low ($)	Volume
November 2016	26.13	24.70	121,306	26.72	25.90	903,276	26.85	26.02	374,725
December 2016	25.54	24.82	84,008	27.15	26.34	667,770	27.40	26.35	212,541
January 2017	25.73	25.34	60,638	27.14	26.61	756,725	27.44	26.74	517,127
February 2017	26.07	25.45	61,513	27.04	26.62	485,510	27.22	26.90	184,272
March 2017	26.05	25.63	42,428	27.20	26.90	483,057	27.44	26.95	289,628
April 2017	26.39	25.90	72,935	27.55	27.04	582,407	27.60	27.04	826,490
May 2017	26.20	25.98	114,323	27.14	26.80	335,426	27.25	26.80	736,086
June 2017	26.43	26.20	38,164	27.09	26.75	483,342	27.14	26.84	676,528
July 2017	26.27	25.51	64,616	27.00	26.60	675,036	27.10	26.72	376,027
August 2017	25.80	25.34	42,536	26.82	26.60	634,874	26.85	26.66	763,447
September 2017	25.70	25.25	60,403	26.85	26.55	387,071	26.86	26.64	1,010,445
October 2017	25.73	25.31	63,519	27.05	26.50	1,070,702	27.14	26.69	744,743

The following table provides the price range and trading volumes of the Depositary Shares on the NYSE for the period indicated. Prices are based on the reported amounts from NYSEConnect.

Month	Series C-1*			Series C-2		
	High (US$)	Low (US$)	Volume	High (US$)	Low (US$)	Volume
November 2016	25.95	25.50	103,856	30.00	27.55	27,845
December 2016	25.66	25.20	62,175	28.01	27.52	10,235
January 2017	25.74	25.17	56,819	29.05	27.65	17,289
February 2017	25.84	25.08	108,720	28.63	27.98	27,516
March 2017	25.82	24.73	103,716	29.70	28.25	13,992
April 2017	25.80	25.55	47,293	30.45	29.06	4,506
May 2017	25.79	25.15	83,692	29.37	28.20	30,888
June 2017	25.69	25.50	60,640	29.50	28.62	11,183
July 2017	25.79	25.65	32,452	30.04	29.35	4,822
August 2017	25.79	25.00	65,986	30.59	29.00	9,560
September 2017	25.34	25.24	28,289	29.99	29.20	5,024
October 2017	25.40	25.28	132,330	30.00	29.00	7,573

* All issued and outstanding Non-Cumulative First Preferred Shares Series C-1 were redeemed on November 13, 2017.

DIVIDENDS

The Bank has had an uninterrupted history of paying dividends on its common shares and on each of its outstanding series of first preferred shares. Information about the Bank's dividends paid or payable per share on the common shares and each outstanding series of first preferred shares in each of the two most recently completed years appears under the heading "Selected share data" in the Capital management section on page 98 of our 2017 Management's Discussion and Analysis, which section is incorporated by reference herein. Information about restrictions on the payment of dividends appears under the heading "Restrictions on the payment of dividends" in Note 21 on page 183 of our 2017 Annual Consolidated Financial Statements, which note is incorporated by reference herein.

The declaration amount and payment of future dividends will be subject to the discretion of the Bank's board of directors, and will be dependent upon the Bank's results of operations, financial condition, cash requirements and future regulatory restrictions on the payment of dividends and other factors deemed relevant by the board of directors. Information about our dividends and our dividend payout ratio (common share dividends as a percentage of net income less preferred share dividends) is provided under the "Capital management" section beginning on page 97 of our 2017 Management's Discussion and Analysis, which section is incorporated by reference herein.

DIRECTORS AND EXECUTIVE OFFICERS

Directors

The following are the Bank's directors as at November 28, 2017:

Name and Year Elected	Province/State and Country of Residence	Occupation
Andrew A. Chisholm (2016)	Ontario, CAN	Corporate Director
Jacynthe Côté (2014)	Quebec, CAN	Corporate Director
Toos N. Daruvala (2015)	New York, U.S.A.	Co-Chief Executive Officer, McKinsey Investment Office
David F. Denison (2012)	Ontario, CAN	Corporate Director
Alice D. Laberge (2005)	British Columbia, CAN	Corporate Director
Michael H. McCain (2005)	Ontario, CAN	President and Chief Executive Officer, Maple Leaf Foods Inc.
David I. McKay (2014)	Ontario, CAN	President and Chief Executive Officer, Royal Bank of Canada
Heather Munroe-Blum (2011)	Quebec, CAN	Professor of Medicine and Principal Emerita, McGill University
Thomas A. Renyi (2013)	Maine, U.S.A.	Corporate Director
Kathleen P. Taylor (2001)	Ontario, CAN	Chair of the Board, Royal Bank of Canada
Bridget A. van Kralingen (2011)	New York, U.S.A.	Senior Vice-President, IBM Industry Platforms, International Business Machines Corporation (IBM)

Name and Year Elected	Province/State and Country of Residence	Occupation
Thierry Vandal (2015)	New York, U.S.A.	President, Axium Infrastructure US Inc.
Jeffery W. Yabuki (2017)	Wisconsin, U.S.A.	President and Chief Executive Officer, Fiserv, Inc.

Directors are elected annually and hold office until the next annual meeting of shareholders. Since November 1, 2012, the directors have held the principal occupations described above, except for the following:

Mr. Andrew A. Chisholm was an Advisory Director at Goldman Sachs & Co. prior to his retirement in April 2016 and Senior Strategy Officer at Goldman Sachs & Co. prior to 2014.

Ms. Jacynthe Côté was President and Chief Executive Officer of Rio Tinto Alcan prior to September 2014.

Mr. Toos N. Daruvala was director and senior partner prior to December 2015 and Director Emeritus and Senior Advisor prior to January 2017 at McKinsey & Company.

Mr. David I. McKay was President of Royal Bank of Canada prior to August 2014 and Group Head, Personal & Commercial Banking of Royal Bank of Canada prior to March 2014.

Dr. Heather Munroe-Blum was Principal and Vice-Chancellor of McGill University prior to June 2013.

Ms. Kathleen P. Taylor was President and Chief Executive Officer of Four Seasons Hotels and Resorts prior to January 2013.

Ms. Bridget A. van Kralingen was Senior Vice-President, IBM Global Business Services, IBM from January 2012 to August 2016.

Mr. Thierry Vandal was President and Chief Executive Officer of Hydro-Québec prior to May 2015.

Committees of the Board

Audit Committee: D.F. Denison (Chair), A.A. Chisholm, J. Côté, M.H. McCain, T. Vandal and J.W. Yabuki.

Risk Committee: T.N. Daruvala (Chair), D.F. Denison, H. Munroe-Blum, A.D. Laberge, T.A. Renyi and B.A. van Kralingen.

Governance Committee: H. Munroe-Blum (Chair), A.A. Chisholm, J. Côté, T.N. Daruvala, T.A. Renyi and J. W. Yabuki.

Human Resources Committee: A.D. Laberge (Chair), M.H. McCain, H. Munroe-Blum, B.A. van Kralingen and T. Vandal.

Executive Officers

The following are the Bank's executive officers as at November 28, 2017:

Name	Province and Country of Residence	Title
Rod Bolger	Ontario, CAN	Chief Financial Officer
Michael Dobbins	Ontario, CAN	Chief Strategy & Corporate Development Officer
Helena Gottschling	Ontario, CAN	Chief Human Resources Officer
Douglas Guzman	Ontario, CAN	Group Head, Wealth Management & Insurance
Mark Hughes	Ontario, CAN	Group Chief Risk Officer
Douglas McGregor	Ontario, CAN	Group Head, Capital Markets and Investor & Treasury Services
David I. McKay	Ontario, CAN	President & Chief Executive Officer
Neil McLaughlin	Ontario, CAN	Group Head, Personal & Commercial Banking
Bruce Ross	Ontario, CAN	Group Head, Technology and Operations
Jennifer Tory	Ontario, CAN	Chief Administrative Officer

Since or prior to November 1, 2012, as applicable, the executive officers have held the positions described below:

Mr. Rod Bolger was appointed to Group Executive in his role as Chief Financial Officer effective December 1, 2016. Prior to his current role, Mr. Bolger was Executive Vice President, Finance and Controller since 2011.

Mr. Michael Dobbins was appointed to Group Executive in his role as Head, Strategy and Corporate Development effective November 1, 2016. Prior to his current role, Mr. Dobbins was Executive Vice President, Personal Financing Products Canada & U.S. since 2010.

Ms. Helena Gottschling was appointed to Group Executive in her role as Chief Human Resources Officer effective June 1, 2017. Prior to her current role, Ms. Gottschling was Senior Vice President, Human Resources since January 2008.

Mr. Douglas Guzman was appointed to Group Executive in his role as Group Head, Wealth Management & Insurance effective November 1, 2015. Prior to his current role, Mr. Guzman was Managing Director and Head Global Investment Banking, Capital Markets since 2006.

Mr. Mark Hughes was appointed to Group Executive in his role as Chief Risk Officer of Royal Bank of Canada effective January 2014. Prior to his current role, Mr. Hughes was Executive Vice-President and Chief Operating Officer for RBC Capital Markets since November 2008.

Mr. Douglas McGregor was appointed to Group Executive in his role as Co-Group Head, Capital Markets in November 2008 and effective October 31, 2012 was appointed Co-Group Head, Capital Markets and Investor & Treasury Services. Mr. McGregor assumed full responsibilities for these businesses effective December 4, 2013.

Mr. David I. McKay was appointed President of Royal Bank of Canada effective in February 2014 and Chief Executive Officer effective in August 2014. Mr. McKay was appointed to Group Executive in his role as Group Head, Canadian Banking in April 2008 and effective October 31, 2012 was appointed Group Head, Personal & Commercial Banking.

Mr. Neil McLaughlin was appointed to Group Executive in his role as Group Head, Personal & Commercial Banking effective May 2017. Prior to his current role, Mr. McLaughlin was Executive Vice President, Business Financial Services, Personal & Commercial Banking since October 2014.

Mr. Bruce Ross was appointed to Group Executive in his role as Group Head, Technology and Operations effective in January 2014. Prior to joining RBC, Mr. Ross was with IBM, holding a series of progressively more senior positions.

Ms. Jennifer Tory was appointed Chief Administrative Officer effective May 2017. Ms. Tory was appointed to Group Executive in her role as Group Head, Personal & Commercial Banking effective April 2014. Prior to joining Group Executive, Ms. Tory was Regional President, Greater Toronto Region since November 2005.

Ownership of Securities

To our knowledge, as at October 31, 2017, the directors and executive officers, as a group, beneficially own or exercise control or direction over less than one per cent (1%) of our common and preferred shares. None of our directors or executive officers holds shares of our subsidiaries except where required for qualification as a director of a subsidiary.

Cease Trade Orders, Bankruptcies, Penalties or Sanctions

To the best of our knowledge, no director or executive officer,

(a) is, as at November 28, 2017 or has been, within the 10 years before, a director, chief executive officer or chief financial officer of any company (including our company), that while that person was acting in that capacity,

  (i) was the subject of a cease trade or similar order or an order that denied the relevant company access to any exemption under Canadian securities legislation,[4] for a period of more than 30 consecutive days, or

  (ii) was subject to an event that resulted, after the director or executive officer ceased to be a director, chief executive officer or chief financial officer, in the company being the subject of a cease trade or similar order or an order that denied the relevant company access to any exemption under Canadian securities legislation,[4] for a period of more than 30 consecutive days, or

[4] National Instrument 14-101 restricts the meaning of "securities legislation" to Canadian provincial and territorial legislation and "securities regulatory authority" to Canadian provincial and territorial securities regulatory authorities.

(b) is, as at November 28, 2017 or has been, within the 10 years before, a director or executive officer of any company (including our company), that while that person was acting in that capacity or within a year of that person ceasing to act in that capacity, became bankrupt, made a proposal under any legislation relating to bankruptcy or insolvency or was subject to or instituted any proceedings, arrangement or compromise with creditors or had a receiver, receiver manager or trustee appointed to hold its assets, or

(c) has, within the 10 years before November 28, 2017, become bankrupt, made a proposal under any legislation relating to bankruptcy or insolvency, or become subject to or instituted any proceedings, arrangement or compromise with creditors, or had a receiver, receiver manager or trustee appointed to hold the assets of the director or executive officer.

To the best of our knowledge, none of our directors or executive officers have been subject to (a) any penalties or sanctions imposed by a court relating to Canadian securities legislation[5] or by a Canadian securities regulatory authority[5] or has entered into a settlement agreement with a Canadian securities regulatory authority,[5] or (b) any other penalties or sanctions imposed by a court or regulatory body that would likely be considered important to a reasonable investor in making an investment decision.

Conflicts of Interest

To the best of our knowledge, no director or executive officer has an existing or potential material conflict of interest with us or any of our subsidiaries.

LEGAL PROCEEDINGS AND REGULATORY ACTIONS

In the ordinary course of our business, we are routinely involved in or parties to various ongoing, pending and threatened legal actions and proceedings.

A description of certain legal proceedings to which we are a party appears in Note 26 “Legal and regulatory matters” beginning on page 193 of our 2017 Annual Consolidated Financial Statements, which note is incorporated by reference herein.

Since October 31, 2016, (a) there have been no penalties or sanctions imposed against us by a court relating to Canadian securities legislation[5] or by a Canadian securities regulatory authority[5] which are individually or in the aggregate material to the Bank, (b) there have been no other penalties or sanctions imposed by a court or regulatory body against us that would likely be considered important to a reasonable investor in making an investment decision, and (c) we have not entered into any settlement agreements with a court relating to Canadian securities legislation[5] or with a Canadian securities regulatory authority,[5] except that three subsidiaries in our Wealth Management business – RBC Dominion Securities Inc., Royal Mutual Funds Inc. and RBC Phillips, Hager & North Investment Counsel Inc. (the Registrants) – entered into a no-contest settlement agreement with, and made a voluntary payment of $925,000 (and $50,000 towards costs) to, the Ontario Securities Commission (the OSC) in connection with alleged control and supervision inadequacies relating to fees charged to clients. The Registrants detected and self-reported these control and supervision inadequacies to the OSC, corrected them, and agreed to pay more than $21.8 million to compensate clients and former clients who were impacted. The no-contest settlement agreement was approved by the OSC pursuant to an order dated June 21, 2017. This settlement was not material to RBC.

[5] National Instrument 14-101 restricts the meaning of “securities legislation” to Canadian provincial and territorial legislation and “securities regulatory authority” to Canadian provincial and territorial securities regulatory authorities.

INTEREST OF MANAGEMENT AND OTHERS IN MATERIAL TRANSACTIONS

To the best of our knowledge, there were no directors or executive officers or any associate or affiliate of a director or executive officer with a material interest in any transaction within the three most recently completed financial years or during the current financial year that has materially affected us or is reasonably expected to materially affect us.

TRANSFER AGENT AND REGISTRAR

For Canada and the Caribbean, Computershare Trust Company of Canada is the transfer agent and registrar for our common shares and our preferred shares. Their principal offices are in the cities of: Montreal, QC; Toronto, ON; Calgary, AB and Vancouver, BC. In the U.S., Computershare Trust Company, N.A. is the co-transfer agent located in Canton, Massachusetts. In the U.K., Computershare Investor Services PLC is the co-transfer agent located in Bristol, England.

EXPERTS

PricewaterhouseCoopers LLP (PwC), Chartered Professional Accountants, prepared the Report of Independent Registered Public Accounting Firm in respect of our audited Annual Consolidated Financial Statements, which comprise the consolidated balance sheets as at October 31, 2017 and October 31, 2016 and the consolidated statements of income, comprehensive income, changes in equity, and cash flows for the years then ended October 31, 2017 and the related notes, which comprise a summary of significant accounting policies and other explanatory information and in respect of our internal control over financial reporting as at October 31, 2017. PwC has advised that they are independent with respect to the Bank within the meaning of the Rules of Professional Conduct of the Chartered Professional Accountants of Ontario and the rules of the SEC and the requirements of the Public Company Accounting Oversight Board.

AUDIT COMMITTEE

Audit Committee Mandate

The mandate of the Audit Committee is attached as Appendix C to this Annual Information Form.

Composition of Audit Committee

The Audit Committee consists of David F. Denison (Chair), Andrew A. Chisholm, Jacynthe Côté, Michael H. McCain, Thierry Vandal and Jeffery W. Yabuki. The board has determined that each member of the Audit Committee is independent under our Director Independence Policy, which incorporates the independence standards under applicable Canadian and U.S. laws and regulations and none receives, directly or indirectly, any compensation from us other than ordinary course compensation for service as a member of the board of directors and its committees or of a board of directors of one or more of our subsidiaries. All members of the Audit Committee are financially literate within the meaning of *National Instrument 52-110 – Audit Committees* and of the Corporate Governance Standards of the NYSE. In considering the criteria for determining financial literacy, the board of directors looks at the ability of a director to read and understand a balance sheet, an income statement and a cash flow statement of a financial institution. The board has determined that each of David F. Denison, Jacynthe Côté, Thierry Vandal and Jeffery W. Yabuki qualifies as an “audit committee financial expert” as defined by the SEC.

Relevant Education and Experience of Audit Committee Members

In addition to each member's general business experience, the education and experience of each Audit Committee member that is relevant to the performance of his or her responsibilities as an Audit Committee member is as follows:

Andrew A. Chisholm, B.Comm., M.B.A. earned his Bachelor of Commerce from Queen's University and his M.B.A. from the University of Western Ontario. Mr. Chisholm served in various leadership capacities with Goldman Sachs & Co. during his 31 years with the firm. He also served as an Advisory Director of the firm from 2014 until his retirement in April 2016. Mr. Chisholm has been a member of our Audit Committee since July 2016.

Jacynthe Côté, B.Sc., earned her Bachelor of Science degree from Laval University. Ms. Côté was President and Chief Executive Officer of Rio Tinto Alcan from 2009 to 2014 and was President and Chief Executive Officer of Rio Tinto Alcan's Primary Metal business group, following Rio Tinto's acquisition of Alcan Inc. in October 2007. Ms. Côté has been a member of our Audit Committee since October 2014.

David F. Denison, O.C., B.Sc., B.Ed., FCPA, FCA, earned his bachelor degrees in mathematics and education from the University of Toronto and is a Chartered Professional Accountant, Chartered Accountant and a Fellow of CPA Ontario. Mr. Denison was President and Chief Executive Officer of the Canada Pension Plan Investment Board from 2005 to 2012, is a director of Allison Transmission Holdings, Inc. and BCE Inc. and is also a director and Chair of the Board of Hydro One Limited. Mr. Denison has been a member of our Audit Committee since August 2012.

Michael H. McCain, B.B.A., earned his Bachelor of Business Administration (Honours) degree from University of Western Ontario. Mr. McCain is President and Chief Executive Officer of Maple Leaf Foods Inc. (a food processing company) and President and a director of McCain Capital Inc. Mr. McCain serves as a director of Maple Leaf Foods Inc. Mr. McCain has been a member of our Audit Committee since April 2017.

Thierry Vandal, B.Eng., M.B.A., earned his engineering degree from École Polytechnique de Montréal and his M.B.A. from École des Hautes Études Commerciales Montréal. Mr. Vandal is President of Axium Infrastructure U.S. Inc., and from 2005 to May 2015 served as President and Chief Executive Officer of Hydro-Québec. Mr. Vandal is also a director of Veresen Inc. Mr. Vandal has been a member of our Audit Committee since July 2015.

Jeffery W. Yabuki, B.S., earned his Bachelor of Science in Business Administration and Accounting from California State University, Los Angeles, and was previously licensed as a Certified Public Accountant. Mr. Yabuki is President and Chief Executive Officer of Fiserv, Inc. and from 1999 to 2005 held various senior positions at H&R Block, Inc., including the position of Executive Vice President and Chief Operating Officer. Mr. Yabuki serves as a director of Fiserv, Inc.

Pre-Approval Policies and Procedures

The Audit Committee has adopted a policy that requires pre-approval by the Audit Committee of audit services and other services within permissible categories of non-audit services. The policy prohibits us from engaging the auditor for "prohibited" categories of non-audit services. A copy of our Pre-Approval Policies and Procedures can be found in Appendix D.

Independent Registered Public Accounting Firm Fees

Following a tender process, PwC was appointed our auditor by the Board of Directors on January 29, 2016, which appointment was approved by the Bank's shareholders at the Annual and Special Meeting of Common Shareholders held on April 6, 2016. Fees relating to the years ended October 31, 2017 and October 31, 2016 to PwC and its affiliates were $40.1 million and $35.7 million respectively and are detailed below. The nature of each category of fees is also described below.

	Year ended October 31, 2017 ($Millions)			**Year ended October 31, 2016**[1] ($Millions)		
	Bank and Subsidiaries	**Mutual Funds**[2]	**Total**	**Bank and Subsidiaries**	**Mutual Funds**[2]	**Total**
Audit fees	30.1	2.0	**32.1**	28.0	1.7	**29.7**
Audit-related fees	6.6	-	**6.6**	4.7	-	**4.7**
Tax fees	0.1	0.3	**0.4**	0.1	0.3	**0.4**
All other fees	0.5	0.5	**1.0**	0.5	0.4	**0.9**
Total fees	37.3	2.8	**40.1**	33.3	2.4	**35.7**

[1] The 2016 amounts have been updated to reflect $4.5 million of additional audit and audit-related fees which relate to the year ended October 31, 2016.
[2] The Mutual Funds category includes fees paid for professional services provided by PwC for certain mutual funds managed by subsidiaries of the Bank. In addition to other administrative costs, the subsidiaries are responsible for the auditors' fees for professional services rendered in connection with the annual audit, statutory and regulatory filings and other services for the Mutual Funds in return for a fixed administration fee.

Audit Fees

Audit fees were paid for professional services rendered by the auditor for the integrated audit of the Annual Consolidated Financial Statements of the Bank, including its audit of the effectiveness of our internal control over financial reporting, and any financial statement audits of our subsidiaries. In addition, audit fees were paid for services that generally only the Bank's independent auditor reasonably can provide including services provided in connection with statutory and regulatory filings related to prospectuses and other offering documents.

Audit-Related Fees

Audit-related fees were paid for assurance and related services that are reasonably related to the performance of the audit or review of our Annual Consolidated Financial Statements and are not reported under the audit fees item above. These services consisted of:

- special attest services traditionally performed by the Bank's independent auditor;
- reporting on the effectiveness of internal controls as required by contract or for business reasons;
- the audits of the financial statements of our various pension plans; and
- the audits of various trusts and limited partnerships.

Tax Fees

Tax fees were paid for tax compliance services including the review of original and amended tax returns and assistance in completing routine tax schedules and calculations.

All Other Fees

These services consist of French translation of financial statements and related continuous disclosure and other public documents containing financial information for us and certain of our subsidiaries as well as accounting and other research publications.

ADDITIONAL INFORMATION

Additional information, including directors' and officers' remuneration and indebtedness, principal holders of our securities, and securities authorized for issuance under equity compensation plans, where applicable, is contained in the Bank's Management Proxy Circular for the most recent annual meeting of shareholders. Additional financial information is provided in our Annual Consolidated Financial Statements and Management's Discussion and Analysis which are included in our 2017 Annual Report.

Copies of this Annual Information Form, our 2017 Annual Report and Management Proxy Circular in respect of the most recent annual meeting of shareholders may be obtained from Investor Relations at 155 Wellington Street West, Toronto, Ontario, M5W 3K7 (416-955-7806).

This Annual Information Form, the Annual Consolidated Financial Statements and Management's Discussion and Analysis for the year ended October 31, 2017, as well as additional information about us may be found on our website at rbc.com, on SEDAR, the Canadian Securities Administrators' website, at sedar.com, and on the EDGAR section of the SEC's website at sec.gov.

Information contained in or otherwise accessible through the websites mentioned in this Annual Information Form does not form a part of this Annual Information Form. All references in this Annual Information Form to websites are inactive textual references and are for your information only.

TRADEMARKS

Trademarks used in this annual information form include the LION & GLOBE Symbol, ROYAL BANK OF CANADA, RBC and RBC CAPITAL MARKETS, which are trademarks of Royal Bank of Canada used by Royal Bank of Canada and/or by its subsidiaries under license. All other trademarks mentioned in this annual information form, which are not the property of Royal Bank of Canada, are owned by their respective holders.

APPENDIX A – PRINCIPAL SUBSIDIARIES

Principal subsidiaries (1)	Principal office address (2)	Carrying value of voting shares owned by the Bank (3)
Royal Bank Holding Inc.	Toronto, Ontario, Canada	56,397
Royal Mutual Funds Inc.	Toronto, Ontario, Canada	
RBC Insurance Holdings Inc.	Mississauga, Ontario, Canada	
RBC Insurance Company of Canada	Mississauga, Ontario, Canada	
RBC Life Insurance Company	Mississauga, Ontario, Canada	
RBC Direct Investing Inc.	Toronto, Ontario, Canada	
RBC Phillips, Hager & North Investment Counsel Inc.	Toronto, Ontario, Canada	
R.B.C. Holdings (Bahamas) Limited	Nassau, New Providence, Bahamas	
RBC Caribbean Investments Limited	George Town, Grand Cayman, Cayman Islands	
Royal Bank of Canada Insurance Company Ltd.	St. Michael, Barbados	
Investment Holdings (Cayman) Limited	George Town, Grand Cayman, Cayman Islands	
RBC (Barbados) Funding Ltd.	St. Michael, Barbados	
Capital Funding Alberta Limited	Calgary, Alberta, Canada	
RBC Global Asset Management Inc.	Toronto, Ontario, Canada	
RBC Investor Services Trust	Toronto, Ontario, Canada	
RBC Investor Services Bank S.A.	Esch-sur-Alzette, Luxembourg	
RBC (Barbados) Trading Bank Corporation	St. James, Barbados	
BlueBay Asset Management (Services) Ltd	London, England	
RBC USA Holdco Corporation (2)	New York, New York, U.S.	19,080
RBC Capital Markets, LLC (2)	New York, New York, U.S.	
RBC Bank (Georgia), National Association (2)	Atlanta, Georgia, U.S.	
City National Bank	Los Angeles, California, U.S.	
RBC Global Asset Management (U.S.) Inc.	Minneapolis, Minnesota, U.S.	
RBC Dominion Securities Limited	Toronto, Ontario, Canada	8,378
RBC Dominion Securities Inc.	Toronto, Ontario, Canada	
RBC Finance S.à r.l./B.V. (2)	Amsterdam, Netherlands	3,200
RBC Holdings (Luxembourg) S.A R.L.	Luxembourg, Luxembourg	
RBC Holdings (Channel Islands) Limited	Jersey, Channel Islands	
Royal Bank of Canada (Channel Islands) Limited	Guernsey, Channel Islands	
RBC Holdings (Barbados) Ltd.	St. Michael, Barbados	3,171
RBC Financial (Caribbean) Limited	Port of Spain, Trinidad and Tobago	
RBC Europe Limited	London, England	1,820
RBC Capital Trust	Toronto, Ontario, Canada	1,624
Royal Bank Mortgage Corporation	Toronto, Ontario, Canada	1,173
The Royal Trust Company	Montreal, Quebec, Canada	692
Royal Trust Corporation of Canada	Toronto, Ontario, Canada	229
RBC Covered Bond Guarantor Limited Partnership	Toronto, Ontario, Canada	154

(1) The Bank directly or indirectly controls each subsidiary.

(2) Each subsidiary is incorporated or organized under the laws of the state or country in which the principal office is situated, except for RBC USA Holdco Corporation which is incorporated under the laws of the State of Delaware, U.S., RBC Capital Markets, LLC, which is organized under the laws of the State of Minnesota, U.S. RBC Finance S.à r.l. / B.V. is a company incorporated in the Netherlands with its official seat in Amsterdam, the Netherlands, and place of effective management, central administration, and principal establishment in Luxembourg, Grand Duchy of Luxembourg. RBC Bank (Georgia), National Association is a national banking association organized under the laws of the U.S. with its main office in Atlanta, Georgia and management offices in Raleigh, North Carolina.

(3) The carrying value (in millions of dollars) of voting shares is stated as the Bank's equity in such investments.

APPENDIX B – EXPLANATION OF RATINGS AND OUTLOOK

Institution	Rating	Outlook
Moody's	● Obligations rated 'Aa' are judged to have high intrinsic, or standalone, financial strength, and subject to very low credit risk. ● Obligations rated 'A' are judged to be upper-medium grade intrinsic, or standalone, financial strength, subject to lower credit risk. ● Issuers assessed Baa are judged to have medium-grade intrinsic, or standalone, financial strength, subject to moderate credit risk and, as such, may possess certain speculative credit elements absent any possibility of extraordinary support from an affiliate or a government. ● Issuers (or supporting institutions) rated Prime-1 have a superior ability to repay short-term debt obligations. ● Moody's appends numerical modifiers 1, 2, and 3 to each generic rating classification from Aa through Caa. The modifier 1 indicates that the obligation ranks in the higher end of its generic rating category; the modifier 2 indicates a mid-range ranking; and the modifier 3 indicates a ranking in the lower end of that generic rating category.	A rating outlook is an opinion regarding the likely direction of an issuer's rating over the medium term.
Standard & Poor's	● An obligation rated 'AA' differs from the highest-rated obligations only to a small degree. The obligor's capacity to meet its financial commitment on the obligation is very strong. ● An obligation rated 'A' has strong capacity to meet its financial commitments but is somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions than obligations in higher-rated categories. ● The addition of a plus or minus sign shows the relative standing within the major rating categories. ● An obligation rated 'BBB' exhibits adequate protection parameters. However, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity of the obligor to meet its financial commitment on the obligation. ● A short term obligation rated 'A-1+' has extremely strong capacity to meet its financial commitments.	A rating outlook assesses the potential direction of a long-term credit rating over the intermediate term (typically six months to two years) and is not necessarily a precursor of a rating change.
Fitch	● 'AA' ratings denote expectations of very low credit risk and are judged to be of very high credit quality. They indicate very strong capacity for payment of financial commitments. This capacity is not significantly vulnerable to foreseeable events. ● The modifiers "+" or "-" may be appended to a rating to denote relative status within major rating categories. ● An obligation rated 'F1' has the highest short-term credit quality. It indicates the strongest intrinsic capacity for timely payment of financial commitments. The modifier '+' denotes any exceptionally strong credit feature.	Rating Outlooks indicate the direction a rating is likely to move over a one- to two-year period and does not imply that a rating change is inevitable.

Institution	Rating	Outlook
DBRS	● An obligation rated 'AA' is of superior credit quality. The capacity for the payment of financial obligations is considered high and it is unlikely to be significantly vulnerable to future events. In many cases they differ from obligations rated 'AAA' only to a small degree. An obligation rated A is of good credit quality, but of lesser credit quality than AA, and has a substantial capacity for the payment of financial obligations. ● Preferred shares rated Pfd-2 are of satisfactory credit quality. Protection of dividends and principal is still substantial, but earnings, the balance sheet and coverage ratios are not as strong as Pfd-1 rated companies. Generally, Pfd-2 ratings correspond with companies whose senior bonds are rated in the A category. ● R-1 (high) is the highest credit quality. The capacity for the payment of short-term financial obligations as they fall due is exceptionally high. Unlikely to be adversely affected by future events. ● Each rating category is denoted by the subcategories "high" and "low". The absence of either a "high" or "low" designation indicated the rating is in the middle of the category.	A Positive or Negative Trend is not an indication that a rating change is imminent. Rather, a Positive or Negative Trend represents an indication that there is a greater likelihood that the rating could change in the future.

Institution	Rating	Outlook
Kroll Bond Rating Agency	● An obligation rated 'AA' is determined to have minimal risk of loss due to credit-related events. Such obligors and obligations are deemed very high quality. ● A short-term obligation rated K1 has a very strong ability to meet short-term obligations. ● The modifiers "-" or "+" may be appended to ratings in categories AA through CCC to indicate, respectively, upper and lower risk levels within the broader category.	A rating outlook is an indication of the likely direction of an issuer's rating over the medium term, generally encompassing a horizon not to exceed two years and is not necessarily a precursor to a rating change.

WHAT THE RATINGS ADDRESS:

Short-term and Long-term Senior Debt

Short-term and long-term senior debt credit ratings are the current opinion of the rating agency on creditworthiness of an obligor with respect to fixed-income obligations whose original maturity is of a short and medium to long-term nature, respectively. They address the possibility that a financial obligation will not be honoured as promised and reflect both the likelihood of default and any financial loss suffered in the event of default.

Subordinated Debt

Subordinated debt credit ratings are the current opinion of the rating agency on creditworthiness of an obligor with respect to a specific financial obligation and a specific class of financial obligation for a specific financial program. Ratings take into consideration the creditworthiness of guarantors, insurers, or other forms of credit enhancement on the obligation and takes into account the currency in which the obligation is denominated.

Preferred Stock

Preferred stock ratings address the issuer's capacity and willingness to pay dividends and principal, in case of limited life, on a timely basis. They address the likelihood of timely payment of dividends, notwithstanding the legal ability to pass on or defer a dividend payment.

Rating Outlook

Rating Outlook assesses the potential direction of a credit rating over the intermediate to longer term. In determining a Rating Outlook consideration is given to any changes in the economic and fundamental business conditions. An Outlook is not necessarily a precursor of a rating change.

APPENDIX C – AUDIT COMMITTEE MANDATE

ROYAL BANK OF CANADA
(hereinafter referred to as the "Bank")
October 19, 2017

AUDIT COMMITTEE MANDATE

A. PURPOSE AND DUTIES OF THE COMMITTEE

1. General Purpose

The Audit Committee is responsible for assisting the Bank's board of directors (the "Board") in its oversight of (i) the integrity of the Bank's financial statements; (ii) the qualifications, performance and independence of the external auditors; (iii) the performance of the Bank's internal audit function; (iv) internal controls; and (v) compliance with legal and regulatory requirements.

2. Financial Statements and other Documents

The Committee will regularly review and discuss the following:

a) prior to review and approval by the Board, the Bank's annual statement which includes its annual consolidated financial statements, its quarterly financial statements, and related management's discussion and analysis;

b) earnings releases on interim and annual results, the annual information form, the annual report and other financial information, earnings guidance and presentations provided to analysts, rating agencies and the public;

c) such other periodic disclosure documents as requested by regulators or that may be required by law;

d) investments and transactions brought to the Committee's attention that could adversely affect the Bank's well-being;

e) prospectuses relating to the issuance of securities of the Bank;

f) representations provided by management to the auditors, where appropriate;

g) reports on any litigation matters which could significantly affect the Bank;

h) tax matters that are material to the financial statements;

i) reports from the Chief Compliance Officer (the "CCO") on regulatory compliance matters, and from the Chief Anti-Money Laundering Officer (the "CAMLO") on anti-money laundering matters; and

j) other reports as required to be communicated by the auditors by the Canadian Public Accountability Board, the Office of the Superintendent of Financial Institutions, and the U.S. Public Company Accounting Oversight Board.

Moreover, the Committee will ensure that adequate procedures are in place for the review of the Bank's public disclosure of financial information derived from the Bank's financial statements, and will periodically assess the adequacy of these procedures.

3. External Auditor

Subject to the shareholders' powers conferred by the *Bank Act*, the Committee will recommend the appointment (or revocation thereof) of any registered public accounting firm (including the external auditor) engaged to prepare or issue an audit report or to perform other audit, review or attest services. The Committee will fix the remuneration and oversee the work of these accounting firms,

including the resolution of disagreements with management regarding financial reporting. Such accounting firms will report directly to the Committee.

Moreover, as part of its oversight of the external auditor the Committee will:

a) meet with the external auditor to review and discuss the annual audit plan, the results of the audit, the auditor's report with respect to the annual statement, and all other reports, returns and transactions as required by applicable laws;

b) approve all audit engagement fees and terms, as well as the terms of any permitted non-audit services to be provided by the external auditor to the Bank, with such approvals to be given specifically or pursuant to preapproval policies and procedures adopted by the Committee in accordance with applicable laws;

c) review any concerns that may be brought forward by the external auditor, including any difficulties they may encounter in conducting their audit, as well as management's response to such concerns;

d) review material correspondence between the external auditor and management relating to audit findings;

e) taking into account the opinions of management and the Bank's internal auditor, annually assess the external auditor's qualifications and performance, including relevant experience, geographical reach, professional scepticism, quality of services and communications, and independence and objectivity;

f) review formal written statements delineating all relationships between the external auditor and the Bank that may impact its independence and objectivity;

g) annually assess the risk of the external auditor withdrawing from the audit;

h) discuss with the external auditor and with management the annual audited financial statements and quarterly financial statements, as well as related management's discussion and analysis;

i) review hiring policies concerning partners, employees and former partners and employees of the present and former external auditors;

j) review and evaluate the qualifications, performance and independence of the external auditor's lead partner and discuss the timing and process for implementing the rotation of the lead audit partner, the concurring audit partners and any other active audit engagement team partner; and

k) at least annually, obtain and review a report by the external auditor describing: (i) the external auditor's internal quality-control procedures; and (ii) any material issues raised by the most recent internal quality-control review or peer review of the external auditors, or by any inquiry or investigation by governmental or professional authorities, within the preceding five years, respecting one or more independent audits carried out by the external auditor, and any steps taken to deal with any such issues.

4. Oversight of Independent Control Functions

The Committee will oversee the finance, compliance, anti-money laundering and internal audit functions, having regard to their independence from the businesses whose activities they review. The Committee will review and approve the appointment or removal of each of the Chief Financial Officer (the "CFO"), the CCO, the CAMLO, and the Chief Audit Executive (the "CAE"), as well as their respective mandates and the mandates or charters of their respective functions. The Committee will approve each of the functions' organizational structures, budgets and resources. Every year the Committee will assess the effectiveness of each of the CFO, CCO, CAMLO and CAE and their respective functions. It will also periodically review independent assessments of each of these functions. Moreover, it will annually review and approve the internal audit function's overall risk methodology.

5. Internal Control

The Committee will assist in the oversight of internal control by engaging in the following activities:

a) requiring management to implement and maintain appropriate systems of internal control, including internal controls over financial reporting and for the prevention and detection of fraud and error;

b) evaluating and approving systems of internal control and meeting regularly with the CAE and with management to assess the adequacy and effectiveness of these systems;

c) receiving reasonable assurances on a regular basis from management that the organization is in control;

d) reviewing reports from the Chief Executive Officer (the "CEO") and the CFO regarding any significant deficiency or material weakness in the design or operation of internal controls over financial reporting and the detection of fraud involving management or other employees who have a significant role in the Bank's internal control over financial reporting;

e) reviewing and approving the Bank's disclosure policy and reviewing reports on the effectiveness of the Bank's disclosure controls and procedures; and

f) reviewing the process relating to the CEO and CFO's certifications on the design and effectiveness of the Bank's disclosure controls and procedures and internal control over financial reporting, and the integrity of the Bank's quarterly and annual financial statements.

6. Internal Auditor

The Committee will regularly meet with the CAE to review and approve the annual internal audit plan and review internal audit activities. The Committee will review and discuss with the CAE issues reported to management by the internal audit function and management's responses and/or corrective actions. The Committee will also evaluate the status of identified control weaknesses, as well as the adequacy and degree of compliance with the Bank's systems of internal control. Other issues that the Committee may review with the CAE include audit scope, information access, resource limitations or any other difficulties encountered by the internal audit function.

7. Capital Management

The Committee will review capital transactions and may designate and authorize the issue of (i) First Preferred Shares and (ii) securities qualifying as additional Tier 1 capital under capital adequacy guidelines issued by the Superintendent of Financial Institutions. The Committee may also review and approve securities disclosure documents in connection with issues of the Bank's subordinated indebtedness as provided in the relevant resolution of the Board.

The Committee will review the adequacy and effectiveness of internal controls related to capital management. It will also discuss with the external auditors any matters arising from the audit that may have an impact on regulatory or capital disclosures included in the Bank's annual statement.

8. Committee Reports

The Committee is responsible for preparing any report from the Committee that may be included in the Bank's annual proxy statement.

9. Other

a) The Committee will discuss major issues regarding accounting principles and financial statement presentations, including significant changes in the Bank's selection or application of accounting principles and analyses prepared by management or the external auditors regarding financial reporting issues and judgments made in connection with the preparation of the financial statements;

b) The Committee will establish procedures for managing complaints received by the Bank regarding accounting, internal accounting controls or auditing matters, as well as procedures for the confidential and anonymous submission by employees of concerns regarding accounting, internal accounting controls or auditing matters. The Committee will receive reports from the Ombudsman at each Committee meeting and will meet with the Ombudsman annually in relation to these procedures;

c) The Committee will establish and monitor procedures to provide disclosure of information to customers and for dealing with customer complaints as required by the *Bank Act*;

d) The Committee will review and discuss any reports concerning material violations submitted to it by the Bank's legal counsel pursuant to applicable law and policy;

e) The Committee will discuss the major financial risk exposures of the Bank and the steps management has taken to monitor and control such exposures; and

f) Subject to the laws applicable to the subsidiary, the Committee may perform for and on behalf of a subsidiary the functions of an audit committee of the subsidiary.

B. COMMITTEE COMPOSITION AND PROCEDURES

1. Composition of Committee

The Committee will be composed of five or more directors. No Committee member may be an officer or employee of the Bank or of an affiliate of the Bank. Each Committee member will be (i) unaffiliated, as determined in accordance with the regulations made under the *Bank Act*, and (ii) independent, as determined by director independence standards adopted by the Board. Committee membership will reflect a balance of experience and expertise required to fulfill the Committee's mandate.

All Committee members will be financially literate or become financially literate within a reasonable period after appointment to the Committee. At least one member will have accounting or financial management expertise. No member may serve on the audit committees of more than two other public companies, unless the Board determines such simultaneous service would not impair the member's ability to serve effectively on the Committee.

2. Appointment of Committee Members

The Board will appoint or reappoint the Committee members at the annual organizational meeting of the directors. In the normal course members will serve a minimum of three years. Each member will remain a member until a successor is appointed, unless the member resigns, is removed or ceases to be a director. The Board may fill a vacancy that occurs in the Committee at any time.

3. Committee Chair and Secretary

The Board will appoint or reappoint a Committee Chair from among the members of the Committee. If the Board fails to do so, the Committee members will make the appointment or re-appointment. In the normal course the Committee Chair will serve a minimum of three years. The Committee Chair will not be a former employee of the Bank or of an affiliate. The Secretary of the Committee need not be a director.

4. Time and Place of Meetings

Meetings may be called by any Committee member, the external auditors or the CFO. The Committee members will determine the time and place of and the procedure at meetings, provided that the Committee meets at least quarterly. The Committee may request any officer or employee of the Bank or the Bank's outside counsel or external auditors to attend a meeting of the Committee or to meet with any members of, or consultants to, the Committee.

5. Quorum

A quorum for meetings will be three members.

6. Notice of Meetings

Notice of the time and place of each meeting will be generally given in writing or by telephone, or by electronic or other communications facilities, to each Committee member and to the external auditors at least 24 hours prior to the time fixed for such meeting; however,

a) a member may in any manner waive notice of a meeting and attendance of a member at a meeting is a waiver of notice of the meeting, except where a member attends a meeting for the express purpose of objecting to the transaction of any business on the grounds that the meeting is not lawfully called;

b) a resolution in writing signed by all the members entitled to vote on that resolution at a Committee meeting, other than a resolution of the Committee carrying out its duties under subsection 194(3) of the *Bank Act*, will be as valid as if it had been passed at a meeting of the Committee; and

c) capital transactions may be reviewed and/or authorized at a meeting of which at least one hour prior notice is given.

7. Reporting to the Board

The Committee will report to the Board following each meeting with respect to its activities and recommendations. It will also report to the Board on the annual statement and returns that must be approved by the directors under the *Bank Act*.

8. Access to Management and External Advisors

In fulfilling its responsibilities, the Committee will have unrestricted access to management and employees of the Bank. The Committee will select, retain, oversee, terminate and approve the fees of any external advisor that the Committee deems necessary, including any legal or accounting advisor, to assist it in fulfilling its responsibilities. The Bank will provide appropriate funding, as determined by the Committee, for any such engagement.

The Committee may also investigate any matter with full access to all books, records, facilities, management and employees of the Bank.

9. Private Meetings

At least quarterly the Committee will meet with no members of management present and have separate private meetings with the external auditors, and each of the CAE, the CFO, the CCO, the CAMLO and the General Counsel, to discuss any matters that the Committee or these parties believe should be discussed.

10. Evaluation of Effectiveness and Review of Mandate

The Committee will annually review and assess the adequacy of its mandate and evaluate its effectiveness in fulfilling its mandate.

APPENDIX D – PRE-APPROVAL POLICIES AND PROCEDURES

Policies and Procedures
for the Monitoring, and Pre-Approval of Services
to be Performed by Public Accounting Firms
and the Review of the External Auditors
(effective October 19, 2016)

Mandate

1. The mandate of the Audit Committee established by the Board of Directors ("Board") confers on the Committee the authority and responsibility (among other things) to:

   - Pre-approve all audit and any legally permissible non-audit services to be provided by the external auditors and all audit, review and attest services provided by any other public accounting firm, with such approval to be given either specifically or pursuant to pre-approval policies and procedures adopted by the Committee; and
   - To complete an annual and five year comprehensive reviews of the external auditor's performance and to recommend to the Board the selection and termination of the external auditor subject to shareholder approval.

Purpose

2. These Policies and Procedures are intended to:

   a) specify the methods by which the Audit Committee may pre-approve the provision of audit, review and attest services by any public accounting firm to the Bank and its subsidiaries;
   b) specify the methods by which the Audit Committee may pre-approve the provision of non-audit services to the Bank and its subsidiaries by the Bank's external auditors and their affiliates (the "auditors") that do not impair the independence of the auditors under applicable laws and professional standards, including the rules of the Chartered Professional Accountants Canada, the Public Company Accounting Oversight Board ("PCAOB"), the Canadian Securities Administrators and the U.S. Securities and Exchange Commission;
   c) set forth procedures designed to ensure that any services to be provided by the auditors and that any audit, review or attestation services to be performed by any other public accounting firm have been properly authorized and pre-approved under the authority of the Audit Committee, and that the Committee is promptly informed of each service;
   d) ensure that the Audit Committee's responsibilities are not delegated to management in violation of applicable law;
   e) specify the policies relating to the annual and comprehensive evaluation of the external auditor and selection of the external auditor by the Audit Committee for recommendation to the Board.

Required Approval of Audit and Non-Audit Services

3. The Audit Committee shall pre-approve all engagements of the auditors by:

   a) the Bank; or
   b) any subsidiary.

4. The Audit Committee shall pre-approve engagements of any public accounting firm to provide audit, review or attest services to:

   a) the Bank; or
   b) any subsidiary.

5. The Audit Committee shall evidence its pre-approval by resolution of the Committee or through the exercise of delegated authority in accordance with these Policies and Procedures.

6. "Subsidiary" has the meaning set forth in Rule 1-02(x) of the U.S. Securities and Exchange Commission's Regulation S-X.

7. For the purpose of these Policies and Procedures and any pre-approval:

   a) "Audit services" include services that are a necessary part of the audit process and any activity that is a necessary procedure used by the accountant in reaching opinions on the financial statements and on internal control over financial reporting as is required under applicable auditing standards ("AAS"), including technical reviews to reach an audit judgment on complex accounting issues;

   b) The term "audit services" is broader than those services strictly required to perform an audit pursuant to AAS and include such services as:
      i) the issuance of comfort letters and consents in connection with offerings of securities;
      ii) the performance of domestic and foreign statutory audits;
      iii) attest services required by statute or regulation; and
      iv) assistance with and review of documents filed with the Office of the Superintendent of Financial Institutions, Canadian Securities Administrators, the Securities and Exchange Commission, the Board of Governors of the Federal Reserve Board and other regulators having jurisdiction over the activities of the Bank and its subsidiaries, and responding to comments from such regulators;

   c) "Audit-related" services are assurance and related services traditionally performed by the principal accountant and that are reasonably related to the performance of the audit or review of financial statements and not categorized under "audit fees" for disclosure purposes.

      "Audit-related services" include:
      i) employee benefit plan audits, including audits of employee pension plans,
      ii) due diligence related to mergers and acquisitions,
      iii) consultations and audits in connection with acquisitions, including evaluating the accounting treatment for proposed transactions;
      iv) internal control reviews;
      v) attest services not required by statute or regulation; and
      vi) consultations regarding financial accounting and reporting standards.

      Non-financial operational audits are not "audit-related" services;

   d) "Review services" are services applied to unaudited financial statements and consist of the inquiry and analytical procedures that provide the accountant with a reasonable basis for expressing limited assurance that there are no material modifications that should be made to financial statements for them to be in conformity with International Financial Reporting Standards or, if applicable, any other comprehensive basis of accounting;

   e) "Attest" services are those engagements where the accountant issues an examination, a review, or an agreed-upon procedures report on a subject matter, or an assertion about the subject matter that is the responsibility of another party. Examples of the subject matter of an "attest" engagement include: examinations (i.e., audits) of financial forecasts and projections; reviews of pro-forma financial information; reporting on a company's internal control over financial reporting; and examinations of compliance with contractual arrangements or laws and regulations.

External Auditor Selection and Appointment

8. The Audit Committee shall monitor, review and assess the quality of the external auditor on an annual basis. The annual assessment will include:

    a) quality and thoroughness of the audit approach and methodology;
    b) level of professional skepticism, and critical judgments applied by the audit team;
    c) independence of the external audit firm and the engagement partner;
    d) skills and knowledge of the audit team;
    e) level of understanding of our businesses and the financial services industry;
    f) sufficiency of resources and ability to complete the audit in a timely manner;
    g) partner rotation;
    h) value for money;
    i) quality of communications;
    j) risk of likelihood of withdrawal from the audit;
    k) input from senior management of RBC;
    l) input from RBC Internal Audit Services;
    m) a self assessment prepared by the auditor; and
    n) audit quality metrics and other matters as determined by the Audit Committee or the Board of Directors.

9. At least every five years the Audit Committee will conduct a comprehensive assessment of the external auditor. The assessment will include:

    a) considerations included within the annual assessment;
    b) performance since the last comprehensive review, or appointment of the external auditor;
    c) quality and continuity of the engagement team;
    d) tenure of the auditor;
    e) incidence of independence threats and effectiveness of applied safeguards;
    f) track record of the auditor applying professional skepticism; and
    g) responsiveness to changes in the Bank's businesses (i.e. significant acquisitions or changes to systems) and calls for improvement from regulators, inspectors, Audit Committees or management.

10. The Audit Committee will take the following into account in deciding whether to recommend the tendering of the external audit engagement of the Bank:

    a) the results of the annual and comprehensive assessments (refer to factors described in sections 8 and 9);
    b) the impact of regulatory and legislative requirements, including mandatory tendering and rotation requirements on the Bank and its subsidiaries; and
    c) other factors deemed relevant by the Audit Committee or the Board.

Delegation

11. The Audit Committee may from time to time delegate to one or more of its members who are "independent" (within the meanings of applicable law and the rules or policies of a securities commission having jurisdiction, and the New York Stock Exchange) the power to pre-approve from time to time:

    a) audit, review or attest services to be provided by any public accounting firm (including the auditors) that have not been otherwise approved by the Committee;
    b) permissible non-audit services to be provided by the auditors that have not otherwise been approved by the Committee, and
    c) changes in the scope of pre-approved engagements and the maximum estimated fees for engagements that have been pre-approved by the Committee.

12. The member(s) exercising such delegated authority must report at the next regularly scheduled meeting of the Audit Committee any services that were pre-approved under this delegated authority since the date of the last regularly scheduled meeting.

13. The member(s) exercising delegated authority may evidence his or her approval by signing an instrument in writing that describes the engagement with reasonable specificity, or by signing an engagement letter containing such a description.

14. In addition, member(s) exercising delegated authority may pre-approve an engagement orally, if any such oral approval is promptly confirmed in writing. Such written confirmation may be given by fax or e-mail and must describe the engagement with reasonable specificity.

Responsibilities of External Auditors

15. To support the independence process, the external auditors shall:

    a) confirm in engagement letters that performance of the work will not impair independence;
    b) satisfy the Audit Committee that they have in place comprehensive internal policies and processes to ensure adherence, world-wide, to independence requirements, including robust monitoring and communications;
    c) provide communication and confirmation to the Committee on independence on a regular basis, and at least annually;
    d) provide for Committee approval, in connection with each annual audit engagement, a detailed scope of services outlining each individual audit to be performed and a detailed description of audit-related services;
    e) utilize the tracking numbers assigned by management to all pre-approved services in all fee billings and correspondence, provide detailed annual fee reporting and review management's detailed quarterly fee reporting.
    f) communicate to the Audit Committee all matters required to be communicated by the Canadian Public Accountability Board and U.S. Public Company Accounting Oversight Board.
    g) maintain certification by the Canadian Public Accountability Board and registration with the U.S. Public Company Accounting Oversight Board; and
    h) review their partner rotation plan and advise the Committee on an annual basis.

Engagements

16. The Audit Committee will not, as a general rule, pre-approve a service more than one year prior to the time at which it is anticipated that the firm of accountants will be engaged to provide the service.

17. Engagements will not be considered to be revolving in nature and may not operate from year-to-year without reapproval.

18. All audit and non-audit services to be provided by the auditors, and all audit, review or attest services to be provided by any public accounting firm, shall be provided pursuant to an engagement letter that shall:

    a) be in writing and signed by the auditors or public accounting firm;
    b) specify the particular services to be provided;
    c) specify the period in which the services will be performed;
    d) specify the maximum total fees to be paid; and
    e) in the case of engagements of the auditors, include a confirmation by the auditors that the services are not within a category of services the provision of which would impair their independence under applicable law and Canadian and U.S. generally accepted auditing standards.

19. Management shall, before signing and delivering an engagement letter on behalf of the Bank or a subsidiary and before authorizing the commencement of an engagement:

a) obtain an engagement letter in accordance with the foregoing;
b) confirm that the services are described in the engagement letter accurately and with reasonable specificity;
c) obtain confirmation from the auditors that they have conducted an analysis that supports their conclusion that performance of the services will not impair their independence;
d) with respect to engagements for the provision of services other than audit and audit-related services, obtain confirmation from legal counsel of the Bank that performance of the services will not impair independence; and
e) verify that the performance of the services has specifically been approved by the Audit Committee or a member in accordance with authority delegated by the Committee.

All engagement letters entered into pursuant to these Policies and Procedures shall be made available to the Audit Committee.

Tax Services

20. The Audit Committee, and any member in the exercise of delegated power, shall consider the provision of tax services by the auditors on an engagement-by-engagement basis.

21. The Audit Committee shall not pre-approve, and any member of the Audit Committee may not exercise delegated power to engage the auditors to provide, tax services to the Bank or a subsidiary:

    a) to represent the Bank or a subsidiary before a tax or other court;
    b) if the provision of the services would be prohibited, as prescribed by paragraph 25 of these Policies and Procedures; or
    c) related to marketing, planning or opinion in favour of the tax treatment of (1) a transaction offered under conditions of confidentiality and for which a fee has been or will be paid by the Bank; or (2) a transaction that was initially recommended directly or indirectly, by the accountant and a significant purpose of which is tax avoidance, unless the proposed tax treatment is at least more likely than not to be allowable under applicable tax laws.

22. The Audit Committee shall not pre-approve, and any member of the Audit Committee may not exercise delegated power to engage the auditors to provide, tax services to a person in a financial oversight role at the Bank, or an immediate family member of such a person, except as would be permitted by the PCAOB rules.

Other Non-Audit Services

23. The Audit Committee, and any member in the exercise of delegated power, shall consider the provision of other non-audit services (non-audit services other than audit-related services and tax services, and including non-audit services relating to internal control and business recovery services) by the auditors on an engagement-by-engagement basis. Any approval of non-audit services relating to internal control must be preceded by a discussion with the auditors of the potential effects of the services on independence as required by the rules of the PCAOB.

Value-Added Services

24. The Audit Committee recognizes and approves of the fact that the auditors from time to time provide, without charge or commitment, value added services to the Bank and its subsidiaries that do not involve an engagement of the auditors. Such value added services may include surveys, educational sessions, workshops, roundtable meetings with peers, benchmarking studies, and monitoring of contest draws as an independent observer. The Audit Committee receives and reviews periodic reports from management and the auditors providing representative examples of such services as part of its monitoring of the Bank’s overall relationship with the auditors.

Prohibited Services

25. The Audit Committee shall not pre-approve, and any member may not exercise delegated power to engage the auditors to provide, any services, including tax services or business recovery services, that (i) provide for a contingency or commission fee arrangement; or (ii) involve the auditors performing any of the non-audit services set forth in paragraph (c)(4) of Rule 2-01 of the U.S. Securities and Exchange Commission's Regulation S-X, which include:

    a. providing bookkeeping or other services related to the accounting records or financial statements of the Bank or any of its subsidiaries,
    b. providing financial information systems design and implementation to the Bank or any of its subsidiaries,
    c. providing actuarial services to the Bank or any of its subsidiaries,
    d. providing internal audit outsourcing services to the Bank or any of its subsidiaries,
    e. providing human resources services to the Bank or any of its subsidiaries,
    f. providing broker-dealer, investment adviser, or investment banking services to the Bank or any of its subsidiaries,
    g. functioning in the role of management for the Bank or any of its subsidiaries,
    h. auditing their own work in relation to the Bank or any of its subsidiaries,
    i. providing appraisal or valuation services, contribution in kind reports or fairness opinions to the Bank or any of its subsidiaries,
    j. serving in an advocacy role for the Bank or any of its subsidiaries,
    k. providing legal services to the Bank or any of its subsidiaries,
    l. providing services that fall within the category of "expert" services that are prohibited by applicable law to the Bank or any of its subsidiaries, or
    m. providing services to the Bank or any of its subsidiaries that would otherwise compromise their independence under applicable regulatory guidance.

For the purposes of the Prohibited Services listed in this Section 25 above, a "subsidiary" includes any entity for which the Bank uses the equity method of accounting and where it is material to the Bank. Therefore, the Audit Committee is not permitted to pre-approve the provision of the prohibited services listed above by the auditors to these entities.

Timely Reporting to the Audit Committee

26. Management shall provide a quarterly written report to the Audit Committee of services performed and related fees, at the scheduled meeting of the Committee held following the end of each fiscal quarter end.

No Delegation to Management

27. Nothing in these Policies and Procedures shall be interpreted as a delegation to management of the Audit Committee's responsibilities in violation of applicable law.

Effective Date

28. These updated Policies and Procedures are effective as and from October 19, 2016.

Disclosure

29. The Bank shall disclose these Policies and Procedures in its periodic filings, as required by applicable law.

Review

30. The Audit Committee shall review and reassess the adequacy of these Policies and Procedures on a triennial basis.

Management's Discussion and Analysis

Management's Discussion and Analysis (MD&A) is provided to enable a reader to assess our results of operations and financial condition for the fiscal year ended October 31, 2017, compared to the preceding fiscal year. This MD&A should be read in conjunction with our 2017 Annual Consolidated Financial Statements and related notes and is dated November 28, 2017. All amounts are in Canadian dollars, unless otherwise specified, and are based on financial statements prepared in accordance with International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board (IASB), unless otherwise noted.

Additional information about us, including our 2017 Annual Information Form, is available free of charge on our website at rbc.com/investorrelations, on the Canadian Securities Administrators' website at sedar.com and on the EDGAR section of the United States (U.S.) Securities and Exchange Commission's (SEC) website at sec.gov.

Information contained in or otherwise accessible through the websites mentioned does not form part of this report. All references in this report to websites are inactive textual references and are for your information only.

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Caution regarding forward-looking statements

From time to time, we make written or oral forward-looking statements within the meaning of certain securities laws, including the "safe harbour" provisions of the *United States Private Securities Litigation Reform Act of 1995* and any applicable Canadian securities legislation. We may make forward-looking statements in this 2017 Annual Report, in other filings with Canadian regulators or the SEC, in other reports to shareholders and in other communications. Forward-looking statements in this document include, but are not limited to, statements relating to our financial performance objectives, vision and strategic goals, the Economic, market, and regulatory review and outlook for Canadian, U.S., European and global economies, the regulatory environment in which we operate, the Strategic priorities and Outlook sections for each of our business segments, and the risk environment including our liquidity and funding risk, and includes our President and Chief Executive Officer's statements. The forward-looking information contained in this document is presented for the purpose of assisting the holders of our securities and financial analysts in understanding our financial position and results of operations as at and for the periods ended on the dates presented, as well as our financial performance objectives, vision and strategic goals, and may not be appropriate for other purposes. Forward-looking statements are typically identified by words such as "believe", "expect", "foresee", "forecast", "anticipate", "intend", "estimate", "goal", "plan" and "project" and similar expressions of future or conditional verbs such as "will", "may", "should", "could" or "would".

By their very nature, forward-looking statements require us to make assumptions and are subject to inherent risks and uncertainties, which give rise to the possibility that our predictions, forecasts, projections, expectations or conclusions will not prove to be accurate, that our assumptions may not be correct and that our financial performance objectives, vision and strategic goals will not be achieved. We caution readers not to place undue reliance on these statements as a number of risk factors could cause our actual results to differ materially from the expectations expressed in such forward-looking statements. These factors – many of which are beyond our control and the effects of which can be difficult to predict – include: credit, market, liquidity and funding, insurance, operational, regulatory compliance, strategic, reputation, legal and regulatory environment, competitive and systemic risks and other risks discussed in the risks sections of our 2017 Annual Report; including global uncertainty and volatility, elevated Canadian housing prices and household indebtedness, information technology and cyber risk, regulatory change, technological innovation and new entrants, global environmental policy and climate change, changes in consumer behaviour, the end of quantitative easing, the business and economic conditions in the geographic regions in which we operate, the effects of changes in government fiscal, monetary and other policies, tax risk and transparency and environmental and social risk.

We caution that the foregoing list of risk factors is not exhaustive and other factors could also adversely affect our results. When relying on our forward-looking statements to make decisions with respect to us, investors and others should carefully consider the foregoing factors and other uncertainties and potential events. Material economic assumptions underlying the forward-looking statements contained in this 2017 Annual Report are set out in the Economic, market, and regulatory review and outlook section and for each business segment under the Strategic priorities and Outlook headings. Except as required by law, we do not undertake to update any forward-looking statement, whether written or oral, that may be made from time to time by us or on our behalf.

Additional information about these and other factors can be found in the risks sections of our 2017 Annual Report.

Selected financial and other highlights — Table 1

(Millions of Canadian dollars, except per share, number of and percentage amounts)	2017	2016	2017 vs. 2016 Increase (decrease)	
Total revenue (1)	$ 40,669	$ 38,795	$ 1,874	4.8%
Provision for credit losses (PCL)	1,150	1,546	(396)	(25.6)%
Insurance policyholder benefits, claims and acquisition expense (PBCAE)	3,053	3,424	(371)	(10.8)%
Non-interest expense (1)	21,794	20,526	1,268	6.2%
Income before income taxes	14,672	13,299	1,373	10.3%
Net income	$ 11,469	$ 10,458	$ 1,011	9.7%
Segments – net income				
Personal & Commercial Banking	$ 5,755	$ 5,184	$ 571	11.0%
Wealth Management	1,838	1,473	365	24.8%
Insurance	726	900	(174)	(19.3)%
Investor & Treasury Services	741	613	128	20.9%
Capital Markets	2,525	2,270	255	11.2%
Corporate Support	(116)	18	(134)	(744.4)%
Net income	$ 11,469	$ 10,458	$ 1,011	9.7%
Selected information				
Earnings per share (EPS) – basic	$ 7.59	$ 6.80	$ 0.79	11.6%
– diluted	7.56	6.78	0.78	11.5%
Return on common equity (ROE) (2), (3)	17.0%	16.3%	n.m.	70 bps
Average common equity (2)	$ 65,300	$ 62,200	$ 3,100	5.0%
Net interest margin (NIM) – on average earning assets (2)	1.72%	1.70%	n.m.	2 bps
Total PCL as a % of average net loans and acceptances (2)	0.21%	0.29%	n.m.	(8) bps
PCL on impaired loans as a % of average net loans and acceptances (2)	0.21%	0.28%	n.m.	(7) bps
Gross impaired loans (GIL) as a % of loans and acceptances (4)	0.46%	0.73%	n.m.	(27) bps
Liquidity coverage ratio (LCR) (5)	122%	127%	n.m.	(500) bps
Capital ratios and Leverage ratio (6)				
Common Equity Tier 1 (CET1) ratio	10.9%	10.8%	n.m.	10 bps
Tier 1 capital ratio	12.3%	12.3%	n.m.	– bps
Total capital ratio	14.2%	14.4%	n.m.	(20) bps
Leverage ratio	4.4%	4.4%	n.m.	– bps
Selected balance sheet and other information (7)				
Total assets	$ 1,212,853	$ 1,180,258	$ 32,595	2.8%
Securities	218,379	236,093	(17,714)	(7.5)%
Loans (net of allowance for loan losses)	542,617	521,604	21,013	4.0%
Derivative related assets	95,023	118,944	(23,921)	(20.1)%
Deposits	789,635	757,589	32,046	4.2%
Common equity	67,416	64,304	3,112	4.8%
Total capital risk-weighted assets	474,478	449,712	24,766	5.5%
Assets under management (AUM)	639,900	586,300	53,600	9.1%
Assets under administration (AUA) (8)	5,473,300	5,058,900	414,400	8.2%
Common share information				
Shares outstanding (000s) – average basic	1,466,988	1,485,876	(18,888)	(1.3)%
– average diluted	1,474,421	1,494,137	(19,716)	(1.3)%
– end of period	1,452,898	1,485,394	(32,496)	(2.2)%
Dividends declared per common share	$ 3.48	$ 3.24	$ 0.24	7.4%
Dividend yield (9)	3.8%	4.3%	n.m.	(50) bps
Common share price (RY on TSX) (10)	$ 100.87	$ 83.80	$ 17.07	20.4%
Market capitalization (TSX) (10)	146,554	124,476	22,078	17.7%
Business information (number of)				
Employees (full-time equivalent) (FTE) (11)	78,210	77,825	385	0.5%
Bank branches	1,376	1,419	(43)	(3.0)%
Automated teller machines (ATMs)	4,630	4,905	(275)	(5.6)%
Period average US$ equivalent of C$1.00 (12)	$ 0.765	$ 0.755	$ 0.010	1.3%
Period-end US$ equivalent of C$1.00	$ 0.775	$ 0.746	$ 0.029	3.9%

(1) Effective Q4 2017, service fees and other costs incurred in association with certain commissions and fees earned are presented on a gross basis in non-interest expense. Comparative amounts have been reclassified to conform with this presentation.
(2) Average amounts are calculated using methods intended to approximate the average of the daily balances for the period. This includes Average common equity used in the calculation of ROE. For further details, refer to the Key performance and non-GAAP measures section.
(3) These measures may not have a standardized meaning under generally accepted accounting principles (GAAP) and may not be comparable to similar measures disclosed by other financial institutions. For further details, refer to the Key performance and non-GAAP measures section.
(4) GIL includes $256 million (2016 – $418 million) related to the acquired credit-impaired (ACI) loans portfolio from our acquisition of City National Corporation (City National). ACI loans added 5 bps to our 2017 GIL ratio (2016 – 8 bps). For further details, refer to Note 2 and 5 of our 2017 Annual Consolidated Financial Statements.
(5) LCR is calculated using the Basel III Liquidity Adequacy Requirements (LAR) guideline. Effective the first quarter of 2017, the Office of the Superintendent of Financial Institutions (OSFI) requires the LCR to be disclosed based on the average of the daily positions during the quarter. For further details, refer to the Liquidity and funding risk section.
(6) Capital and Leverage ratios presented above are on an "all-in" basis. The Leverage ratio is a regulatory measure under the Basel III framework. For further details, refer to the Capital management section.
(7) Represents period-end spot balances.
(8) AUA includes $18.4 billion and $8.4 billion (2016 – $18.6 billion and $9.6 billion) of securitized residential mortgages and credit card loans, respectively.
(9) Defined as dividends per common share divided by the average of the high and low share price in the relevant period.
(10) Based on TSX closing market price at period-end.
(11) Amounts have been revised from those previously reported.
(12) Average amounts are calculated using month-end spot rates for the period.
n.m. not meaningful

About Royal Bank of Canada

Royal Bank of Canada is a global financial institution with a purpose-driven, principles-led approach to delivering leading performance. Our success comes from the 80,000+ employees who bring our vision, values and strategy to life so we can help our clients thrive and communities prosper. As Canada's biggest bank, and one of the largest in the world based on market capitalization, we have a diversified business model with a focus on innovation and providing exceptional experiences to our 16 million clients in Canada, the U.S. and 35 other countries. Learn more at rbc.com.

Our business segments are described below.

Personal & Commercial Banking operates in Canada, the Caribbean and the U.S., and comprises our personal and business banking operations, as well as our auto financing and retail investment businesses.

Wealth Management serves high net worth (HNW) and ultra-high net worth clients (UHNW) from our offices in key financial centres mainly in Canada, the U.S., the U.K., the Channel Islands and Asia with a comprehensive suite of investment, trust, banking, credit and other wealth management solutions. We also provide asset management products and services directly to institutional and individual clients through our distribution channels and third-party distributors.

Insurance provides a wide range of life, health, home, auto, travel, wealth, group and reinsurance products and solutions. In Canada, we offer insurance products and services through our proprietary distribution channels, comprised of the field sales force which includes retail insurance branches, our field sales representatives, advice centres and online, as well as through independent insurance advisors and affinity relationships. Outside Canada, we operate in reinsurance markets globally offering life, accident and annuity reinsurance products.

Investor & Treasury Services serves the needs of institutional investing clients by providing asset services, custodial, advisory, financing and other services to safeguard assets, maximize liquidity and manage risk in multiple jurisdictions around the world. We also provide short-term funding and liquidity management for RBC.

Capital Markets provides public and private companies, institutional investors, governments and central banks with a wide range of products and services. In North America, we offer a full suite of products and services which include corporate and investment banking, equity and debt origination and distribution, and structuring and trading. Outside North America, we offer a diversified set of capabilities in our key sectors of expertise such as energy, mining and infrastructure, and we have expanded into industrial, consumer and healthcare in Europe.

Our business segments are supported by Corporate Support, which consists of Technology & Operations and Functions. Technology & Operations provides the technological and operational foundation required to effectively deliver products and services to our clients, while Functions includes our finance, human resources, risk management, internal audit and other functional groups.

The following chart presents our business segments and respective lines of business:

ROYAL BANK OF CANADA

Personal & Commercial Banking	Wealth Management	Insurance	Investor & Treasury Services	Capital Markets
○ Canadian Banking ○ Caribbean & U.S. Banking	○ Canadian Wealth Management ○ U.S. Wealth Management (including City National) ○ Global Asset Management ○ International Wealth Management	○ Canadian Insurance ○ International Insurance		○ Corporate and Investment Banking ○ Global Markets ○ Other

Corporate Support

○ Technology & Operations ○ Functions

Vision and strategic goals

Our business strategies and actions are guided by our vision, **"To be among the world's most trusted and successful financial institutions."** Our three strategic goals are:

- In Canada, to be the undisputed leader in financial services;
- In the U.S., to be the preferred partner to corporate, institutional and high net worth clients and their businesses; and
- In select global financial centres, to be a leading financial services partner valued for our expertise.

For our progress in 2017 against our business strategies and strategic goals, refer to the Business segment results section.

The predictions and forecasts in this section are based on information and assumptions from sources we consider reliable. If this information or these assumptions are not accurate, actual economic outcomes may differ materially from the outlook presented in this section. For details on risk factors from general business and economic conditions that may affect our business and financial results, refer to the Macroeconomic risk drivers and Overview of other risks sections.

Canada

The Canadian economy is expected to grow by 3.0% during calendar 2017, which is above both our estimates of 1.8% as at November 29, 2016 and 2.9% as at August 22, 2017. Growth has been broad-based across regions and sectors. In particular, strong growth earlier this year reflected a robust increase in consumer spending amid strong employment growth, low interest rates, and wealth accumulation from rising home prices. Business investment has also improved alongside growing corporate profits and improving business sentiment. The unemployment rate of 6.3% in October is down from 7.0% a year ago and indicates the labour market is close to full employment. Growth is expected to slow to a more moderate rate towards the end of 2017 as the economy nears capacity limits and consumer spending returns to a more sustainable trend. The housing sector is expected to slow as rising interest rates and recent policy changes weigh on activity. Business investment is expected to continue rising although uncertainty surrounding U.S. trade policy could impact business sentiment. With strong growth over the first half of the year pushing the Canadian economy close to full capacity, the Bank of Canada (BoC) raised rates, once in July and again in September. The overnight rate was then left unchanged at 1.00% in October 2017.

In calendar 2018, we expect the Canadian economy will grow at a rate of 2.1% as stronger business investment, exports and government spending offset slower consumer spending growth and further moderation in the housing sector. Uncertainty relating to NAFTA negotiations remains a downside risk to the outlook for exports and business investment. That risk, along with uncertainty about how highly-indebted households will respond to higher interest rates, is keeping the BoC cautious in raising interest rates. We expect a pause in the current tightening cycle until the second calendar quarter of 2018.

U.S.

The U.S. economy is expected to grow by 2.2% in calendar 2017, which is consistent with our estimate as at November 29, 2016 and slightly above our estimate of 2.1% as at August 22, 2017. Growth this year has been supported by consumer spending, reflecting a strong labour market and elevated consumer confidence, as well as rising business investment. Economic activity remained strong in the third calendar quarter of 2017 despite a negative impact from severe weather conditions. The labour market is close to full capacity with October's unemployment rate of 4.1% well below the Federal Reserve's (Fed) longer run estimate of 4.6%. Inflation remains below the Fed's 2% target but is expected to increase over the medium term amid tight economic conditions. We expect the Fed will raise the federal funds target range by 25 basis points to 1.25% to 1.50% in December 2017.

In calendar 2018, we expect the U.S. economy will grow at a rate of 2.5%, largely reflecting continued strength in consumer spending amid a solid job market and elevated consumer confidence. Business investment is also expected to continue rising as a result of strong business confidence, accommodative fiscal policies and stronger global growth support investment. The release of the Tax Reform Framework by the U.S. administration in the fourth quarter of 2017, including corporate tax reform, if or when enacted, could have significant implications for both corporations and individuals. As inflation reaches its target, we expect the Fed will continue with steady, gradual rate hikes next year.

Europe

The Eurozone economy is expected to grow by 2.3% in calendar 2017, which is well above our estimate of 1.3% as at November 29, 2016 and above our estimate of 2.0% as at August 22, 2017. Despite a politically unstable environment, including the Catalonian referendum, Brexit negotiations, and the success of populist parties seen in recent elections, the Eurozone has experienced positive growth. Improving labour market conditions, stronger business and consumer confidence, and accommodative financial conditions have supported a broad-based recovery. The unemployment rate of 8.9% in September was the lowest since January 2009. In October, the European Central Bank (ECB) announced its asset purchase program would be extended at least through September 2018, although with net monthly purchases being reduced beginning in January 2018.

In calendar 2018, we expect the Eurozone economy will grow at a rate of 1.9%. Growth will continue to be driven by improving labour market conditions, accommodative monetary policy and a stronger global backdrop. However, with inflationary pressure and wage growth remaining muted, we expect the ECB will hold its deposit rate at -0.4% throughout 2018 and maintain asset purchases as planned.

Financial markets

A strengthening global economic outlook has contributed to equity markets rising to record highs. Some central banks have begun scaling back accommodation but monetary policy remains stimulative. Government bond yields have increased modestly as markets anticipate further monetary policy tightening will be gradual. Geopolitical and trade risks remain a source of uncertainty and have the potential to weigh on global markets.

The macroeconomic headwinds discussed above, such as the potential for greater uncertainty or financial market volatility related to proposed policies by the U.S. administration, including the Tax Reform Framework and NAFTA negotiations, Brexit, high household indebtedness, and possible further cuts by the BoC and the Fed to their respective stimulus measures may alter our outlook and results for fiscal 2018 and future periods as these continuing pressures may lead to higher PCL in our wholesale and retail loan portfolios, slower volume growth, and impact the general business and economic conditions in the regions we operate.

Regulatory environment

We continue to monitor and prepare for regulatory developments in a manner that seeks to ensure compliance with new requirements while mitigating any adverse business or economic impacts. Such impacts could result from new or amended regulations and the expectations of those who enforce them. Significant developments include continuing changes to global and domestic standards for capital and liquidity, changes to federal mortgage rules, over-the-counter (OTC) derivatives reform, and initiatives to enhance requirements for institutions deemed systemically important to the financial sector. We also continue to monitor changes to resolution regimes addressing government bail-in and total loss-absorbing capacity.

For a discussion on risk factors resulting from these and other regulatory developments which may affect our business and financial results, refer to the Risk management section. For further details on our framework and activities to manage risks, refer to the Risk management and Capital management sections.

Defining and measuring success through total shareholder returns

Our focus is to maximize total shareholder returns (TSR) through the achievement of top half performance compared to our global peer group over the medium-term (3-5 years), which we believe reflects a longer-term view of strong and consistent financial performance.

Maximizing TSR is aligned with our three strategic goals discussed earlier and we believe represents the most appropriate measure of shareholder value creation. TSR is a concept used to compare the performance of our common shares over a period of time, reflecting share price appreciation and dividends paid to common shareholders. The absolute size of TSR will vary depending on market conditions, and the relative position reflects the market's perception over a period of time of our overall performance relative to our peers.

Financial performance objectives are used to measure progress against our medium-term TSR objectives. We review and revise these financial performance objectives as economic, market and regulatory environments change. By focusing on our medium-term objectives in our decision-making, we believe we will be well-positioned to provide sustainable earnings growth and solid returns to our common shareholders.

The following table provides a summary of our 2017 performance against our medium-term financial performance objectives:

2017 Financial performance compared to our medium-term objectives — Table 2

	2017 results
Diluted EPS growth of 7% +	**11.5%**
ROE of 16% +	**17.0%**
Strong capital ratios (CET1) (1)	**10.9%**
Dividend payout ratio 40% – 50%	**46%**

(1) For further details on the CET1 ratio, refer to the Capital management section.

For 2018, our medium-term financial performance objectives will remain unchanged.

We compare our TSR to that of a global peer group approved by our Board of Directors. The global peer group remains unchanged from last year and consists of the following 10 financial institutions:

- **Canadian financial institutions:** Bank of Montreal, Canadian Imperial Bank of Commerce, Manulife Financial Corporation, National Bank of Canada, Power Financial Corporation, The Bank of Nova Scotia, and Toronto-Dominion Bank.
- **U.S. banks:** JPMorgan Chase & Co. and Wells Fargo & Company.
- **International banks:** Westpac Banking Corporation.

Medium-term objectives – three and five year TSR vs. peer group average — Table 3

	Three year TSR (1)	Five year TSR (1)
Royal Bank of Canada	12% Top half	17% Top half
Peer group average (excluding RBC)	10%	15%

(1) The three and the five year annualized TSR are calculated based on our common share price appreciation as per the TSX closing market price plus reinvested dividends for the period October 31, 2014 to October 31, 2017 and October 31, 2012 to October 31, 2017, respectively.

Common share and dividend information — Table 4

For the year ended October 31	2017	2016	2015	2014	2013
Common share price (RY on TSX) – close, end of period	$ **100.87**	$ 83.80	$ 74.77	$ 80.01	$ 70.02
Dividends paid per share	**3.40**	3.20	3.04	2.76	2.46
Increase (decrease) in share price	**20.4%**	12.1%	(6.5)%	14.3%	23.0%
Total shareholder return	**25.0%**	16.8%	(3.0)%	19.0%	28.0%

Key corporate events of 2017

Sale of certain Caribbean Wealth Management businesses

On May 12, 2017, we completed the previously announced sale of our trust, custody and fund administration businesses in the Caribbean to SMP Partners Group. The transaction did not have a significant impact on our financial statements. For further details, refer to Note 11 of our Annual Consolidated Financial Statements.

Sale of U.S. operations of Moneris Solutions Corporation

On November 10, 2016, our payment processing joint venture with Bank of Montreal, Moneris Solutions Corporation (Moneris), signed a Purchase and Sale agreement to sell its U.S. operations to Vantiv, Inc. The transaction closed on December 21, 2016. As a result, we recorded our share of the gain which was $212 million (before- and after-tax) in Non-interest income – Share of profit in joint ventures and associates. For further details, refer to Note 12 of our Annual Consolidated Financial Statements.

Financial performance

Overview

2017 vs. 2016

Net income of $11,469 million was up $1,011 million or 10% from a year ago. Diluted earnings per share (EPS) of $7.56 was up $0.78 or 12% and return on common equity (ROE) of 17.0% was up 70 bps from 16.3% last year. Our Common Equity Tier 1 (CET1) ratio was 10.9%, up 10 bps from a year ago.

Our results reflected strong earnings in Personal & Commercial Banking, Capital Markets, Wealth Management and Investor & Treasury Services, partially offset by lower earnings in Insurance. Our results include our share of the gain related to the sale of the U.S. operations of Moneris in 2017. Our results in 2016 included the gain on sale of our home and auto insurance manufacturing business.

Personal & Commercial Banking results were higher mainly reflecting volume growth of 6%, and our share of the gain related to the sale of the U.S. operations of Moneris in the current year. Higher fee-based revenue in Canada and lower PCL also contributed to the increase. These factors were partially offset by higher costs in support of business growth reflecting ongoing investments in technology, including digital initiatives and higher marketing costs.

Capital Markets results were up largely driven by higher results in Corporate and Investment Banking and Global Markets reflecting increased fee-based revenue, lower PCL and a lower effective tax rate due to changes in earnings mix. These factors were partially offset by higher costs related to changes in the timing of deferred compensation, increased variable compensation on improved results and the impact of foreign exchange translation.

Wealth Management earnings increased mainly due to growth in average fee-based client assets, higher net interest income and increased transaction revenue. These factors were partially offset by higher variable compensation on improved results and increased costs in support of business growth, mainly reflecting higher staff-related costs in the U.S. and ongoing investments in technology, including digital initiatives.

Investor & Treasury Services results increased primarily due to higher earnings across all major businesses driven by funding and liquidity and increased results from our asset services business. These factors were partially offset by higher investment in technology initiatives.

Insurance results decreased primarily due to the gain on sale as noted above, which was a specified item in the prior year and is described further below. Excluding the gain on sale, Insurance earnings were up mainly due to higher favourable annual actuarial assumption updates largely reflecting changes in credit and discount rates and favourable mortality experience, mainly in the U.K. These factors were partially offset by lower earnings from new U.K. annuity contracts and reduced earnings associated with the sale of our home and auto insurance manufacturing business, which was sold on July 1, 2016.

Corporate Support net loss was $116 million in the current year, largely reflecting severance and related charges, net unfavourable tax adjustments and legal costs, partially offset by asset/liability management activities. Corporate Support net income was $18 million in the prior year, largely reflecting asset/liability management activities, partially offset by net unfavourable tax adjustments and a $50 million ($37 million after-tax) increase in the provision for loans not yet identified as impaired.

For further details on our business segment results and CET1 ratio, refer to the Business segment results and Capital management sections, respectively.

Results excluding specified items are non-GAAP measures. For further details, including a reconciliation, refer to the Key performance and non-GAAP measures section.

Impact of foreign currency translation

The following table reflects the estimated impact of foreign currency translation on key income statement items:

Table 5

(Millions of Canadian dollars, except per share amounts)	2017 vs. 2016
Increase (decrease):	
Total revenue	$ (360)
PCL	(3)
PBCAE	–
Non-interest expense	(270)
Income taxes	(15)
Net income	(72)
Impact on EPS	
Basic	$ (0.05)
Diluted	(0.05)

The relevant average exchange rates that impact our business are shown in the following table:

Table 6

(Average foreign currency equivalent of C$1.00) (1)	2017	2016
U.S. dollar	**0.765**	0.755
British pound	**0.596**	0.544
Euro	**0.686**	0.683

(1) Average amounts are calculated using month-end spot rates for the period.

Total revenue

Table 7

(Millions of Canadian dollars)	2017	2016
Interest income	$ 26,904	$ 24,452
Interest expense	9,764	7,921
Net interest income	$ 17,140	$ 16,531
NIM	1.72%	1.70%
Investments (1), (2)	$ 9,558	$ 8,946
Insurance (3)	4,566	4,868
Trading	806	701
Banking (4)	5,110	4,848
Underwriting and other advisory	2,093	1,876
Other (5)	1,396	1,025
Non-interest income (1)	$ 23,529	$ 22,264
Total revenue (1)	$ 40,669	$ 38,795

(1) Effective Q4 2017, service fees and other costs incurred in association with certain commissions and fees earned are presented on a gross basis in non-interest expense. Comparative amounts have been reclassified to conform with this presentation.
(2) Includes securities brokerage commissions, investment management and custodial fees, and mutual fund revenue.
(3) Includes premiums and investment and fee income. Investment income includes the change in fair value of investments backing policyholder liabilities, which is largely offset in PBCAE.
(4) Includes service charges, foreign exchange revenue other than trading, card service revenue and credit fees.
(5) Includes other non-interest income, net gain (loss) on available-for-sale (AFS) securities and share of profit in joint ventures and associates.

2017 vs. 2016

Total revenue increased $1,874 million or 5% from last year, mainly due to higher investment revenue and higher net interest income. Higher banking and underwriting revenue, as well as our share of the gain related to the sale of the U.S. operations of Moneris in the current year also contributed to the increase. These factors were partially offset by lower insurance revenue and the gain from the sale of our home and auto insurance manufacturing business in the prior year. The impact of foreign exchange translation also decreased our total revenue by $360 million.

Net interest income increased $609 million or 4%, mainly due to volume growth in both Canadian Banking and Wealth Management, and the impact of higher U.S. interest rates. These factors were partially offset by lower spreads in Canadian Banking.

NIM was up 2 bps compared to last year largely due to the impact of higher U.S. interest rates.

Investments revenue increased $612 million or 7%, mainly due to growth in average fee-based client assets, which benefitted from capital appreciation and net sales in Wealth Management, and higher balances driving higher mutual fund distribution fees in Canadian Banking.

Insurance revenue decreased $302 million or 6%, mainly reflecting the change in fair value of investments backing our policyholder liabilities, which was largely offset in PBCAE, as well as lower premiums reflecting the impact of the sale of our home and auto insurance manufacturing business in the prior year. These factors were partially offset by higher revenues from group annuity sales in Canadian Insurance, and the impact of restructured international life contracts, both of which are largely offset in PBCAE.

Banking revenue increased $262 million or 5%, primarily due to increased loan syndication activity mainly in the U.S. and Canada, and higher card service revenue.

Underwriting and other advisory revenue increased $217 million or 12%, primarily reflecting increased debt origination activity mainly in the U.S. and Canada. Higher mergers and acquisitions (M&A) activity, largely in the U.S. and Europe also contributed to the increase.

Other revenue increased $371 million from last year largely reflecting the change in fair value of our U.S. share-based compensation plan, which is largely offset in non-interest expense, and a gain from the disposition of certain securities. Our results also include our share of the gain from the sale of the U.S. operations of Moneris in the current year which was more than offset by the gain from the sale of our home and auto insurance manufacturing business in the prior year.

Additional trading information

Table 8

(Millions of Canadian dollars)	2017	2016
Total trading revenue (1)		
Net interest income	$ 2,370	$ 2,376
Non-interest income	806	701
Total trading revenue	**$ 3,176**	$ 3,077
Total trading revenue by product		
Interest rate and credit (2)	$ 1,796	$ 1,830
Equities	895	684
Foreign exchange and commodities (2)	485	563
Total trading revenue	**$ 3,176**	$ 3,077
Trading revenue (teb) by product		
Interest rate and credit (2)	$ 1,796	$ 1,830
Equities	1,221	1,166
Foreign exchange and commodities (2)	485	564
Total trading revenue (teb)	**$ 3,502**	$ 3,560
Trading revenue (teb) by product – Capital Markets		
Interest rate and credit	$ 1,466	$ 1,473
Equities	1,251	1,205
Foreign exchange and commodities	331	402
Total Capital Markets trading revenue (teb)	**$ 3,048**	$ 3,080

(1) Includes a gain of $170 million (2016 – $49 million gain) related to a funding valuation adjustment on uncollateralized OTC derivatives.
(2) Amounts have been revised from previously reported.

2017 vs. 2016
Total trading revenue of $3,176 million, which comprises trading-related revenue recorded in Net interest income and Non-interest income, was up $99 million, or 3%, mainly due to higher equity trading revenue in Europe and Asia & other international, partially offset by lower fixed income trading revenue mainly in the U.S., and lower foreign exchange trading revenue across all regions.

Provision for credit losses (PCL)

2017 vs. 2016
Total PCL of $1,150 million decreased $396 million or 26% from a year ago, mainly due to lower PCL in Capital Markets, Personal & Commercial Banking, and Wealth Management. The total PCL ratio of 21 bps improved 8 bps.

For further details on PCL, refer to Credit quality performance in the Credit Risk section.

Insurance policyholder benefits, claims and acquisition expense (PBCAE)

2017 vs. 2016
PBCAE of $3,053 million decreased $371 million or 11% from the prior year, mainly due to a change in the fair value of investments backing our policyholder liabilities, largely offset in revenue. Lower claims reflecting the impact from the sale of our home and auto insurance manufacturing business in the prior year and higher favourable annual actuarial assumption updates largely reflecting changes in credit and discount rates and favourable mortality experience, mainly in the U.K., also contributed to the decrease. These factors were partially offset by the impact from group annuity sales and restructured international life contracts, both of which are largely offset in revenue.

Non-interest expense

Table 9

(Millions of Canadian dollars, except percentage amounts) (1)	2017	2016
Salaries	$ 5,936	$ 5,865
Variable compensation	5,203	4,583
Benefits and retention compensation	1,792	1,674
Share-based compensation	399	255
Human resources	$ 13,330	$ 12,377
Equipment	1,434	1,438
Occupancy	1,588	1,568
Communications	1,011	945
Professional fees	1,214	1,078
Amortization of other intangibles	1,015	970
Other	2,202	2,150
Non-interest expense	$ 21,794	$ 20,526
Efficiency ratio (2)	53.6%	52.9%
Efficiency ratio adjusted (3)	53.5%	53.8%

(1) Effective Q4 2017, service fees and other costs incurred in association with certain commissions and fees earned are presented on a gross basis in non-interest expense. Comparative amounts have been reclassified to conform with this presentation.
(2) Efficiency ratio is calculated as non-interest expense divided by total revenue.
(3) Measures have been adjusted by excluding the change in fair value of investments backing our policyholder liabilities. These are non-GAAP measures. For further details, refer to the Key performance and non-GAAP measures section.

2017 vs. 2016

Non-interest expense increased $1,268 million or 6%, largely due to increased staff-related costs including severance, and higher costs in support of business growth reflecting ongoing investments in technology, including digital initiatives, and increased marketing costs. The change in fair value of our U.S. share-based compensation plan, which is largely offset in revenue, also contributed to the increase. These factors were partially offset by the impact of foreign exchange translation and continued benefits from our efficiency management activities.

Our efficiency ratio of 53.6% increased 70 bps from 52.9% last year. Excluding the change in fair value of investments backing our policyholder liabilities, our efficiency ratio of 53.5% decreased 30 bps from last year mainly driven by the impact of foreign exchange translation and continued benefits from our efficiency management activities. These factors were partially offset by increased staff-related costs including severance and higher costs in support of business growth as noted above.

Efficiency ratio excluding the change in fair value of investments backing our policyholder liabilities is a non-GAAP measure. For further details, including a reconciliation, refer to the Key performance and non-GAAP measures section.

Income and other taxes

Table 10

(Millions of Canadian dollars, except percentage amounts)	2017	2016
Income taxes	$ 3,203	$ 2,841
Other taxes		
Goods and services sales taxes	$ 446	$ 442
Payroll taxes	643	627
Capital taxes	88	106
Property taxes	140	134
Insurance premium taxes	30	45
Business taxes	46	69
	$ 1,393	$ 1,423
Total income and other taxes	$ 4,596	$ 4,264
Income before income taxes	$ 14,672	$ 13,299
Canadian statutory income tax rate (1)	26.5%	26.5%
Lower average tax rate applicable to subsidiaries	(3.5)%	(2.6)%
Tax-exempt income from securities	(2.0)%	(3.1)%
Tax rate change	(0.1)%	–%
Effect of previously unrecognized tax loss, tax credit or temporary differences	–%	(0.4)%
Other	0.9%	1.0%
Effective income tax rate	21.8%	21.4%
Effective total tax rate (2)	28.6%	29.0%

(1) Blended Federal and Provincial statutory income tax rate.
(2) Total income and other taxes as a percentage of income before income taxes and other taxes.

2017 vs. 2016
Income tax expense increased $362 million or 13% from last year, mainly due to higher Income before income taxes. The effective tax rate of 21.8% increased 40 bps, mainly due to lower tax-exempt income and the impact from the gain on sale of our home and auto insurance manufacturing business of $287 million ($235 million after-tax) in 2016. These factors were partially offset by our share of a gain related to the sale of our U.S. operations of Moneris of $212 million (before- and after-tax) in the current year.

Other taxes decreased $30 million or 2% from 2016, mainly due to lower business taxes, capital taxes and insurance premiums, partially offset by an increase in payroll taxes. In addition to the income and other taxes reported in our Consolidated Statement of Income, we recorded income taxes of $469 million (2016: recovery of $438 million) in our Consolidated Statement of Comprehensive Income, primarily reflecting the remeasurement of employee benefit plans, net gains on derivatives designated as cash flow hedges, and net foreign currency translation gains from hedging activities.

Client assets

Assets under administration
Assets under administration (AUA) are assets administered by us which are beneficially owned by our clients. We provide services that are administrative in nature, including safekeeping, collecting investment income, settling purchase and sale transactions, and record keeping. Underlying investment strategies within AUA are determined by our clients and generally do not impact the administrative fees that we receive. Administrative fees can be impacted by factors such as asset valuation level changes from market movements, types of services administered, transaction volumes, geography and client relationship pricing based on volumes or multiple services.

Our Investor & Treasury Services business is the primary business segment that has AUA with approximately 78% of total AUA, as at October 31, 2017, followed by our Wealth Management and Personal & Commercial Banking businesses with approximately 17% and 5% of total AUA, respectively.

2017 vs. 2016
AUA increased $414 billion or 8% compared to last year, mainly reflecting capital appreciation.

The following table summarizes AUA by geography and asset class:

AUA by geographic mix and asset class — Table 11

(Millions of Canadian dollars)	2017	2016
Canada (1)		
Money market	$ 33,100	$ 33,000
Fixed income	730,100	731,200
Equity	765,800	705,900
Multi-asset and other	774,900	733,800
Total Canada	$ 2,303,900	$ 2,203,900
U.S. (1)		
Money market	$ 35,400	$ 36,400
Fixed income	124,500	126,800
Equity	238,100	200,800
Multi-asset and other	57,500	44,800
Total U.S.	$ 455,500	$ 408,800
Other International (1)		
Money market	$ 43,300	$ 50,300
Fixed income	387,500	426,200
Equity (2)	867,600	836,300
Multi-asset and other (2)	1,415,500	1,133,400
Total International	$ 2,713,900	$ 2,446,200
Total AUA	$ 5,473,300	$ 5,058,900

(1) Geographic information is based on the location from where our clients are serviced.
(2) Amounts have been revised from those previously presented.

Assets under management
Assets under management (AUM) are assets managed by us which are beneficially owned by our clients. Management fees are paid by the investment funds for the investment capabilities of an investment manager and can also cover administrative services. Management fees may be calculated daily, monthly or quarterly as a percentage of the AUM, depending on the distribution channel, product and investment strategies. In general, equity strategies carry a higher fee rate than fixed income or money market strategies. Fees are also impacted by asset mix and relationship pricing for clients using multiple services. Higher risk assets generally produce higher fees, while clients using multiple services can take advantage of synergies which reduce the fees they are charged. Certain funds may have performance fee arrangements. Performance fees are recorded when certain benchmarks or performance targets are achieved. These factors could lead to differences on fees earned by products and therefore net return by asset class may vary despite similar average AUM. Our Wealth Management segment is the primary business segment with approximately 99% of total AUM.

2017 vs. 2016
AUM increased $54 billion or 9% compared to last year, primarily due to capital appreciation and net sales, partially offset by the impact of foreign exchange translation.

The following table presents the change in AUM for the year ended October 31, 2017:

Client assets – AUM — Table 12

(Millions of Canadian dollars)	2017 Money market	Fixed income	Equity	Multi-asset and other	Total	2016 Total
AUM, beginning balance	$ 47,900	$ 198,700	$ 100,800	$ 238,900	$ 586,300	$ 498,400
Institutional inflows	27,200	31,500	6,600	4,000	69,300	55,200
Institutional outflows	(37,900)	(32,800)	(4,800)	(2,300)	(77,800)	(72,100)
Personal flows, net	800	2,100	10,300	18,400	31,600	21,600
Total net flows	(9,900)	800	12,100	20,100	23,100	4,700
Market impact	–	3,600	18,200	20,600	42,400	21,500
Acquisitions/dispositions	–	–	–	(4,000)	(4,000)	58,100
Foreign exchange	(1,100)	(2,200)	(2,400)	(2,200)	(7,900)	3,600
Total market, acquisitions/dispositions and foreign exchange impact	(1,100)	1,400	15,800	14,400	30,500	83,200
AUM, balance at end of year	$ 36,900	$ 200,900	$ 128,700	$ 273,400	$ 639,900	$ 586,300

Business segment results

Results by business segments

Table 13

(Millions of Canadian dollars, except percentage amounts)	2017 Personal & Commercial Banking	Wealth Management	Insurance	Investor & Treasury Services	Capital Markets (1)	Corporate Support (1)	Total	2016 Total
Net interest income	$ 10,787	$ 2,248	$ –	$ 679	$ 3,565	$ (139)	$ 17,140	$ 16,531
Non-interest income (2)	5,076	7,827	4,566	1,756	4,617	(313)	23,529	22,264
Total revenue (2)	$ 15,863	$ 10,075	$ 4,566	$ 2,435	$ 8,182	$ (452)	$ 40,669	$ 38,795
PCL	1,054	34	–	–	62	–	1,150	1,546
PBCAE	–	–	3,053	–	–	–	3,053	3,424
Non-interest expense (2)	7,176	7,611	584	1,466	4,719	238	21,794	20,526
Net income before income taxes	$ 7,633	$ 2,430	$ 929	$ 969	$ 3,401	$ (690)	$ 14,672	$ 13,299
Income tax	1,878	592	203	228	876	(574)	3,203	2,841
Net income	$ 5,755	$ 1,838	$ 726	$ 741	$ 2,525	$ (116)	$ 11,469	$ 10,458
ROE (3)	28.3%	13.2%	41.8%	22.7%	12.9%	n.m.	17.0%	16.3%
Average assets	$ 421,100	$ 88,100	$ 14,300	$ 138,100	$ 494,400	$ 30,600	$1,186,600	$ 1,176,400

(1) Net interest income, total revenue and net income before income taxes are presented in Capital Markets on a taxable equivalent basis (teb). The teb adjustment is eliminated in the Corporate Support segment. For a further discussion, refer to the How we measure and report our business segments section.
(2) Effective Q4 2017, service fees and other costs incurred in association with certain commissions and fees earned are presented on a gross basis in non-interest expense. Comparative amounts have been reclassified to conform with this presentation.
(3) This measure may not have a standardized meaning under GAAP and may not be comparable to similar measures disclosed by other financial institutions. For further details, refer to the Key performance and non-GAAP measures section.
n.m. not meaningful

How we measure and report our business segments

Our management reporting framework is intended to measure the performance of each business segment as if it were a stand-alone business and reflects the way that the business segment is managed. This approach is intended to ensure that our business segments' results include all applicable revenue and expenses associated with the conduct of their business and depicts how management views those results.

Key methodologies
The following outlines the key methodologies and assumptions used in our management reporting framework. These are periodically reviewed by management to ensure they remain valid.

Expense allocation
To ensure that our business segments' results include expenses associated with the conduct of their business, we allocate costs incurred or services provided by Technology & Operations and Functions, which are directly undertaken or provided on the business segments' behalf. For other costs not directly attributable to our business segments, including overhead costs and other indirect expenses, we use our management reporting framework for allocating these costs to each business segment in a manner that is intended to reflect the underlying benefits. In 2017, we maintained some of our severance and related costs in Corporate Support.

Capital attribution
Our management reporting framework also determines the attribution of capital to our business segments in a manner that is intended to consistently measure and align economic costs with the underlying benefits and risks associated with the activities of each business segment. The amount of capital assigned to each business segment is referred to as attributed capital. Unattributed capital and associated net charges are reported in Corporate Support. For further information, refer to the Capital management section.

Funds transfer pricing
Funds transfer pricing refers to the pricing of intra-company borrowing or lending for management reporting purposes. We employ a funds transfer pricing process to enable risk-adjusted management reporting of segment results. This process determines the costs and revenue for intra-company borrowing and lending of funds after taking into consideration our interest rate risk and liquidity risk management objectives, as well as applicable regulatory requirements.

Provisions for credit losses
PCL are recorded to recognize estimated losses on impaired loans and losses that have been incurred but not yet identified in our total loans portfolio. This credit portfolio includes on-balance sheet exposures, such as loans and acceptances, and off-balance sheet items such as letters of credit, guarantees and unfunded commitments. PCL on impaired loans are included in the results of each business segment to fully reflect the appropriate expenses related to the conduct of each business segment. PCL on loans not yet identified as impaired are included in Corporate Support, as Group Risk Management (GRM) effectively controls this through its monitoring and oversight of various lending portfolios throughout the enterprise. For details on our accounting policy on Allowance for credit losses, refer to Note 2 of our 2017 Annual Consolidated Financial Statements.

In addition to the key methodologies described above, the following highlights the key aspects of how some of our business segments are managed and reported:

- Wealth Management reported results also include disclosure in U.S. dollars, primarily for U.S. Wealth Management (including City National) as we review and manage the results of this business largely in this currency.
- Capital Markets results are reported on a taxable equivalent basis (teb), which grosses up total revenue from certain tax-advantaged sources (Canadian taxable corporate dividends and the U.S. tax credit investment business) to their effective taxable equivalent value with a corresponding offset recorded in the provision for income taxes. We record the elimination of the teb adjustments in Corporate Support. We believe these adjustments are useful and reflect how Capital Markets manages its business, since it enhances the comparability of revenue and related ratios across taxable revenue and our principal tax-advantaged source of revenue. The use of teb adjustments and measures may not be comparable to similar generally accepted accounting principles (GAAP) measures or similarly adjusted amounts disclosed by other financial institutions.
- Corporate Support results include all enterprise level activities that are undertaken for the benefit of the organization that are not allocated to our five business segments, such as enterprise funding, securitizations, net charges associated with unattributed capital, and consolidation adjustments, including the elimination of the teb gross-up amounts.

Key performance and non-GAAP measures

Performance measures
Return on common equity (ROE)
We measure and evaluate the performance of our consolidated operations and each business segment using a number of financial metrics, such as net income and ROE. We use ROE, at both the consolidated and business segment levels, as a measure of return on total capital invested in our business. Management views the business segment ROE measure as a useful measure for supporting investment and resource allocation decisions because it adjusts for certain items that may affect comparability between business segments and certain competitors.

Our consolidated ROE calculation is based on net income available to common shareholders divided by total average common equity for the period. Business segment ROE calculations are based on net income available to common shareholders divided by average attributed capital for the period. For each segment, average attributed capital includes the capital required to underpin various risks as described in the Capital management section and amounts invested in goodwill and intangibles.

The attribution of capital involves the use of assumptions, judgments and methodologies that are regularly reviewed and revised by management as deemed necessary. Changes to such assumptions, judgments and methodologies can have a material effect on the business segment ROE information that we report. Other companies that disclose information on similar attributions and related return measures may use different assumptions, judgments and methodologies.

The following table provides a summary of our ROE calculations:

Calculation of ROE — **Table 14**

(Millions of Canadian dollars, except percentage amounts)	2017 Personal & Commercial Banking	Wealth Management	Insurance	Investor & Treasury Services	Capital Markets	Corporate Support	2017 Total	2016 Total
Net income available to common shareholders	$ 5,659	$ 1,775	$ 718	$ 725	$ 2,438	$ (187)	$ 11,128	$ 10,111
Total average common equity (1), (2)	20,000	13,450	1,700	3,200	18,850	8,100	65,300	62,200
ROE (3)	28.3%	13.2%	41.8%	22.7%	12.9%	n.m.	17.0%	16.3%

(1) Total average common equity represents rounded figures.
(2) The amounts for the segments are referred to as attributed capital. Effective the first quarter of 2017, we increased our capital attribution rate to better align with higher regulatory capital requirements.
(3) ROE is based on actual balances of average common equity before rounding.
n.m. not meaningful

Embedded value for Insurance operations
Embedded value is a measure of shareholder value embedded in the balance sheet of our Insurance segment, excluding any value from future new sales. We use the change in embedded value between reporting periods as a measure of the value created by the insurance operations during the period.

We define embedded value as the value of equity held in our Insurance segment and the value of in-force business (existing policies). The value of in-force business is calculated as the present value of future expected earnings on in-force business less the cost of capital required to support in-force business. We use discount rates equal to long-term risk free rates plus a spread. Required capital uses the capital frameworks in the jurisdictions in which we operate.

Key drivers affecting the change in embedded value from period to period are new sales, investment performance, claims and policyholder experience, change in actuarial assumptions, changes in foreign exchange rates and changes in shareholder equity arising from transfers in capital.

Embedded value does not have a standardized meaning under GAAP and may not be directly comparable to similar measures disclosed by other companies. Given that this measure is specifically used for our Insurance segment and involves the use of discount rates to determine the present value of the future expected earnings and capital required for the in-force business, reconciliation to financial statements information is not applicable.

Non-GAAP measures

We believe that certain non-GAAP measures described below are more reflective of our ongoing operating results and provide readers with a better understanding of management's perspective on our performance. These measures enhance the comparability of our financial performance for the year ended October 31, 2017 with results from last year as well as, in the case of economic profit, measure relative contribution to shareholder value. Non-GAAP measures do not have a standardized meaning under GAAP and may not be comparable to similar measures disclosed by other financial institutions.

The following discussion describes the non-GAAP measures we use in evaluating our operating results.

Economic profit

Economic profit is net income excluding the after-tax effect of amortization of other intangibles less a capital charge for use of attributed capital. It measures the return generated by our businesses in excess of our cost of shareholders' equity, thus enabling users to identify relative contributions to shareholder value.

The capital charge includes a charge for common equity and preferred shares. Effective the first quarter of 2017, we revised our cost of equity to 8.5% from 9.0% for 2016, largely as a result of lower long-term interest rates.

The following table provides a summary of our Economic profit:

Economic Profit — **Table 15**

	2017						
(Millions of Canadian dollars)	Personal & Commercial Banking	Wealth Management	Insurance	Investor & Treasury Services	Capital Markets	Corporate Support	Total
Net income	$ 5,755	$ 1,838	$ 726	$ 741	$ 2,525	$ (116)	$ 11,469
add: Non-controlling interests	(5)	–	–	(1)	–	(35)	(41)
After-tax effect of amortization of other intangibles	11	179	–	15	–	1	206
Adjusted net income (loss)	$ 5,761	$ 2,017	$ 726	$ 755	$ 2,525	$ (150)	$ 11,634
less: Capital charge	1,791	1,206	154	286	1,690	722	5,849
Economic profit (loss)	$ 3,970	$ 811	$ 572	$ 469	$ 835	$ (872)	$ 5,785

	2016						
(Millions of Canadian dollars)	Personal & Commercial Banking	Wealth Management	Insurance	Investor & Treasury Services	Capital Markets	Corporate Support	Total
Net income	$ 5,184	$ 1,473	$ 900	$ 613	$ 2,270	$ 18	$ 10,458
add: Non-controlling interests	(8)	–	–	(1)	–	(44)	(53)
After-tax effect of amortization of other intangibles	12	183	–	16	–	1	212
Adjusted net income (loss)	$ 5,188	$ 1,656	$ 900	$ 628	$ 2,270	$ (25)	$ 10,617
less: Capital charge	1,756	1,229	160	316	1,694	738	5,893
Economic profit (loss)	$ 3,432	$ 427	$ 740	$ 312	$ 576	$ (763)	$ 4,724

Results excluding specified items

Our results were impacted by the following specified items:

- For the year ended October 31, 2017, our share of a gain related to the sale by our payment processing joint venture Moneris of its U.S. operations to Vantiv, Inc., which was $212 million (before- and after-tax) and recorded in Personal & Commercial Banking.
- For the year ended October 31, 2016, a gain from the sale of our home and auto insurance manufacturing business, RBC General Insurance Company, to Aviva Canada Inc. (Aviva), which was $287 million ($235 million after-tax) and recorded in Insurance.

The following tables provide calculations of our business segment results and measures excluding these specified items:

Personal & Commercial Banking — **Table 16**

(Millions of Canadian dollars, except percentage amounts) (1)	2017		
		Item excluded	
	As reported	Gain related to the sale by Moneris (2)	Adjusted
Total revenue	$ 15,863	$ (212)	$ 15,651
PCL	1,054	–	1,054
Non-interest expense	7,176	–	7,176
Net income before income taxes	$ 7,633	$ (212)	$ 7,421
Net income	$ 5,755	$ (212)	$ 5,543
Other information			
Non-interest expense	$ 7,176	$ –	$ 7,176
Total revenue	15,863	(212)	15,651
Efficiency ratio	45.2%		45.9%
Revenue growth rate	5.7%		4.3%
Non-interest expense growth rate	3.5%		3.5%
Operating leverage	2.2%		0.8%

(1) Effective Q4 2017, service fees and other costs incurred in association with certain commissions and fees earned are presented on a gross basis in non-interest expense. Comparative amounts have been reclassified to conform with this presentation.
(2) Includes foreign currency translation.

Canadian Banking — **Table 17**

(Millions of Canadian dollars, except percentage amounts) (1)	2017		
		Item excluded	
	As reported	Gain related to the sale by Moneris (2)	Adjusted
Total revenue	$ 14,877	$ (212)	$ 14,665
PCL	1,016	–	1,016
Non-interest expense	6,423	–	6,423
Net income before income taxes	$ 7,438	$ (212)	$ 7,226
Net income	$ 5,571	$ (212)	$ 5,359
Other information			
Non-interest expense	$ 6,423	$ –	$ 6,423
Total revenue	14,877	(212)	14,665
Efficiency ratio	43.2%		43.8%
Revenue growth rate	6.2%		4.7%
Non-interest expense growth rate	3.8%		3.8%
Operating leverage	2.4%		0.9%

(1) Effective Q4 2017, service fees and other costs incurred in association with certain commissions and fees earned are presented on a gross basis in non-interest expense. Comparative amounts have been reclassified to conform with this presentation.
(2) Includes foreign currency translation.

Insurance — **Table 18**

(Millions of Canadian dollars, except percentage amounts)	2016 As reported	2016 Item excluded: Gain related to the sale of RBC General Insurance Company	2016 Adjusted
Total revenue	$ 5,151	$ (287)	$ 4,864
PBCAE	3,424	–	3,424
Non-interest expense (1)	623	–	623
Net income before income taxes	$ 1,104	$ (287)	$ 817
Net income	$ 900	$ (235)	$ 665
Other information			
ROE	52.8%		41.0%

(1) Includes Provision for credit losses of $1 million.

Efficiency ratio excluding the change in fair value of investments in Insurance
Our efficiency ratio is impacted by the change in fair value of investments backing our policyholder liabilities, which is reported in revenue and largely offset in PBCAE.

The following table provides calculations of our consolidated efficiency ratio excluding the change in fair value of investments backing our policyholder liabilities:

Consolidated non-GAAP efficiency ratio — **Table 19**

(Millions of Canadian dollars, except percentage amounts) (1)	2017 As reported	2017 Items excluded: Change in fair value of investments backing policyholder liabilities	2017 Adjusted	2016 As reported	2016 Items excluded: Change in fair value of investments backing policyholder liabilities	2016 Adjusted
Total revenue	**$40,669**	**$ 58**	**$40,727**	$38,795	$ (633)	$ 38,162
Non-interest expense	**21,794**	**–**	**21,794**	20,526	–	20,526
Efficiency ratio	**53.6%**		**53.5%**	52.9%		53.8%

(1) Effective Q4 2017, service fees and other costs incurred in association with certain commissions and fees earned are presented on a gross basis in non-interest expense. Comparative amounts have been reclassified to conform with this presentation.

Personal & Commercial Banking

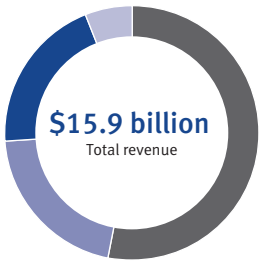
Personal & Commercial Banking provides a broad suite of financial products and services, and aims to provide an exceptional client experience to individuals and businesses for their day-to-day banking, purchase of a home and investment needs. We have meaningful relationships with many of our clients underscored by the breadth of our products and depth of expertise across our businesses.

› 13 million
Number of clients

› 6 million
Active digital users

34,773
Employees

Revenue by business lines



- 53% Personal Financial Services
- 21% Business Financial Services
- 20% Cards and Payment Solutions
- 6% Caribbean and U.S. Banking

We operate through two businesses – Canadian Banking and Caribbean & U.S. Banking. Canadian Banking serves our home market in Canada, where we maintain top (#1 or #2) rankings in market share in this competitive environment for all key retail and business financial product categories. We have the largest branch network, the most ATMs and one of the largest mobile sales networks across Canada. In Caribbean & U.S. Banking, we offer a broad range of financial products and services in targeted markets.

In Canada, we compete with other Schedule 1 banks, independent trust companies, foreign banks, credit unions, caisses populaires and auto financing companies.

In the Caribbean, our competition includes banks, trust companies and investment management companies serving retail and corporate customers, as well as public institutions. In the U.S., we compete primarily with other Canadian banking institutions with U.S. operations.

2017 Operating environment

- Strong employment growth in Canada boosted consumer confidence which resulted in strong volume growth across most of our Canadian Banking lending and deposit products.
- Continued strong demand for housing in Canada resulted in solid growth in client mortgage balances.
- Growth in our investment product balances, driven by solid equity market returns and increased client confidence.
- A low interest rate environment coupled with competitive pressures persisted for most of 2017. This was partially offset by the Bank of Canada rate increases in July and September.
- Improved credit conditions due to lower national unemployment and improved economic conditions, especially in oil exposed provinces.
- In the Caribbean, the region continued to experience underlying economic challenges which has negatively impacted growth in our loan and deposit balances.
- Technology is transforming the way we operate and interact with our clients. Therefore, we continued to invest in digital solutions to improve the client experience and deliver personalized advice.

Strategic priorities

OUR STRATEGY	PROGRESS IN 2017	PRIORITIES IN 2018
Transform how we serve our clients	Continued to provide exceptional and secure client experiences via mobile platforms, releasing more mobile functionality than our competitors Focused on innovating our branch network, including the opening of new alternative branch formats	Deliver anytime, anywhere solutions to our clients across distribution channels, integrating mobile and digital devices and capabilities into our clients' lives Continue to reimagine our branch network to meet the evolving needs of our clients
Accelerate our growth in key segments	Targeted high-growth client segments to increase our presence in and deliver customized advice to underserviced groups, including retirees, youth, newcomers and business owners	Focus on engaging key segments to build new and deeper relationships and achieve industry leading volume growth
Rapidly deliver digital solutions to our clients	Leveraged artificial intelligence to create NOMI Insights™ and NOMI Find & Save™, becoming the first bank in Canada to offer clients personalized digital financial insights and a fully automated savings service Introduced Interac E-transfers with iMessage and Siripay Launched MyAdvisor, an online advice platform to remotely connect a client to an advisor Introduced CreditView Dashboard to provide clients with online access to their credit score	Introduce more personalized insights to improve the customer experience while continuing to simplify and digitize everyday banking Enhance the digital experience for our small business and commercial clients and make it easier to do business with us
Innovate to become a more agile and efficient bank	Accelerated our investments to simplify, digitize and automate activities and processes for both clients and employees	Continue to invest in new tools and capabilities and proactively seek ways to simplify internal processes and the client experience
In the Caribbean	Continued to streamline our branch network and invest in our mobile banking platform Rolled out voice enabled ATMs in the Trinidad market – a first of its kind	Continue to transform our business by investing in our distribution network supported by digital innovations, self-serve channels, redesigned branches and a proactive mobile sales force to grow and retain our target retail, business and corporate client base
In the U.S.	Continued strong growth in our U.S. cross-border client base supported by significant enhancements to our online banking capabilities, driving increased client engagement	Strive to fully digitize our account opening processes, deliver on targeted marketing, content and service partnerships and further enhancements to the digital banking experience to drive client acquisition and volume growth

Outlook

The Canadian economy is expected to grow by 2.1% in calendar 2018, driven by stronger business investment, exports and government spending, offset by slower consumer spending growth. Given recent regulatory measures implemented by the Federal government in 2017, we expect the housing market to moderate, which could impact demand for mortgage products. Although the BoC raised its overnight rate twice in 2017, we expect a pause until the second calendar quarter of 2018 as the BoC remains cautious regarding future rate increases. The rate increases in 2017, as well as any future increases, will continue to have an impact on our net interest margins, partially offset by ongoing competitive pressures. We continue to maintain our focus on strengthening business performance by pursuing industry leading volume growth, operational efficiency efforts and channel transformation to achieve our vision of being a Digitally Enabled Relationship Bank.

In the Caribbean, we are focused on transforming our business in order to be the best bank for our target retail, business and corporate clients, by building an organization with a multi-channel distribution network supported by digital innovations.

For further details on our general economic review and outlook, refer to the Economic, market and regulatory review and outlook section.

Personal & Commercial Banking — Table 20

(Millions of Canadian dollars, except percentage amounts and as otherwise noted) (1)	2017	2016
Net interest income	$ 10,787	$ 10,337
Non-interest income	5,076	4,675
Total revenue	15,863	15,012
PCL	1,054	1,122
Non-interest expense	7,176	6,933
Income before income taxes	7,633	6,957
Net income	$ 5,755	$ 5,184
Revenue by business		
Canadian Banking	$ 14,877	$ 14,009
Caribbean & U.S. Banking	986	1,003
Key ratios		
ROE	28.3%	27.5%
NIM	2.68%	2.68%
Efficiency ratio	45.2%	46.2%
Efficiency ratio adjusted (2)	45.9%	n.a.
Operating leverage	2.2%	1.3%
Operating leverage adjusted (2)	0.8%	n.a.
Selected average balance sheet information		
Total assets	$ 421,100	$ 403,800
Total earning assets	403,100	385,400
Loans and acceptances	402,500	383,900
Deposits	344,400	320,100
Other information		
AUA (3)	$ 264,800	$ 239,600
AUM	4,600	4,600
Number of employees (FTE) (4)	34,773	35,362
Effective income tax rate	24.6%	25.5%
Credit information		
Gross impaired loans as a % of related loans and acceptances	0.36%	0.43%
PCL on impaired loans as a % of average net loans and acceptances	0.26%	0.29%

(1) Effective Q4 2017, service fees and other costs incurred in association with certain commissions and fees earned are presented on a gross basis in non-interest expense. Comparative amounts have been reclassified to conform with this presentation.
(2) Measures have been adjusted by excluding our share of the Q1 2017 gain related to the sale of the U.S. operations of Moneris of $212 million (before- and after-tax). These are non-GAAP measures. For further details, refer to the Key performance and non-GAAP measures section.
(3) AUA includes $18.4 billion and $8.4 billion (2016 – $18.6 billion and $9.6 billion) of securitized residential mortgages and credit card loans, respectively.
(4) Amounts have been revised from previously reported.
n.a. not applicable

Financial performance

2017 vs. 2016

Net income increased $571 million or 11% from the prior year. Excluding our share of the gain related to the sale of the U.S. operations of Moneris of $212 million (before- and after-tax), net income increased $359 million or 7%, mainly due to volume growth of 6%. Higher fee-based revenue in Canada and lower PCL also contributed to the increase. These factors were partially offset by higher costs, including costs in support of business growth.

Total revenue increased $851 million or 6% from the prior year. Excluding our share of the gain noted previously, revenue increased $639 million or 4% mainly due to volume growth of 6%, and higher fee-based revenue in Canada primarily attributable to higher balances driving higher mutual fund distribution fees. Higher card service revenue due to higher purchase volumes also contributed to the increase.

NIM was flat.

PCL decreased $68 million or 6%, with the PCL ratio improving 3 bps, largely due to lower provisions in our Canadian lending portfolios. For further details, refer to Credit quality performance in the Credit Risk section.

Non-interest expense increased $243 million or 4%, primarily attributable to higher costs in support of business growth reflecting ongoing investments in technology, including digital initiatives, and higher marketing costs. Higher staff-related costs, including severance, and an impairment related to properties held for sale in the Caribbean also contributed to the increase. These factors were partially offset by the continued benefits from our efficiency management activities.

Average loans and acceptances increased $19 billion or 5%, largely due to growth in Canadian residential mortgages and business loans.

Average deposits increased $24 billion or 8%, reflecting growth in business and personal deposits.

Results excluding the specified item noted previously are non-GAAP measures. For further details, including a reconciliation, refer to the Key performance and non-GAAP measures section.

In Canada, we operate through three business lines: Personal Financial Services, Business Financial Services, and Cards and Payment Solutions. The following provides a discussion of our consolidated Canadian Banking results.

Canadian Banking financial highlights — **Table 21**

(Millions of Canadian dollars, except percentage amounts and as otherwise noted) (1)	2017	2016
Net interest income	$ 10,128	$ 9,683
Non-interest income	4,749	4,326
Total revenue	14,877	14,009
PCL	1,016	1,080
Non-interest expense	6,423	6,186
Net income before income taxes	7,438	6,743
Net income	$ 5,571	$ 5,002
Revenue by business		
Personal Financial Services	$ 8,331	$ 7,986
Business Financial Services	3,357	3,190
Cards and Payment Solutions	3,189	2,833
Key Ratios		
ROE	32.9%	32.6%
NIM	2.62%	2.63%
Efficiency ratio	43.2%	44.2%
Efficiency ratio adjusted (2)	43.8%	n.a.
Operating leverage	2.4%	1.2%
Operating leverage adjusted (2)	0.9%	n.a.
Selected average balance sheet information		
Total assets	$ 398,500	$ 381,000
Total earning assets	386,000	368,100
Loans and acceptances	393,400	374,600
Deposits	326,100	301,400
Other information		
AUA (3)	$ 256,400	$ 231,400
Number of employees (FTE) (4)	31,902	32,297
Effective income tax rate	25.1%	25.8%
Credit information		
Gross impaired loans as a % of related loans and acceptances	0.24%	0.27%
PCL on impaired loans as a % of average net loans and acceptances	0.26%	0.29%

(1) Effective Q4 2017, service fees and other costs incurred in association with certain commissions and fees earned are presented on a gross basis in non-interest expense. Comparative amounts have been reclassified to conform with this presentation.
(2) Measures have been adjusted by excluding our share of the Q1 2017 gain related to sale of the U.S. operations of Moneris of $212 million (before- and after-tax). These are non-GAAP measures. For further details, refer to the Key performance and non-GAAP measures section.
(3) AUA includes $18.4 billion and $8.4 billion (2016 – $18.6 billion and $9.6 billion) of securitized residential mortgages and credit card loans, respectively.
(4) Amounts have been revised from previously reported.
n.a. not applicable

Financial performance
2017 vs. 2016

Net income increased $569 million or 11% compared to last year. Excluding our share of the gain related to the sale of the U.S. operations of Moneris of $212 million (before- and after-tax), net income increased $357 million or 7%, largely due to volume growth of 6%, partially offset by lower spreads. Higher fee-based revenue and lower PCL also contributed to the increase. These factors were partially offset by higher costs, including costs in support of business growth.

Total revenue increased $868 million or 6% compared to last year. Excluding our share of the gain noted previously, revenue increased $656 million or 5%, mainly due to volume growth of 6%, partially offset by lower spreads, and higher fee-based revenue primarily attributable to higher balances driving higher mutual fund distribution fees. Increased card service revenue due to higher purchase volumes and higher foreign exchange revenue also contributed to the increase.

Net interest margin decreased 1 bp compared to last year.

PCL decreased $64 million or 6%, with the PCL ratio improving 3 bps, largely due to lower provisions in our personal lending portfolios. For further details, refer to Credit quality performance in the Credit Risk section.

Non-interest expense increased $237 million or 4%, primarily attributable to higher costs in support of business growth reflecting ongoing investments in technology, including digital initiatives, and higher marketing costs. Higher staff-related costs, including severance, also contributed to the increase. These factors were partially offset by continued benefits from our efficiency management activities.

Average loans and acceptances increased $19 billion or 5%, largely due to growth in residential mortgages and business loans.

Average deposits increased $25 billion or 8%, reflecting growth in business and personal deposits.

Results excluding the specified item noted previously are non-GAAP measures. For further details, including a reconciliation, refer to the Key performance and non-GAAP measures section.

Personal Financial Services

Personal Financial Services offers a full range of products focused on meeting the needs of our individual Canadian clients at every stage of their lives through a wide range of financing and investment products and services, including home equity financing, personal lending, deposit accounts, Canadian private banking, indirect lending (including auto financing), mutual funds distribution and self-directed brokerage accounts, and Guaranteed Investment Certificates (GICs). We rank #1 or #2 in market share for all key personal banking products in Canada and our retail banking network is the largest in Canada with 1,235 branches and 4,290 ATMs.

Financial performance

Total revenue increased $345 million or 4% compared to last year, primarily reflecting volume growth of 5% largely in residential mortgages and deposits, partially offset by lower spreads. Increased fee-based revenue primarily attributable to higher balances driving higher mutual fund distribution fees also contributed to the increase.

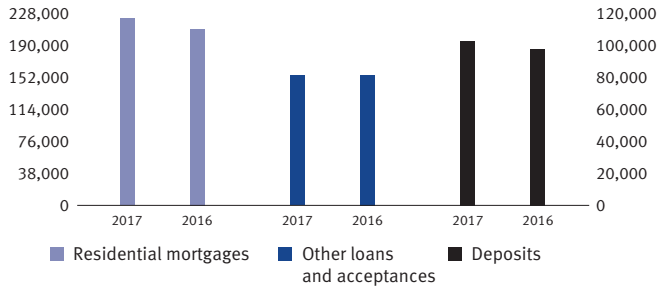
Average residential mortgages increased 6% compared to last year mainly due to solid housing market activity. Average deposits increased 5% from last year largely reflecting the acquisition of new clients and deepening of our existing relationships. Strong market appreciation and net sales resulted in continued growth in client mutual fund balances.

Selected highlights — Table 22

(Millions of Canadian dollars, except number of)	2017	2016
Total revenue (1)	$ 8,331	$ 7,986
Other information (average)		
Residential mortgages	222,500	210,400
Other loans and acceptances	81,400	81,800
Deposits (2)	195,700	185,600
Branch mutual fund balances (3)	148,400	132,100
AUA – Self-directed brokerage (3)	79,600	69,700
Number of:		
New deposit accounts opened (thousands)	1,306	1,346
Branches	1,235	1,268
ATM	4,290	4,555

(1) Effective Q4 2017, service fees and other costs incurred in association with certain commissions and fees earned are presented on a gross basis in non-interest expense. Comparative amounts have been reclassified to conform with this presentation.
(2) Includes GIC balances.
(3) Represents year-end spot balances.

Average residential mortgages, personal loans and deposits
(Millions of Canadian dollars)



Business Financial Services

Business Financial Services offers a wide range of lending, leasing, deposit, investment, foreign exchange, cash management, auto dealer financing (floor plan), trade products and services to small and medium-sized commercial businesses, as well as agriculture and agribusiness clients across Canada. Our business banking network has the largest team of relationship managers and specialists in the industry. Our strong commitment to our clients has resulted in our leading market share in business loans and deposits.

Financial performance

Total revenue increased $167 million or 5% compared to last year, largely reflecting volume growth of 11%, partially offset by lower spreads.

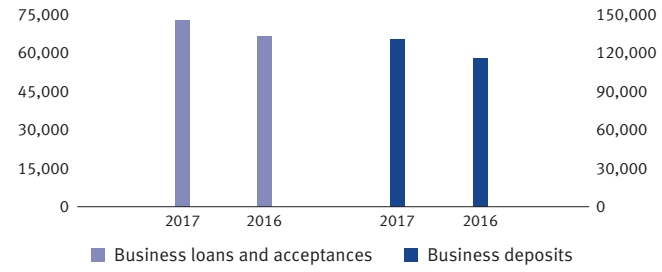
Average loans and acceptances increased 9% and average deposits were up 13%, mainly due to our strategy of new client acquisition in select business segments and markets, as well as increased activity from existing clients.

Selected highlights — Table 23

(Millions of Canadian dollars)	2017	2016
Total revenue	$ 3,357	$ 3,190
Other information (average)		
Loans and acceptances	72,500	66,400
Deposits (1)	130,400	115,800

(1) Includes GIC balances.

Average business loans and acceptances and business deposits
(Millions of Canadian dollars)



Cards and Payment Solutions

Cards and Payment Solutions provides a wide array of credit cards with loyalty and reward benefits, and payment products and solutions within Canada. We have over 7 million credit card accounts and have approximately 23% market share of Canada's credit card purchase volume. In addition, this business line includes our 50% interest in Moneris, our payment processing joint venture which sold its U.S. operations to Vantiv, Inc. during the year.

Financial performance

Total revenue increased $356 million or 13% compared to last year. Excluding our share of the gain noted previously, revenue increased $144 million or 5% mainly driven by higher loan balances and increased purchase volumes.

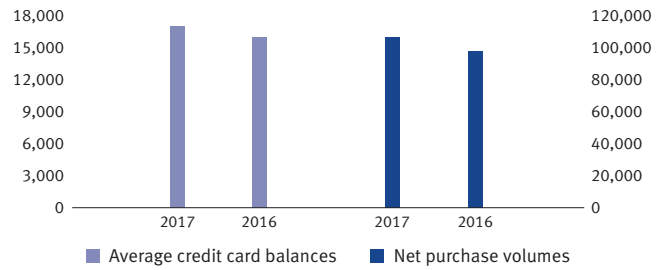
Average credit card balances increased 6% and net purchase volumes increased 9% reflecting higher client activity, underscored by the strength of our proprietary rewards program and our co-brand relationships.

Results excluding the specified item noted previously are non-GAAP measures. For further details, including a reconciliation, refer to the Key performance and non-GAAP measures section.

Selected highlights — Table 24

(Millions of Canadian dollars)	2017	2016
Total revenue	$ 3,189	$ 2,833
Other information		
Average credit card balances	17,000	16,000
Net purchase volumes	106,600	97,400

Average credit card balances and net purchase volumes (Millions of Canadian dollars)



Caribbean & U.S. Banking

Our Caribbean Banking business offers a comprehensive suite of banking products and services, as well as international financing and trade promotion services through extensive branch, ATM, online and mobile banking networks.

Our U.S. cross-border banking business serves the needs of our Canadian clients within the U.S., and offers a broad range of financial products and services to individual and business clients across all 50 states.

Financial performance

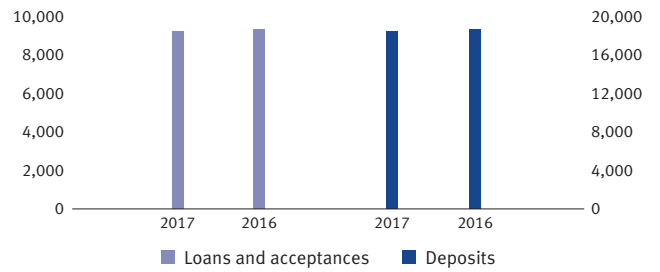
Total revenue was down $17 million or 2% from last year, primarily due to lower volumes and the impact of foreign exchange translation.

Average loans and acceptances decreased 2%, and average deposits decreased 2%, mostly due to lower client activity and the impact of foreign exchange translation.

Selected highlights — Table 25

(Millions of Canadian dollars, number of and percentage amounts)	2017	2016
Total revenue	$ 986	$ 1,003
Other information		
Net interest margin	3.85%	3.78%
Average loans and acceptances	$ 9,100	$ 9,300
Average deposits	18,300	18,700
AUA	8,400	8,200
AUM	4,600	4,600
Number of:		
Branches	67	77
ATM	266	276

Average loans and deposits (Millions of Canadian dollars)



Wealth Management

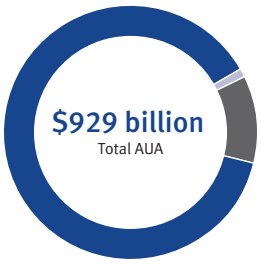
Wealth Management is a global business serving clients in key financial centres. We serve high net worth (HNW) and ultra-high net worth (UHNW) individual and institutional clients with a comprehensive suite of advice-based solutions and strategies to help them achieve their financial goals.

$10.1 billion
Total revenue

› 4,800
Client-facing advisors

› $19 billion
AUA net flows

Asset under Administration



88% Personal
11% Institutional
1% Mutual Funds

Asset under Management

32% Mutual Funds
34% Personal
34% Institutional

Our lines of businesses are comprised of Canadian Wealth Management, U.S. Wealth Management (including City National), Global Asset Management (GAM) and International Wealth Management.

- Canadian Wealth Management is the largest full-service wealth advisory business in Canada as measured by AUA
- U.S. Wealth Management (including City National) is among the top 10 full-service brokerage firms in terms of AUA and number of advisors
- GAM is the largest retail fund company in Canada as well as a leading institutional asset manager
- International Wealth Management serves HNW and UHNW clients primarily through key financial centres in Europe and Asia.

2017 Operating environment

- In 2017, the Canadian and U.S. economies continued to expand and respective central banks increased core interest rates. The strong economic performance resulted in improved investor confidence and stronger equity markets driving higher assets under management and assets under administration.
- Net sales and net new assets also benefitted from strong equity markets, offsetting the negative returns of the bond market as interest rates increased and are anticipated to continue rising in 2018.
- Strong loan growth and increased spreads due to the rising interest rate environment, mainly in the U.S., contributed to net interest income growth.
- Technology is transforming the way we operate and interact with our clients. Therefore, we continue to invest in digital solutions to anticipate and meet changing client preferences and increase efficiencies.

Strategic priorities

OUR STRATEGY	PROGRESS IN 2017	PRIORITIES IN 2018
In select global financial centres, become the most trusted regional private bank	Continued to deliver comprehensive value to key HNW and UHNW client segments by providing a more integrated and tailored proposition across multiple solutions, including investments, deposits, credit and trust services	Continue to leverage our global strengths and capabilities to drive growth in HNW and UHNW client segments Continue to enhance our product offering and distribution capabilities
In Canada, be the premier service provider for HNW and UHNW clients	Maintained our position as industry leader in our full-service private wealth business Improved client experience and advisor productivity through enhanced digital engagement (e.g., launch of the Advisor's Virtual Assistant application) Launched the Money in Motion initiative to further solidify our expertise around business owners, succession and wealth planning	Continue to differentiate client experience that is digitally-enabled and supported by data-driven insights Deepen client relationships jointly with our partners (e.g., Private Banking and Commercial Banking in Personal & Commercial Banking)
In the U.S., become the leading private and commercial bank and wealth manager in our key markets	Invested in capabilities, technology and talent to grow our full-service brokerage business Expanded City National business model to select high growth markets with strong RBC Wealth Management and Capital Markets presence, including Washington, D.C. and Minneapolis	Continue to strive to deliver an exceptional client experience for targeted HNW, UHNW, middle market and business banking segments Leverage the combined strengths within U.S. Wealth Management (including City National) and Capital Markets with a view to accelerating growth in the U.S.
In asset management, be a leading, diversified asset manager focused on global institutional and North American retail clients	Maintained #1 market share in Canadian mutual fund assets under management Continued to drive growth in U.S. and international institutional clients in select investment capabilities	Strengthen our partnerships with Personal & Commercial Banking, other Wealth Management businesses and third-party distributors to defend and grow our distribution reach Grow our global institutional asset management business, particularly in relevant markets

Outlook

Our diversified businesses are positioned to benefit from our focus on our clients, continued investments in people and technology, volume growth, and rising interest rates. Despite continued geopolitical and regulatory uncertainty in the major global economies, we expect global private wealth accumulation to continue to drive growth in the HNW and UHNW client segments. We will continue to leverage our brand, reputation and financial strength to increase our market share of the HNW and UHNW client segments globally. In addition, changing demographics and rapid advancements in digitization are expected to drive change in client preferences, needs and service models, requiring a continued focus on delivering a digitally-integrated, multi-channel experience for our clients and client-facing professionals.

For further details on our general economic review and outlook, refer to the Economic, market and regulatory review and outlook section.

Wealth Management — **Table 26**

(Millions of Canadian dollars, except number of and percentage amounts and as otherwise noted) (1)	2017	2016
Net interest income	$ 2,248	$ 1,955
Non-interest income		
Fee-based revenue	5,799	5,323
Transaction and other revenue	2,028	1,725
Total revenue	10,075	9,003
PCL	34	48
Non-interest expense	7,611	7,015
Income before income taxes	2,430	1,940
Net income	$ 1,838	$ 1,473
Revenue by business		
Canadian Wealth Management	$ 2,815	$ 2,506
U.S. Wealth Management (including City National)	4,891	4,173
U.S. Wealth Management (including City National) (US$ millions)	3,744	3,155
Global Asset Management	1,994	1,894
International Wealth Management	375	430
Key Ratios		
ROE	13.2%	10.9%
NIM	3.02%	2.84%
Pre-tax margin (2)	24.1%	21.5%
Selected average balance sheet information		
Total assets	$ 88,100	$ 83,200
Loans and acceptances	51,500	49,200
Deposits	93,100	85,400
Attributed capital	13,450	12,950
Other information		
Revenue per advisor (000s) (3)	$ 1,353	$ 1,184
AUA (4), (5)	929,200	875,300
AUM (4)	634,100	580,700
Average AUA	898,500	845,800
Average AUM	600,400	560,800
Number of employees (FTE)	16,962	16,385
Number of advisors (6)	4,884	4,780

Estimated impact of U.S. dollar, British pound and Euro translation on key income statement items

(Millions of Canadian dollars, except percentage amounts and as otherwise noted)	2017 vs. 2016
Increase (decrease):	
Total revenue (1)	$ (124)
PCL	1
Non-interest expense (1)	(102)
Net income	(17)
Percentage change in average US$ equivalent of C$1.00	1%
Percentage change in average British pound equivalent of C$1.00	10%
Percentage change in average Euro equivalent of C$1.00	–%

(1) Effective Q4 2017, service fees and other costs incurred in association with certain commissions and fees earned are presented on a gross basis in non-interest expense. Comparative amounts have been reclassified to conform with this presentation.
(2) Pre-tax margin is defined as Income before income taxes divided by Total revenue.
(3) Represents investment advisors and financial consultants of our Canadian and U.S. full-service wealth businesses.
(4) Represents year-end spot balances.
(5) In addition to Canadian Wealth Management, U.S. Wealth Managements (including City National), and International Wealth Management, amounts also include AUA of $6,600 million (2016: $6,200 million) related to Global Asset Management (GAM).
(6) Represents client-facing advisors across all our wealth management businesses.

Client assets – AUA Table 27

(Millions of Canadian dollars)	2017	2016
AUA, beginning balance	$ 875,300	$ 823,700
Asset inflows	274,300	251,000
Asset outflows	(254,800)	(257,500)
Total net flows	19,500	(6,500)
Market impact	82,700	31,100
Acquisitions/dispositions	(28,200)	17,800
Foreign exchange	(20,100)	9,200
Total market, acquisition/dispositions and foreign exchange impact	34,400	58,100
AUA, balance at end of year	$ 929,200	$ 875,300

Client assets – AUM Table 28

	2017					2016
(Millions of Canadian dollars)	Money market	Fixed income	Equity	Multi-asset and other	Total	Total
AUM, beginning balance	$ 48,000	$ 196,800	$ 100,800	$ 235,100	$ 580,700	$ 492,800
Institutional inflows	27,200	31,100	6,600	4,000	68,900	54,700
Institutional outflows	(37,800)	(32,400)	(4,800)	(2,300)	(77,300)	(71,600)
Personal flows, net	700	2,100	10,300	18,300	31,400	21,500
Total net flows	(9,900)	800	12,100	20,000	23,000	4,600
Market impact	–	3,500	18,200	20,400	42,100	21,600
Acquisition/dispositions	–	–	–	(4,000)	(4,000)	58,100
Foreign exchange	(1,100)	(2,200)	(2,400)	(2,000)	(7,700)	3,600
Total market, acquisition/dispositions and foreign exchange impact	(1,100)	1,300	15,800	14,400	30,400	83,300
AUM, balance at end of year	$ 37,000	$ 198,900	$ 128,700	$ 269,500	$ 634,100	$ 580,700

AUA by geographic mix and asset class Table 29

(Millions of Canadian dollars)	2017	2016
Canada (1)		
Money market	$ 21,600	$ 21,600
Fixed income	35,700	36,300
Equity	94,300	89,100
Multi-asset and other	208,700	180,700
Total Canada	$ 360,300	$ 327,700
U.S. (1)		
Money market	$ 35,100	$ 36,100
Fixed income	124,500	126,800
Equity	238,100	200,800
Multi-asset and other	45,000	30,500
Total U.S.	$ 442,700	$ 394,200
Other International (1)		
Money market	$ 17,000	$ 23,300
Fixed income	11,400	21,400
Equity (2)	50,100	69,500
Multi-asset and other (2)	47,700	39,200
Total International	$ 126,200	$ 153,400
Total AUA	$ 929,200	$ 875,300

(1) Geographic information is based on the location from where our clients are served.
(2) Amounts have been revised from those previously presented.

Financial performance
2017 vs. 2016

Net income increased $365 million or 25% from a year ago, mainly due to growth in average fee-based client assets and higher net interest income and transaction revenue. These factors were partially offset by higher variable compensation on improved results and increased costs in support of business growth.

Total revenue increased $1,072 million or 12%, reflecting growth in average fee-based client assets which benefitted from capital appreciation and net sales, higher net interest income, mainly in the U.S. resulting from the impact of higher interest rates and volume growth, and higher transaction revenue.

PCL decreased $14 million largely reflecting a recovery in one account in International Wealth Management.

Non-interest expense increased $596 million or 8%, largely due to higher variable compensation on improved results and higher costs in support of business growth, mainly reflecting higher staff-related costs in the U.S. and ongoing investments in technology, including digital initiatives.

Assets under administration increased $54 billion or 6%, largely due to capital appreciation and net sales, partially offset by the impacts from the exit of certain international businesses and foreign exchange translation.

Assets under management increased $53 billion or 9%, primarily reflecting capital appreciation and net sales, partially offset by the impact from foreign exchange translation.

Canadian Wealth Management

Canadian Wealth Management includes our full service Canadian wealth advisory business, which is the largest in Canada as measured by AUA, with over 1,700 investment advisors providing comprehensive advice-based financial solutions to HNW and UHNW clients. Additionally, we provide discretionary investment management and estate and trust services to our clients through approximately 78 investment counsellors and 103 trust professionals across Canada.

We compete with domestic banks and trust companies, investment counselling firms, bank-owned full service brokerages and boutique brokerages, mutual fund companies and global private banks. In Canada, bank-owned wealth managers continue to be the major players.

Financial performance

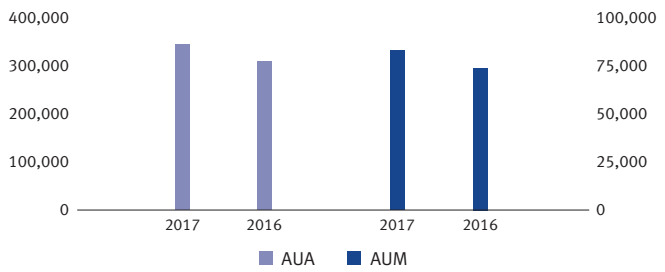
Revenue increased $309 million or 12% from a year ago, primarily due to higher average fee-based client assets reflecting capital appreciation and net sales.

Selected highlights — Table 30

(Millions of Canadian dollars)	2017	2016
Total revenue (1)	$ 2,815	$ 2,506
Other information		
Average loans and acceptances	3,300	3,200
Average deposits	17,400	16,300
AUA	359,600	326,600
AUM	90,400	76,000
Average AUA	344,900	309,100
Average AUM	83,700	69,400

(1) Effective Q4 2017, service fees and other costs incurred in association with certain commissions and fees earned are presented on a gross basis in non-interest expense. Comparative amounts have been reclassified to conform with this presentation.

Average AUA and AUM (Millions of Canadian dollars)



U.S. Wealth Management (including City National)

U.S. Wealth Management (including City National) includes our private client group and City National. Our private client group is the 7th largest full-service wealth advisory firm in the U.S., as measured by number of advisors, with over 1,800 financial advisors. Additionally, our correspondent and advisor services businesses deliver clearing and execution services for small to mid-sized independent broker-dealers and registered investment advisor firms. City National provides comprehensive financial solutions to affluent individuals, entrepreneurs, professionals, their businesses and their families and provides a premier banking and financial experience through a high-touch service model, proactive advice and financial solutions. City National offers a broad range of lending, deposit, cash management, international banking, equipment financing, and other products and services. In the U.S., we operate in a fragmented and highly competitive industry and our competition includes other broker-dealers, commercial banks and other financial institutions that service HNW individuals, entrepreneurs and their businesses.

Financial performance

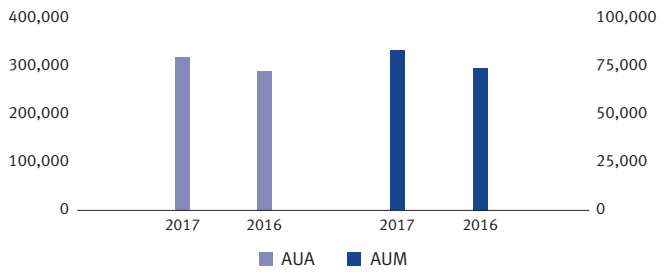
Revenue increased $718 million or 17% from a year ago, mainly due to increased net interest income from higher U.S. interest rates and volume growth of 13% in loans and deposits, higher average fee-based client assets reflecting capital appreciation and net sales, and higher transaction revenue.

Selected highlights — Table 31

(Millions of Canadian dollars, except as otherwise noted)	2017	2016
Total revenue (1)	$ 4,891	$ 4,173
Other information (Millions of U.S. dollars)		
Total revenue (1)	3,744	3,155
Average loans, guarantees and letters of credit	33,500	29,900
Average deposits	47,500	41,200
AUA	343,200	293,900
AUM	92,200	76,700
Average AUA	319,100	289,200
Average AUM	83,500	74,200

(1) Effective Q4 2017, service fees and other costs incurred in association with certain commissions and fees earned are presented on a gross basis in non-interest expense. Comparative amounts have been reclassified to conform with this presentation.

Average AUA and AUM (Millions of U.S. dollars)



Global Asset Management

Global Asset Management provides global investment management services and solutions for individual and institutional investors in Canada, the U.S., the U.K., Europe and Asia. We provide a broad range of investment management services through mutual, pooled and private funds, fee-based accounts and separately managed portfolios. We distribute our investment solutions through a broad network of bank branches, our self-directed and full-service wealth advisory businesses, independent third-party advisors and private banks, and directly to individual clients. We also provide investment solutions directly to institutional clients, including pension plans, insurance companies, corporations, and endowments and foundations.

We are the largest retail fund company in Canada as well as a leading institutional asset manager. We face competition in Canada from banks, insurance companies, and asset management organizations. The Canadian fund management industry is large and mature, but remains a relatively fragmented industry.

In the U.S., our asset management business offers investment management solutions and services primarily to institutional investors and competes with independent asset management firms, as well as those that are part of national and international banks, and insurance companies.

Internationally, through our global capabilities of BlueBay and RBC Global Asset Management®, we offer investment management solutions for institutions and, through private banks including RBC Wealth Management®, to HNW and UHNW investors. We face competition from asset managers that are part of international banks as well as national and regional asset managers in the geographies where we serve clients.

Financial performance

Revenue increased $100 million or 5% from a year ago, reflecting higher average fee-based client assets due to capital appreciation and net sales.

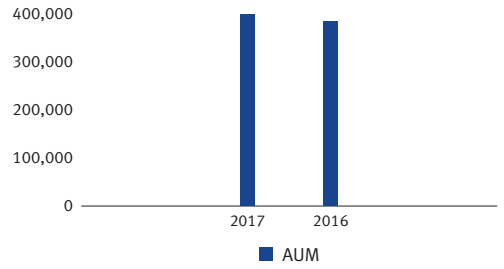
Selected highlights — Table 32

(Millions of Canadian dollars)	2017	2016
Total revenue (1)	**$ 1,994**	$ 1,894
Other information		
Canadian net long-term mutual fund sales (2)	**10,689**	7,868
Canadian net money market mutual fund sales (redemptions) (2)	**240**	(439)
AUM	**415,200**	392,600
Average AUM	**398,300**	383,400

(1) Effective Q4 2017, service fees and other costs incurred in association with certain commissions and fees earned are presented on a gross basis in non-interest expense. Comparative amounts have been reclassified to conform with this presentation.

(2) As reported to the Investment Funds Institute of Canada. Includes all prospectus-based mutual funds across our Canadian Global Asset Management businesses.

Average AUM (Millions of Canadian dollars)



International Wealth Management

International Wealth Management includes operations in Europe and Asia. We provide customized and integrated trust, banking, credit and investment solutions to HNW and UHNW clients and corporate clients in key financial centres in Europe and Asia. Competitors to our International Wealth Management business comprise global wealth managers, traditional offshore private banks, domestic wealth managers and U.S. investment-led private client operations.

Financial performance

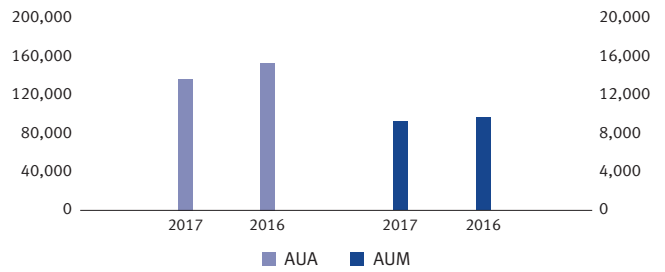
Revenue decreased $55 million or 13% from a year ago, mainly reflecting the impact of foreign exchange translation, the exit of certain international businesses, and lower transaction revenue.

Selected highlights — Table 33

(Millions of Canadian dollars)	2017	2016
Total revenue	**$ 375**	$ 430
Other information		
Average loans, guarantees and letters of credit	**5,300**	7,200
Average deposits	**13,700**	14,600
AUA (1)	**120,300**	148,300
AUM	**9,400**	9,100
Average AUA (1)	**130,500**	147,700
Average AUM	**9,300**	9,700

(1) Amounts have been revised from those previously presented.

Average AUA and AUM (Millions of Canadian dollars)



Insurance

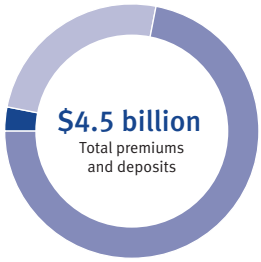
RBC Insurance® offers a wide range of life, health, home, auto, travel, wealth and reinsurance advice and solutions, as well as creditor and business insurance services to individual, business and group clients.

$4.6 billion
Total revenue

› 4 million
Number of clients

2,691
Employees

Premiums and Deposits



- 72% Life and Health
- 25% Annuity
- 3% P&C

Insurance has operations in Canada and globally, operating under two business lines: Canadian Insurance and International Insurance.

In Canada, we offer our products and services through our proprietary distribution channels, comprised of the field sales force, which includes retail insurance stores, our field sales representatives, advice centres and online, as well as through independent insurance advisors and affinity relationships.

Outside Canada, we operate in reinsurance markets globally offering life, accident and annuity reinsurance products. The competitive environment for each business is discussed below.

2017 Operating environment

- The insurance industry continues to face a number of challenges and opportunities, including regulatory changes, changing customer preferences and expectations, and increasing technological, digital and mobile transformation in every aspect of the business. Insurers are also refining product and distribution capacities in order to enhance operational efficiencies and manage expenses. To overcome these challenges and take advantage of these opportunities, we have and continue to invest in digitization to enhance access and convenience, reduce costs, and deliver value to clients beyond traditional insurance products.
- Our International Insurance business continues to be impacted by market conditions in a post-Brexit environment and industry adjustments on new mortality data.
- Businesses have been revisiting their pension de-risking strategies and have looked to insurance companies to transfer their longevity risk.

Strategic priorities

OUR STRATEGY	PROGRESS IN 2017	PRIORITIES IN 2018
Improve distribution efficiency	We experienced solid sales growth in our Canadian Insurance business, maintaining our #1 ranking in individual disability sales and outpacing industry growth in our individual term life insurance product Our Pension De-risking business achieved record growth and is among the leaders in Canada Our RBC Guaranteed Investment Fund recently reached $1 billion in AUM and we continue to be one of the fastest growing segregated fund providers in Canada	Continue to improve our distribution efficiency by expanding our proprietary distribution channels and focusing on the delivery of technology and operational solutions
Deepen client relationships	July 1, 2017 marked the one year anniversary of our Aviva relationship. With this relationship, our advisors have benefitted from access to a new set of solutions for automobiles and expanded home coverage as well as access to new technology and tools to offer insurance solutions to our clients	Deepen client relationships by continuing to be an innovative, client-focused provider of a full suite of insurance products
Simplify.Agile.Innovate	We continued our focus on investments to enhance our client experience and our cost effectiveness through ongoing transformation of our legacy business and improving our digital capabilities We launched two apps: RBC Insurance My Benefits, which gives our clients fast and easy access to their group benefits plan; and PATH, a travel mobile app that provides clients with access to emergency medical assistance and up-to-date travel information	Simplify and innovate by accelerating our digital initiatives' time-to-market, improving quality and cost effectiveness
Pursue select international opportunities to grow our reinsurance business	There has been a general slowdown in UK longevity transactions as the market adjusted its pricing to reflect emerging mortality trends in the UK. As such, growth in the UK annuity market slowed in 2017	Pursue select international opportunities, within our risk appetite, with the aim of continuing to grow our core reinsurance business

Outlook

The insurance industry is expected to continue experiencing tremendous change and disruption in the coming year. Traditional market incumbents will see their market share erode if they do not adapt to forces of change that include: evolving customer preferences and expectations, changing demographics and customer profiles, technological transformation in every area of the business, new distribution models, and the emergence of non-traditional competitors. We believe that execution of our business strategy will allow us to continue to thrive in this changing environment.

There was a general slowdown in U.K. longevity transactions during 2017 as the market adjusted its pricing to reflect emerging mortality trends. We believe that the U.K. pension risk transfer (annuity) business offers opportunities for growth in 2018 as the market rebounds. We will continue to build on our capabilities, expand our portfolio of solutions in the annuity business and diversify our sources of longevity risk.

For further details on our general economic review and outlook, refer to the Economic, market and regulatory review and outlook section.

Insurance — **Table 34**

(Millions of Canadian dollars, except percentage amounts and as otherwise noted)	2017	2016
Non-interest income		
Net earned premiums	$ 3,875	$ 3,175
Investment income (1)	453	1,422
Fee income	238	554
Total revenue	4,566	5,151
Insurance policyholder benefits and claims (1)	2,787	3,208
Insurance policyholder acquisition expense	266	216
Non-interest expense (2)	584	623
Income before income taxes	929	1,104
Net income	$ 726	$ 900
Revenue by business		
Canadian Insurance	$ 2,569	$ 3,373
International Insurance	1,997	1,778
Key ratios		
ROE	41.8%	52.8%
Selected balances and other information		
Total assets	$ 14,300	$ 14,400
Attributed capital	1,700	1,700
Other information		
Premiums and deposits (3)	$ 4,546	$ 4,594
Canadian Insurance	2,496	2,424
International Insurance	2,050	2,170
Insurance claims and policy benefit liabilities	9,676	9,164
Fair value changes on investments backing policyholder liabilities (1)	(58)	633
Embedded value (4)	7,320	6,886
Number of employees (FTE)	2,691	2,657

(1) Investment income can experience volatility arising from fluctuation of fair value through profit or loss (FVTPL) assets. The investments which support actuarial liabilities are predominantly fixed income assets designated as at FVTPL. Consequently, changes in the fair values of these assets, are recorded in investment income in the Consolidated Statement of Income and are largely offset by changes in the fair value of the actuarial liabilities, the impact of which is reflected in insurance policyholder benefits and claims.
(2) Amount includes PCL of $nil (2016 – $1 million).
(3) Premiums and deposits include premiums on risk-based insurance and annuity products, and individual and group segregated fund deposits, consistent with insurance industry practices.
(4) Embedded value is defined as the sum of value of equity held in our Insurance segment and the value of in-force business (existing policies). For further details, refer to the Key performance and non-GAAP measures section.

Financial performance

2017 vs. 2016

Net income decreased $174 million or 19% from a year ago, primarily due to the gain on sale of our home and auto insurance manufacturing business, which was sold on July 1, 2016. Excluding the after-tax gain of $235 million on the sale of RBC General Insurance Company to Aviva Canada Inc., net income increased $61 million or 9%, mainly due to higher favourable annual actuarial assumption updates, and business growth mainly in Canadian Insurance. These factors were partially offset by lower earnings from new U.K. annuity contracts and reduced earnings associated with the sale of our home and auto insurance manufacturing business, as noted previously.

Total revenue decreased $585 million or 11%, mainly due to a change of $691 million related to the fair value of investments backing our policyholder liabilities resulting from changes in long-term interest rates, largely offset in PBCAE. The prior year also included the associated premiums and a gain of $287 million relating to our home and auto insurance manufacturing business, as noted previously. These factors were partially offset by higher revenues from group annuity sales in Canadian Insurance and the impact of restructured international life contracts, both of which are largely offset in PBCAE.

PBCAE decreased $371 million or 11%, mainly due to a change in the fair value of investments backing our policyholder liabilities, largely offset in revenue. Lower claims reflecting the impact from the sale of our home and auto insurance manufacturing business in the prior year and higher favourable annual actuarial assumption updates largely reflecting changes in credit and discount rates and favourable mortality experience, mainly in the U.K., also contributed to the decrease. These factors were partially offset by the impact from group annuity sales and restructured international life contracts, both of which are largely offset in revenue.

Non-interest expense decreased $39 million or 6%, largely reflecting the impact of the sale of our home and auto insurance manufacturing business in the prior year.

Premiums and deposits were down $48 million or 1%, reflecting the impact of the sale of our home and auto insurance manufacturing business in the prior year, the impact of foreign exchange translation, and lower premiums from new U.K. annuity contracts, largely offset by business growth, including group annuity sales.

Embedded value increased $434 million, reflecting the impact of favourable actuarial assumption updates, improved experience and product updates.

Results excluding the specified item noted previously are non-GAAP measures. For further details, including a reconciliation, refer to the Key performance and non-GAAP measures section.

Canadian Insurance

We offer life, health, property and casualty insurance products, as well as wealth accumulation solutions, to individual and group clients across Canada. Our life and health portfolio includes universal life, term life, critical illness, disability, long-term care insurance and group benefits. We offer a wide range of property and casualty products including home, auto and travel insurance. Our travel products include out-of-province/country medical coverage, and trip cancellation and interruption insurance.

In Canada, the majority of our competitors specialize in life and health or property and casualty products. We hold a leading market position in disability insurance products, have a significant presence in life and travel products, and have a growing presence in wealth solutions as well as in home and auto through our distribution agreement with Aviva.

Financial performance

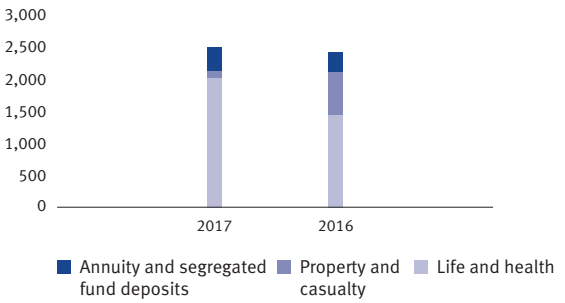
Total revenue decreased $804 million or 24% from last year, mainly due to a change in the fair value of investments backing our policyholder liabilities resulting from changes in long-term interest rates, largely offset in PBCAE. The prior year also included the associated premiums and the gain on sale relating to our home and auto insurance manufacturing business, as noted previously. These factors were partially offset by business growth, primarily reflecting higher revenue from group annuity sales, largely offset in PBCAE.

Premiums and deposits increased $72 million or 3%, as sales growth, primarily related to our group annuity business, more than offset the impact of the sale of our home and auto insurance manufacturing business in the prior year.

Selected highlights Table 35

(Millions of Canadian dollars)	2017	2016
Total revenue	**$ 2,569**	$ 3,373
Other information		
Premiums and deposits		
Life and health	**2,016**	1,438
Property and casualty	**119**	674
Annuity and segregated fund deposits	**361**	312
Fair value changes on investments backing policyholder liabilities	**(63)**	575

Premiums and deposits (Millions of Canadian dollars)



International Insurance

International Insurance is primarily comprised of our reinsurance businesses which insure risks of other insurance and reinsurance companies. We offer life and health, accident and annuity reinsurance products.

The global reinsurance market is dominated by a few large players, with significant presence in the U.S., the U.K. and Europe. The reinsurance industry is competitive but barriers to entry remain high.

Financial performance

Total revenue increased $219 million or 12%, mainly due to the impact of restructured international life contracts, partially offset by a change in the fair value of investments backing our policyholder liabilities resulting from changes in long-term interest rates, both of which are largely offset in PBCAE.

Premiums and deposits decreased $120 million or 6%, due to the impact of foreign exchange translation and lower premiums from new U.K. annuity contracts, partially offset by volume growth in international life.

Selected highlights Table 36

(Millions of Canadian dollars)	2017	2016
Total revenue	**$ 1,997**	$ 1,778
Other information		
Premiums and deposits		
Life and health	**1,276**	1,335
Property and casualty	**(1)**	–
Annuity	**775**	835
Fair value changes on investments backing policyholder liabilities	**5**	58

Investor & Treasury Services

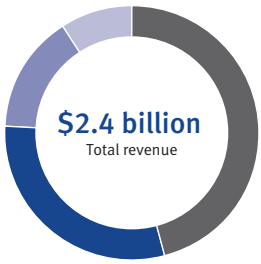
RBC Investor & Treasury Services is a specialist provider of asset services, custody, payments and treasury services for financial and other institutional investors worldwide.

$4.3 trillion
Assets under administration

23%
Return on equity

4,771
Employees

Revenue by Geography



- 46% North America
- 30% Europe (Ex. UK)
- 15% UK
- 9% Asia-Pacific

We deliver custodial, advisory, financing and other services to safeguard client assets, maximize liquidity, and manage risk across multiple jurisdictions. We rank among the world's leading global custodians with a network of offices across North America, Europe, U.K., and the Asia-Pacific region. Our team of approximately 5,000 employees serves almost 10 million investors and administers over 6,700 funds.

We have one of the widest transfer agency networks in the market, we are a top-ranked international securities lending service, and we provide short-term funding and liquidity management for RBC. Our transaction banking business is a leading provider of Canadian dollar cash management, correspondent banking, and trade finance for financial institutions globally.

2017 Operating environment

- The highly competitive environment in the global asset services industry continued to pressure margins.
- Continued increases in financial services regulations have driven up compliance and technology costs; however, tightening credit spreads, increased FX volumes and interest rate volatility benefitted our funding and liquidity business.

Strategic priorities

OUR STRATEGY	PROGRESS IN 2017	PRIORITIES IN 2018
In Canada, maintain position as the #1 provider of domestic custody, asset services and cash management	Custody revenue relatively flat compared to prior year due to fee pressure and competitive environment	Continue to win new business and deepen relationships with existing clients and onboarding clients without delay
Compete as a leading provider of asset services in the major offshore fund domicile markets of Luxembourg and Ireland	Increased revenue, AUA and profit while continuing to invest in technology to better serve our clients and reduce costs	Capitalize on trading opportunities through strategic positioning of our portfolio and drive client deposit growth
Continue to deliver a high-level of investment in client-centered technology solutions	Continued investment in client-focused technology solutions to develop client-centered digital applications and launched robotics processing automation (RPA) labs in Canada, Luxembourg and Malaysia	Continue to execute on Advanced Client Experience (ACE) program, our multi-year strategic technology program, and our RPA initiatives
Enhance our client centric service offering and improve efficiency	Continued to invest in technology solutions via ACE and RPA while improving efficiency ratio compared to prior year	Prudently manage expenses and execute cost management initiatives

Outlook

In 2018, our aim is to continue to be the leading provider of asset services and cash management in Canada and a leading provider of fund services to asset managers in the key offshore markets of Luxembourg and Ireland. Our focus is to drive top-line growth by continuing to leverage our leadership position in Canada and recognized capabilities in offshore fund services markets to win new business and deepen existing client relationships. We will continue to execute on our strategic and transformational technology initiatives to enhance the client experience. While we expect the global asset services industry to remain challenging in the near-term, we are well-positioned to compete and grow in the continuously changing operating environment.

For further details on our general economic review and outlook, refer to the Economic, market and regulatory review and outlook section.

Investor & Treasury Services — Table 37

(Millions of Canadian dollars, except percentage amounts and as otherwise noted)	2017	2016
Net interest income	$ 679	$ 825
Non-interest income	1,756	1,446
Total revenue	2,435	2,271
Non-interest expense	1,466	1,457
Net income before income taxes	969	814
Net income	$ 741	$ 613
Key Ratios		
ROE	22.7%	17.9%
Selected average balance sheet information		
Total assets	$ 138,100	$ 142,500
Deposits	132,800	134,300
Client deposits	54,400	52,800
Wholesale funding deposits	78,400	81,500
Attributed capital	3,200	3,350
Other Information		
AUA (1)	4,266,600	3,929,400
Average AUA	4,044,800	3,770,200
Number of employees (FTE)	4,771	4,776

Estimated impact of U.S. dollar, British pound and Euro translation on key income statement items

(Millions of Canadian dollars, except percentage amounts)	2017 vs. 2016
Increase (decrease):	
Total revenue	$ (43)
Non-interest expense	(24)
Net income	(15)
Percentage change in average US$ equivalent of C$1.00	1%
Percentage change in average British pound equivalent of C$1.00	10%
Percentage change in average Euro equivalent of C$1.00	–%

(1) Represents period-end spot balances.

Financial performance

2017 vs. 2016

Net income increased $128 million or 21%, primarily due to higher results across all major businesses driven by funding and liquidity earnings and increased results from our asset services business. These factors were partially offset by higher investment in technology initiatives.

Total revenue increased $164 million or 7%, mainly due to higher funding and liquidity revenue reflecting tightening credit spreads, and increased revenue from our asset services business driven by higher client activity and growth in client deposits. These factors were partially offset by the impact of foreign exchange translation.

Non-interest expense increased $9 million reflecting higher investment in technology initiatives, largely offset by the impact of foreign exchange translation.

Capital Markets

RBC Capital Markets® is a premier global investment bank providing expertise in banking, finance and capital markets to corporations, institutional investors, asset managers, governments and central banks around the world. Over 2,800 professionals serve clients from 70 offices in 15 countries across North America, the U.K., Europe and Asia & other international regions.

› 14,000
Number of clients

#9
Global league rankings[1]

3,970
Employees

Revenue by Geography

- 54% U.S.
- 26% Canada
- 14% U.K. & Europe
- 6% Asia & other international

We operate two main business lines, Corporate and Investment Banking and Global Markets. Our legacy portfolio is grouped under Other.

In North America, we offer a full suite of products and services which include corporate and investment banking, equity and debt origination and distribution, and structuring and trading. In Canada, we compete mainly with Canadian banks where we are a premier global investment bank and market leader with a strategic presence in all lines of capital markets businesses. In the U.S., we have full industry sector coverage and investment banking product range and compete with large U.S. and global investment banks as well as smaller regional firms.

Outside North America, we have a select presence in the U.K. and Europe, and Asia & other international markets, where we offer a diversified set of capabilities in our key sectors of expertise such as energy, mining and infrastructure and we have a growing presence in industrial, consumer, healthcare and technology in Europe. In the U.K. and Europe, we have continued to make experienced hires, and compete in our key sectors of expertise with global and regional investment banks. In our Asia & other international markets, we compete with global and regional investment banks in select products, consisting of fixed income distribution and currencies trading and corporate and investment banking in Australia, Asia and the Caribbean.

2017 Operating environment

- Financial markets started fiscal 2017 very strong with elevated client trading activity following the U.S. election as well as strong investment banking activity, particularly in North America, amidst improving credit and energy markets.
- Global investment banking fee pool increased by 7%[1] in the fiscal year from the same period a year ago.
- The second half of the year was characterized by lower volatility across a range of asset classes and correspondingly lower levels of client activity, market uncertainty (namely around fiscal policy and proposed tax and regulatory reform in the U.S.), as well as a continued rise in geopolitical tensions. Despite these challenges, our business lines have continued to perform well. Our Fixed Income, Currencies and Commodities business performed particularly well despite these headwinds, with our credit trading performance across numerous products in the U.S. driving higher results.
- Improved credit and energy markets led to lower PCL.

[1] Source: Dealogic, based on global investment bank fees, fiscal 2017

Strategic priorities

OUR STRATEGY	PROGRESS IN 2017	PRIORITIES IN 2018
Maintain our leadership position in Canada	We deepened our existing client relationships and gained new clients by leveraging our strong global capabilities and improving collaboration with enterprise partners to drive operational efficiencies We continued to win significant mandates including acting as financial advisor to Cenovus Energy Inc. on its $17.7 billion acquisition of assets from ConocoPhillips Co. and leading the deal financing, the largest ever oil & gas asset transaction in North America We also acted as financial advisor to D+H Corporation on its sale to Vista Equity Partners for $4.8 billion	We will continue to focus on long-term client relationships, leveraging our global capabilities and continuing to improve collaboration with Wealth Management
Expand and strengthen client relationships in the U.S.	We deepened key client relationships from our corporate and investment banking businesses to generate additional revenue We continued to win significant mandates including acting as financial advisor to CSC on its US$8.5 billion merger with the Enterprise Services Segment of Hewlett Packard Enterprise In our largest left lead high yield transaction in technology, we acted as financial advisor to Novitex, lead left arranger and joint bookrunner on US$1.45 billion of senior secured credit facilities and joint lead bookrunner on US$275 million of PIPE (Private Investment in Public Equity) Investment in the US$2.6 billion combination	We will continue to deepen client relationships in the U.S. by building on our momentum through expanded origination, advisory and distribution activity, and driving cross-selling through our diversified loan book We expect the U.S. to continue to be the world's most attractive market and it will remain Capital Markets' priority growth market
Build on core strengths and capabilities in U.K./Europe and optimize performance in Asia & other international regions	In the U.K. and Europe, we maintained momentum throughout the year and improved profitability through repositioning our fixed income business, as well as growing our corporate and investment banking presence in key markets We acted as joint financial advisor to Quad Gas Group on its acquisition of a 61% stake in the UK gas distribution business of National Grid plc for an enterprise value of £13.8 billion In Asia and other international regions, we continued to focus on our corporate and investment banking, fixed income trading distribution and foreign exchange trading capabilities	In Europe, we will continue to grow and deepen client relationships in Corporate and Investment Banking and Global Markets In Asia, we will aim to optimize the performance of our existing footprint
Optimize capital use to earn high risk-adjusted returns on assets and equity	We continued to focus on the efficient deployment of our capital and growth throughout our businesses by reducing unproductive assets and re-allocating capital to businesses that provide higher returns and increased profitability	Optimize capital use to earn high risk-adjusted returns by maintaining both a balanced approach between investment banking and trading revenue and a disciplined approach to managing the risks and costs of our business

Outlook

Despite geopolitical tensions, market uncertainty surrounding U.S. fiscal policy and tax reform and a historically low volatility environment persisting into fiscal 2018, we remain confident in our franchises' ability to continue to produce strong revenue and earnings growth driven by our diversified geographic and product mix. We remain focused on carrying forward the momentum in our Investment Banking business, with a potential improvement in the underwriting environment particularly for equity origination. Corporate lending continues to be challenged by a lower spread environment. We expect to continue to grow the loan book at a modest pace and with an increased focus on alignment with fee-based business. We remain cautious in our outlook for trading businesses amidst a general market slowdown and uncertainty from lack of volatility. Regulatory headwinds are expected to continue to impact earnings growth in 2018, particularly in our trading businesses, although we will remain diligent in monitoring and managing the impacts of ongoing global trends as a key strategic priority. Capital Markets will strive to maintain its focus on full-service activities in Canada, the U.S. and Europe in 2018, while navigating through significant changes in the regulatory environment.

For further details on our general economic review and outlook, refer to the Economic, market and regulatory review and outlook section.

Capital Markets financial highlights — Table 38

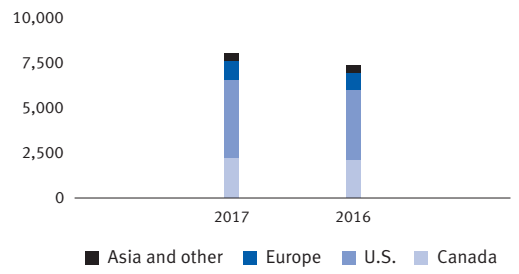
(Millions of Canadian dollars, except percentage amounts and as otherwise noted)	2017	2016
Net interest income (1)	$ 3,565	$ 3,804
Non-interest income (1)	4,617	4,146
Total revenue (1)	8,182	7,950
PCL	62	327
Non-interest expense	4,719	4,466
Net income before income taxes	3,401	3,157
Net income	$ 2,525	$ 2,270
Revenue by business		
Corporate and Investment Banking	$ 4,000	$ 3,694
Global Markets	4,466	4,361
Other	(284)	(105)
Key ratios		
ROE	12.9%	12.2%
Selected average balance sheet information		
Total assets	$ 494,400	$ 508,200
Trading securities	91,800	104,900
Loans and acceptances	83,400	88,100
Deposits	60,200	61,500
Attributed capital	18,850	17,900
Other information		
Number of employees (FTE)	3,970	3,883
Credit information		
Gross impaired loans as a % of related loans and acceptances	0.63%	1.73%
PCL on impaired loans as a % of average net loans and acceptances	0.07%	0.37%

Estimated impact of U.S. dollar, British pound and Euro translation on key income statement items

(Millions of Canadian dollars, except percentage amounts and as otherwise noted)	2017 vs. 2016
Increase (decrease):	
Total revenue	$ (179)
Non-interest expense	(111)
Net income	(51)
Percentage change in average US$ equivalent of C$1.00	1%
Percentage change in average British pound equivalent of C$1.00	10%
Percentage change in average Euro equivalent of C$1.00	–%

(1) The taxable equivalent basis (teb) adjustment for 2017 was $548 million (2016 – $736 million). For further discussion, refer to the How we measure and report our business segments section.

Revenue by region (Millions of Canadian dollars)



Financial performance

2017 vs. 2016

Net income increased $255 million or 11%, driven by higher results in Corporate and Investment Banking and Global Markets reflecting increased fee-based revenue, lower PCL and a lower effective tax rate due to changes in earnings mix. These factors were partially offset by higher staff-related costs and the impact of foreign exchange translation.

Total revenue increased $232 million or 3%, largely reflecting increased loan syndication and debt origination activity mainly in the U.S. and Canada. Higher M&A activity primarily in the U.S. and Europe, higher equity trading revenue in Europe and Asia & other international, and higher investment gains also contributed to the increase. These factors were partially offset by higher residual funding costs and the impact of foreign exchange translation.

PCL decreased $265 million or 81%, due to lower provisions including higher recoveries primarily in the oil & gas sector, partially offset by higher provisions in the real estate & related sector. For further details, refer to the Credit quality performance section.

Non-interest expense increased $253 million or 6%, largely reflecting higher costs related to changes in the timing of deferred compensation, increased variable compensation on improved results, and higher compliance costs. These factors were partially offset by the impact of foreign exchange translation.

Business line review

Corporate and Investment Banking

Corporate and Investment Banking comprises our corporate lending, loan syndications, debt and equity origination, mergers and acquisitions (M&A) advisory services, client securitization and the global credit businesses. For debt and equity origination, revenue is allocated between Corporate and Investment Banking and Global Markets based on the contribution of each group in accordance with an established agreement.

Financial performance

Corporate and Investment Banking revenue of $4,000 million increased $306 million as compared to last year, despite the unfavourable impact of foreign exchange translation.

Investment banking revenue increased $248 million or 13%, primarily due to increased loan syndication activity driven by increased market share in the U.S., and higher M&A activity mainly in the U.S. and Europe. Higher investment gains and higher debt origination activity largely in North America also contributed to the increase. These factors were partially offset by lower results from Municipal Banking in the U.S.

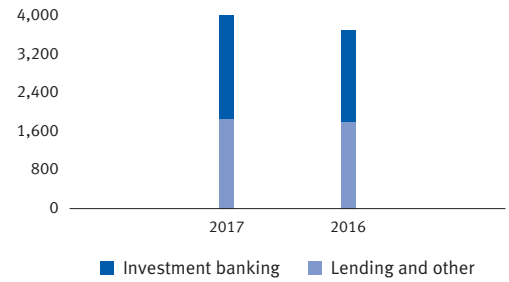
Lending and other revenue increased $58 million or 3%, reflecting improving credit conditions.

Selected highlights — Table 39

(Millions of Canadian dollars)	2017	2016
Total revenue (1)	$ 4,000	$ 3,694
Breakdown of revenue (1)		
Investment banking	2,140	1,892
Lending and other (2)	1,860	1,802
Other information		
Average assets	67,900	73,200
Average loans and acceptances	60,500	65,300

(1) The teb adjustment for 2017 was $229 million (2016 – $279 million). For further discussion, refer to the How we measure and report our business segments section.
(2) Comprises our corporate lending, client securitization, and global credit businesses.

Breakdown of total revenue (Millions of Canadian dollars)



Global Markets

Global Markets comprises our fixed income, foreign exchange, equity sales and trading, repos and secured financing and commodities businesses.

Financial performance

Total revenue of $4,466 million increased $105 million or 2% as compared to last year, despite the unfavourable impact of foreign exchange translation.

Revenue in our Fixed income, currencies and commodities business increased $140 million or 7%, mainly due to higher fixed income trading revenue in the U.S. and Asia & other international, higher debt origination activity in North America, and a gain from the disposition of certain securities. These factors were partially offset by lower commodities and foreign exchange trading revenue across all regions.

Revenue in our Equities business decreased $63 million or 5%, primarily due to decreased equity origination activity largely in Canada, and lower volume in our cash equities businesses in the U.S.

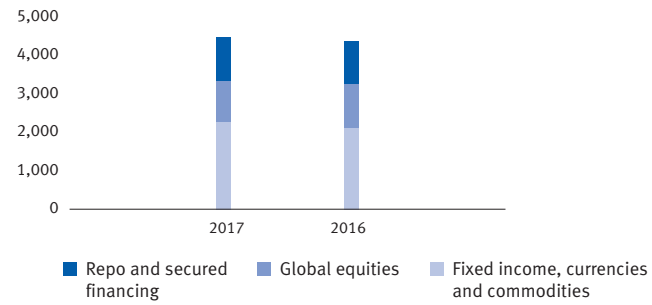
Revenue in our Repo and secured financing business increased $28 million or 3%, mainly due to higher equity trading revenue, partially offset by lower fixed income trading revenue.

Selected highlights — Table 40

(Millions of Canadian dollars)	2017	2016
Total revenue (1)	$ 4,466	$ 4,361
Breakdown of revenue (1)		
Fixed income, currencies and commodities	2,253	2,113
Equities	1,084	1,147
Repo and secured financing (2)	1,129	1,101
Other information		
Average assets	435,500	472,100

(1) The teb adjustment for 2017 was $319 million (2016 – $457 million). For further discussion, refer to the How we measure and report our business segments section.
(2) Comprises our secured funding businesses for internal businesses and external clients.

Breakdown of total revenue (Millions of Canadian dollars)



Other

Other includes our legacy portfolio, which mainly consists of our U.S. commercial mortgage-backed securities and structured rates in Asia. In recent years, in order to optimize our capital employed to improve our risk-adjusted returns and reduce our liquidity risk on various products, we have significantly reduced several of our legacy portfolios. Our legacy portfolio assets decreased by 28% as compared to last year.

Financial performance

Revenue decreased $179 million as compared to last year largely due to higher residual funding costs.

Corporate Support

Corporate Support comprises Technology & Operations, which provide the technological and operational foundation required to effectively deliver products and services to our clients, and Functions, which includes our finance, human resources, risk management, internal audit and other functional groups. Reported results for Corporate Support mainly reflect certain activities related to monitoring and oversight of enterprise activities which are not allocated to business segments. Corporate Support also includes our Corporate Treasury function. For further details, refer to the How we measure and report our business segments section.

Corporate Support — Table 41

(Millions of Canadian dollars, except as otherwise noted)	2017	2016
Net interest income (loss) (1)	$ (139)	$ (390)
Non-interest income (loss) (1)	(313)	(202)
Total revenue (1)	(452)	(592)
PCL	–	51
Non-interest expense	238	30
Net income (loss) before income taxes (1)	(690)	(673)
Income taxes (recoveries) (1)	(574)	(691)
Net income (loss) (2)	$ (116)	$ 18

(1) Teb adjusted.
(2) Net income reflects income attributable to both shareholders and Non-Controlling Interests (NCI). Net income attributable to NCI for the year ended October 31, 2017 was $35 million (October 31, 2016 – $44 million).

Due to the nature of activities and consolidation adjustments reported in this segment, we believe that a comparative period analysis is not relevant. The following identifies material items affecting the reported results in each period.

Total revenue and income taxes (recoveries) in each period in Corporate Support include the deduction of the teb adjustments related to the gross-up of income from Canadian taxable corporate dividends and the U.S. tax credit investment business recorded in Capital Markets. The amount deducted from revenue was offset by an equivalent increase in income taxes (recoveries).

The teb amount for the year ended October 31, 2017 was $548 million and $736 million last year.

The following identifies the material items, other than the teb impacts noted previously, affecting the reported results in each period.

2017
Net loss was $116 million, largely reflecting severance and related charges, net unfavourable tax adjustments, and legal costs. These factors were partially offset by asset/liability management activities.

2016
Net income was $18 million largely reflecting asset/liability management activities, partially offset by net unfavourable tax adjustments and a $50 million ($37 million after-tax) increase in the provision for loans not yet identified as impaired.

Quarterly financial information

Fourth quarter performance

Q4 2017 vs. Q4 2016
Fourth quarter net income of $2,837 million was up $294 million or 12% from last year. Diluted EPS of $1.88 was up $0.23 and ROE of 16.6% was up 110 bps. Our fourth quarter earnings increased as higher results in Personal & Commercial Banking, Capital Markets, Wealth Management, and Insurance were partially offset by lower earnings in Investment & Treasury Services.

Total revenue increased $1,159 million or 12%, largely due to the change in the fair value of investments backing our policyholder liabilities, group annuity sales growth and the impact of restructured international life contracts, all of which were largely offset in PBCAE. Volume growth of 6% in Personal & Commercial Banking, growth in average fee-based client assets and higher net interest income reflecting the impact from higher interest rates and volume growth in Wealth Management, and higher equity trading revenue in Capital Markets also contributed to the increase. These factors were partially offset by the impact of foreign exchange translation.

Total PCL decreased $124 million and the PCL ratio of 17 bps improved 10 bps from last year, mainly reflecting lower provisions and higher recoveries mainly in the oil & gas and real estate & related sectors in Capital Markets. The prior period also included provisions in U.S. Wealth Management (including City National).

PBCAE increased $740 million, largely reflecting the change in fair value of investments backing our policyholder liabilities, growth in the group annuity business and the impact of restructured international life contracts, all of which are largely offset in revenue. These factors were partially offset by higher favourable annual actuarial assumption updates largely reflecting changes in credit and discount rates and favourable mortality experience, mainly in the U.K.

Non-interest expense increased $314 million or 6%, primarily reflecting higher variable compensation on improved results in Wealth Management and ongoing investments in technology, including digital initiatives, in Personal & Commercial Banking, Investor & Treasury Services, and Wealth Management. Higher costs related to changes in the timing of deferred compensation in Capital Markets, higher staff-related costs, including severance and other related charges, in Corporate Support, Wealth Management and Personal & Commercial Banking, and charges associated with our real estate portfolio also contributed to the increase. These factors were partially offset by the impact of foreign exchange translation.

Income tax expense decreased $65 million from last year, and the effective income tax rate decreased from 23.2% last year to 19.9%, due to more favourable tax adjustments and changes in the earnings mix.

Q4 2017 vs. Q3 2017

Net income of $2,837 million was up $41 million or 1% compared to the prior quarter, due to lower staff-related costs, including severance, favourable annual actuarial assumption updates largely reflecting changes in credit and discount rates and favourable mortality experience, mainly in the U.K., in Insurance, higher earnings in Personal & Commercial Banking due to higher spreads and volume growth of 2%, and lower PCL due to recoveries in the oil & gas and real estate & related sectors. These factors were partially offset by lower earnings in Capital Markets primarily due to lower fixed income and equity trading revenue across most regions, and lower M&A activity largely in Canada. There were also lower fee-based revenue, higher marketing costs in support of business growth in Personal & Commercial Banking, the impact of foreign exchange translation, and unfavourable tax adjustments in the current quarter.

Quarterly results and trend analysis

Our quarterly results are impacted by a number of trends and recurring factors, which include seasonality of certain businesses, general economic and market conditions, and fluctuations in the Canadian dollar relative to other currencies. The following table summarizes our results for the last eight quarters (the period):

Quarterly results (1) **Table 42**

	2017				2016			
(Millions of Canadian dollars, except per share and percentage amounts)	**Q4**	Q3	Q2	Q1	Q4	Q3	Q2	Q1
Net interest income	**$ 4,361**	$ 4,257	$ 4,198	$ 4,324	$ 4,187	$ 4,123	$ 4,025	$ 4,196
Non-interest income (2)	**6,162**	5,831	6,214	5,322	5,177	6,229	5,597	5,261
Total revenue (2)	**$10,523**	$10,088	$10,412	$ 9,646	$ 9,364	$10,352	$ 9,622	$ 9,457
PCL	**234**	320	302	294	358	318	460	410
PBCAE	**1,137**	643	1,090	183	397	1,210	988	829
Non-interest expense (2)	**5,611**	5,537	5,331	5,315	5,297	5,188	4,983	5,058
Net income before income taxes	**$ 3,541**	$ 3,588	$ 3,689	$ 3,854	$ 3,312	$ 3,636	$ 3,191	$ 3,160
Income taxes	**704**	792	880	827	769	741	618	713
Net income	**$ 2,837**	$ 2,796	$ 2,809	$ 3,027	$ 2,543	$ 2,895	$ 2,573	$ 2,447
EPS – basic	**$ 1.89**	$ 1.86	$ 1.86	$ 1.98	$ 1.66	$ 1.88	$ 1.67	$ 1.59
– diluted	**1.88**	1.85	1.85	1.97	1.65	1.88	1.66	1.58
Segments – net income (loss)								
Personal & Commercial Banking	**$ 1,404**	$ 1,399	$ 1,360	$ 1,592	$ 1,275	$ 1,322	$ 1,297	$ 1,290
Wealth Management	**491**	486	431	430	396	388	386	303
Insurance	**265**	161	166	134	228	364	177	131
Investor & Treasury Services	**156**	178	193	214	174	157	139	143
Capital Markets	**584**	611	668	662	482	635	583	570
Corporate Support	**(63)**	(39)	(9)	(5)	(12)	29	(9)	10
Net income	**$ 2,837**	$ 2,796	$ 2,809	$ 3,027	$ 2,543	$ 2,895	$ 2,573	$ 2,447
Effective income tax rate	**19.9%**	22.1%	23.9%	21.5%	23.2%	20.4%	19.4%	22.6%
Period average US$ equivalent of C$1.00	**$ 0.792**	$ 0.770	$ 0.746	$ 0.752	$ 0.757	$ 0.768	$ 0.768	$ 0.728

(1) Fluctuations in the Canadian dollar relative to other foreign currencies have affected our consolidated results over the period.

(2) Effective Q4 2017, service fees and other costs incurred in association with certain commissions and fees earned are presented on a gross basis in non-interest expense. Comparative amounts have been reclassified to conform with this presentation.

Seasonality

Seasonal factors may impact our results in certain quarters. The first quarter has historically been stronger for our Capital Markets businesses. The second quarter has fewer days than the other quarters, which generally results in a decrease in net interest income and certain expense items. The third and fourth quarters include the summer months which results in lower client activity and may negatively impact the results of our Capital Markets' brokerage business and our Wealth Management's investment management business.

Specified items affecting our consolidated results

- In the first quarter of 2017, our results included our share of a gain related to the sale of the U.S. operations of Moneris of $212 million (before- and after-tax).
- In the third quarter of 2016, our results included a gain of $287 million ($235 million after-tax) related to the sale of RBC General Insurance Company to Aviva.

Trend analysis

The Canadian economy has generally improved over the period, expanding since the second calendar quarter of 2016 as the manufacturing and mining sectors have been boosted by improving oil prices and positive results from the energy sector, after the impact of the Alberta wildfires in May 2016. In particular, strong growth earlier this year reflected robust gains in consumer spending amid strong employment growth, low interest rates, and wealth effects from rising home prices. With strong growth over the first half of 2017, the BoC raised its overnight rate, once in July and again in September. The U.S. economy also experienced growth over the period due to higher household wages, strong job growth, and continued consumer confidence as well as rising business investment. As a result of improving economic conditions, in June 2017 the Fed raised its funds target range for the third time over the period. Global markets were given a boost since the beginning of 2017 as equity markets continued to rebound from the setbacks seen in 2016, particularly in the energy sector. For further details, refer to the Economic and market review and outlook section.

Earnings have generally trended upwards over the period, driven by our Canadian Banking results reflecting solid volume growth, partially offset by lower spreads over a majority of the period, higher fee-based revenue and our share of the gain from the sale of the U.S. operations of Moneris in the first quarter of 2017. Our Wealth Management results reflect growth in average fee-based client assets, mainly due to strong capital appreciation and net sales, volume growth, and the impact from higher U.S. interest rates since the first quarter of 2017. Results from our

acquisition of City National have been reflected in our Wealth Management segment since the first quarter of 2016 and have trended higher since the acquisition. Capital Markets results have trended upwards over the period, driven by higher results in Corporate and Investment Banking and Global Markets driven by increased client activity and generally improved market conditions. The decline in the fourth quarter of 2016 was primarily due to lower trading revenue largely in the U.S. and Europe, and lower equity origination activity in Canada. Results in our Insurance segment were impacted by the gain on the sale of our home and auto insurance manufacturing business in the third quarter of 2016 as noted previously. Investor & Treasury Services results have generally trended higher over the period due to higher funding and liquidity earnings since the first quarter of 2016, reflecting tightening credit spreads and favourable interest and foreign exchange rates movements.

Revenue has generally increased over the period, reflecting solid volume and fee-based revenue growth in our Canadian Banking businesses. The first quarter of 2017 benefitted from the gain on sale of the U.S. operations of Moneris as noted previously. Wealth Management revenue has generally trended upwards primarily due to growth in average fee-based client assets and the inclusion of City National which has resulted in higher net interest income reflecting volume growth and the impact from higher U.S. interest rates since the first quarter of 2017. Capital Markets benefitted from stabilizing credit spreads since the first quarter of 2016, resulting in higher fixed income trading over the period except in the latter half of 2017 which was impacted by reduced market volatility. The favourable impact of foreign exchange translation due to a generally weaker Canadian dollar over the period was partially offset by the strengthening Canadian dollar during the past two quarters. Insurance revenue was primarily impacted by changes in the fair value of investments backing our policyholder liabilities, which is largely offset in PBCAE and benefitted from the gain on sale of our home and auto insurance manufacturing business in the third quarter of 2016, as noted previously, and the annual favourable actuarial adjustments in the fourth quarter.

The credit quality of our portfolios has generally improved over the period. Higher PCL related to our Capital Markets and Canadian Banking businesses was recorded in the first two quarters of 2016, mainly reflecting the impact of the sustained low oil price environment and general economic uncertainty. PCL trended lower in 2017 due to lower provisions and recoveries in our Capital Markets and Canadian Banking portfolios.

PBCAE has fluctuated quarterly as it includes the changes to the fair value of investments backing our policyholder liabilities, which is largely offset in revenue. PBCAE has also increased due to business growth, and has been impacted by actuarial liability adjustments and claims costs over the period.

While we continue to focus on efficiency management activities, non-interest expense has generally trended upwards over the period, mostly to support business growth and due to the inclusion of City National since the first quarter of 2016. Growth in non-interest expense in 2017 mainly reflects higher variable compensation in Wealth Management and Capital Markets on improved results, and was impacted by higher severance in the third quarter of 2017. Higher costs in support of business growth reflecting ongoing investments in technology, including digital initiatives, and an impairment related to properties held for sale in the first quarter of 2017 also contributed to the increase. The unfavourable impact of foreign exchange translation due to a generally weaker Canadian dollar over the period was partially offset by the strengthening Canadian dollar during the past two quarters.

Our effective income tax rate has fluctuated over the period, mostly due to varying levels of income reported in jurisdictions with different tax rates, as well as fluctuating levels of income from tax-advantaged sources. Our effective income tax rate has generally been impacted over the period by higher earnings before income taxes and lower tax-exempt income in 2017.

Results excluding the specified item noted previously are non-GAAP measures. For further details, including a reconciliation, refer to the Key performance and non-GAAP measures section.

Financial condition

Condensed balance sheets

The following table shows our condensed balance sheets:

Table 43

(Millions of Canadian dollars)	2017	2016
Assets (1)		
Cash and due from banks	$ 28,407	$ 14,929
Interest-bearing deposits with banks	32,662	27,851
Securities	218,379	236,093
Assets purchased under reverse repurchase agreements and securities borrowed	220,977	186,302
Loans		
Retail	385,170	369,470
Wholesale	159,606	154,369
Allowance for loan losses	(2,159)	(2,235)
Other – Derivatives	95,023	118,944
– Other (2)	74,788	74,535
Total assets	$ 1,212,853	$ 1,180,258
Liabilities (1)		
Deposits	$ 789,635	$ 757,589
Other – Derivatives	92,127	116,550
– Other (2)	247,398	224,745
Subordinated debentures	9,265	9,762
Total liabilities	1,138,425	1,108,646
Equity attributable to shareholders	73,829	71,017
Non-controlling interests	599	595
Total equity	74,428	71,612
Total liabilities and equity	$ 1,212,853	$ 1,180,258

(1) Foreign currency-denominated assets and liabilities are translated to Canadian dollars.
(2) Other – Other assets and liabilities include Segregated fund net assets and liabilities, respectively.

2017 vs. 2016

Total assets were up $33 billion or 3% from last year. Foreign exchange translation decreased total assets by $33 billion.

Cash and due from banks was up $13 billion, mainly due to higher deposits with central banks reflecting our management of liquidity and funding risk.

Interest-bearing deposits with banks increased $5 billion or 17%, largely reflecting higher deposits with central banks.

Securities were down $18 billion or 8%, largely driven by lower equity trading positions, a decrease in government debt securities reflecting our management of liquidity and funding risk, and the impact of foreign exchange translation. These factors were partially offset by an increase in corporate debt securities in support of business activities.

Assets purchased under reverse repurchase agreements (reverse repos) and securities borrowed increased $35 billion or 19%, mainly attributable to higher client and business activities, partially offset by higher financial netting and the impact of foreign exchange translation.

Loans were up $21 billion or 4%, largely due to continued volume growth in residential mortgages in Canada reflecting increased client activities, and higher wholesale loans driven by business growth, partially offset by the impact of foreign exchange translation.

Derivative assets were down $24 billion or 20%, mainly attributable to lower fair values on interest rate swaps and the impact of foreign exchange translation, partially offset by lower financial netting on our interest rate swaps.

Other assets remained relatively flat.

Total liabilities were up $30 billion or 3%. Foreign exchange translation decreased total liabilities by $33 billion.

Deposits increased $32 billion or 4%, mainly as a result of increased business and retail deposits driven by higher client activity, growth in issuances of fixed-term notes driven by funding requirements, and higher bank deposits due to increased client activity. These factors were partially offset by the impact of foreign exchange translation.

Derivative liabilities were down $24 billion or 21%, mainly attributable to lower fair values on interest rate swaps and the impact of foreign exchange translation, partially offset by lower financial netting on our interest rate swaps.

Other liabilities increased $23 billion or 10%, mainly attributable to higher repurchase agreements reflecting business and client activities, partially offset by lower obligations related to securities sold short.

Total equity increased $3 billion or 4%, largely reflecting earnings, net of dividends.

Off-balance sheet arrangements

In the normal course of business, we engage in a variety of financial transactions that, for accounting purposes, are not recorded on our Consolidated Balance Sheets. Off-balance sheet transactions are generally undertaken for risk, capital and funding management purposes which benefit us and our clients. These include transactions with structured entities and may also include the issuance of guarantees. These transactions give rise to, among other risks, varying degrees of market, credit, liquidity and funding risk, which are discussed in the Risk management section.

We use structured entities to securitize our financial assets as well as assist our clients in securitizing their financial assets. These entities are not operating entities, typically have no employees, and may or may not be recorded on our Consolidated Balance Sheets.

In the normal course of business, we engage in a variety of financial transactions that may qualify for derecognition. We apply the derecognition rules to determine whether we have transferred substantially all the risks and rewards or control associated with the financial assets to a third party. If the transaction meets specific criteria, it may qualify for full or partial derecognition from our Consolidated Balance Sheets.

Securitizations of our financial assets

We periodically securitize our credit card receivables, residential and commercial mortgage loans and bond participation certificates primarily to diversify our funding sources, enhance our liquidity position and for capital purposes. We also securitize residential and commercial mortgage loans as part of our sales and trading activities.

We securitize our credit card receivables, on a revolving basis, through a consolidated structured entity. We securitize single and multiple-family residential mortgages through the National Housing Act Mortgage-Backed Securities (NHA MBS) program. The majority of our securitization activities are recorded on our Consolidated Balance Sheets as we do not meet the derecognition criteria. As at October 31, 2017, we derecognized $1.2 billion (October 31, 2016 – $nil) of mortgages where both the NHA and the residual interests in the mortgages were sold to third parties resulting in the transfer of substantially all of the risks and rewards. For further details, refer to Note 6 and Note 7 of our 2017 Annual Consolidated Financial Statements.

We periodically securitize residential mortgage loans for the Canadian social housing program through the NHA MBS program, which are derecognized from our Consolidated Balance Sheets when sold to third party investors. During 2017, we securitized $13 million of residential mortgage loans for the Canadian social housing program (October 31, 2016 – $nil).

We also periodically securitize commercial mortgage loans by selling them in collateral pools, which meet certain diversification, leverage and debt coverage criteria, to structured entities, one of which is sponsored by us. Securitized commercial mortgage loans are derecognized from our Consolidated Balance Sheets as we have transferred substantially all of the risks and rewards of ownership of the securitized assets. During the year ended October 31, 2017, we securitized $407 million of commercial mortgages (October 31, 2016 – $700 million). Our continuing involvement with the transferred assets is limited to servicing certain of the underlying commercial mortgages sold. As at October 31, 2017, there was $1.4 billion of commercial mortgages outstanding that we continue to service related to these securitization activities (October 31, 2016 – $1.3 billion).

In prior years, we participated in bond securitization activities where we purchased government, government-related and corporate bonds and repackaged those bonds in trusts that issue participation certificates, which were sold to third party investors. Securitized bonds are derecognized from our Consolidated Balance Sheets as we have transferred substantially all of the risk and rewards of ownership of the securitized assets. Our continuing involvement with the transferred assets is limited to servicing the underlying bonds. As at October 31, 2017, there were $49 million of bond participation certificates outstanding related to these prior period securitization activities (October 31, 2016 – $81 million).

Involvement with unconsolidated structured entities

In the normal course of business, we engage in a variety of financial transactions with structured entities to support our customers' financing and investing needs, including securitization of our clients' financial assets, creation of investment products, and other types of structured financing.

We have the ability to use credit mitigation tools such as third party guarantees, credit default swaps, and collateral to mitigate risks assumed through securitization and re-securitization exposures. The process in place to monitor the credit quality of our securitization and re-securitization exposures involves, among other things, reviewing the performance data of the underlying assets. We affirm our ratings each quarter and formally confirm or assign a new rating at least annually. For further details on our activities to manage risks, refer to the Risk management section.

Below is a description of our activities with respect to certain significant unconsolidated structured entities. For a complete discussion of our interests in consolidated and unconsolidated structured entities, refer to Note 7 of our 2017 Annual Consolidated Financial Statements.

RBC-administered multi-seller conduits

We administer multi-seller conduits which are used primarily for the securitization of our clients' financial assets. Our clients primarily use our multi-seller conduits to diversify their financing sources and to reduce funding costs by leveraging the value of high-quality collateral. The conduits offer us a favourable revenue stream and risk-adjusted return.

We provide services such as transaction structuring, administration, backstop liquidity facilities and partial credit enhancements to the multi-seller conduits. Revenue for all such services amounted to $287 million during the year (October 31, 2016 – $252 million).

Our total commitment to the conduits in the form of backstop liquidity and credit enhancement facilities is shown below. The total committed amount of these facilities exceeds the total amount of the maximum assets that may have to be purchased by the conduits under the purchase agreements. As a result, the maximum exposure to loss attributable to our backstop liquidity and credit enhancement facilities is less than the total committed amounts of these facilities.

Liquidity and credit enhancement facilities **Table 44**

	2017				2016			
As at October 31 (Millions of Canadian dollars)	Notional of committed amounts (1)	Allocable notional amounts	Outstanding loans (2)	Maximum exposure to loss (3)	Notional of committed amounts (1)	Allocable notional amounts	Outstanding loans (2)	Maximum exposure to loss (3)
Backstop liquidity facilities	$ 38,622	$ 35,981	$ 371	$ 36,352	$ 39,462	$ 36,494	$ 733	$ 37,227
Credit enhancement facilities	2,270	2,270	–	2,270	2,235	2,235	–	2,235
Total	$ 40,892	$ 38,251	$ 371	$ 38,622	$ 41,697	$ 38,729	$ 733	$ 39,462

(1) Based on total committed financing limit.
(2) Net of allowance for loan losses and write-offs.
(3) Not presented in the table above are derivative assets with a fair value of $17 million (October 31, 2016 – $11 million) which are a component of our total maximum exposure to loss from our interests in the multi-seller conduits. Refer to Note 7 of our 2017 Annual Consolidated Financial Statements for more details.

As at October 31, 2017, the notional amount of backstop liquidity facilities we provide decreased by $840 million or 2% from last year. The decrease in the amount of backstop liquidity facilities provided to the multi-seller conduits as compared to last year primarily reflects the impact of foreign exchange translation. The notional amount of partial credit enhancement facilities we provide increased by $35 million from last year. The increase in the credit enhancement facilities reflects increased client usage. Total loans extended to the multi-seller conduits under the backstop liquidity facilities decreased by $362 million from last year primarily due to principal repayments and the impact of foreign exchange translation.

Maximum exposure to loss by client type **Table 45**

	2017			2016		
As at October 31 (Millions of dollars)	(US$)	(C$)	Total (C$)	(US$)	(C$)	Total (C$)
Outstanding securitized assets						
Credit cards	$ 4,058	$ 510	$ 5,745	$ 5,057	$ 510	$ 7,292
Auto loans and leases	10,597	3,113	16,783	9,489	2,646	15,372
Student loans	1,747	–	2,253	2,352	–	3,154
Trade receivables	2,358	–	3,042	2,002	51	2,736
Asset-backed securities	287	–	371	547	–	734
Equipment receivables	1,402	–	1,809	1,428	–	1,915
Consumer loans	1,267	–	1,634	1,470	–	1,971
Dealer floor plan receivables	939	852	2,064	760	903	1,922
Fleet finance receivables	766	306	1,294	914	306	1,532
Insurance premiums	134	163	336	–	163	163
Residential mortgages	–	1,377	1,377	–	1,122	1,122
Transportation finance	1,346	179	1,914	1,041	153	1,549
Total	$ 24,901	$ 6,500	$ 38,622	$ 25,060	$ 5,854	$ 39,462
Canadian equivalent	$ 32,122	$ 6,500	$ 38,622	$ 33,608	$ 5,854	$ 39,462

Our overall exposure decreased by 2.1% compared to last year, primarily reflecting the impact of foreign exchange translation. Correspondingly, total assets of the multi-seller conduits decreased by $831 million or 2.1% over last year, primarily due to decreases in the Credit Card and Student Loans asset classes, which were partially offset by increases in the Auto loans and leases and Transportation finance asset classes. 100% of multi-seller conduits assets were internally rated A or above, consistent with last year. All transactions funded by the unconsolidated multi-seller conduits are internally rated using a rating system which is largely consistent with that of the external rating agencies.

Multiple independent debt rating agencies review all of the transactions in the multi-seller conduits. Transactions financed in two U.S. multi-seller conduits are reviewed by Moody's Investors Service (Moody's), Standard & Poor's (S&P) and Fitch Ratings (Fitch). Transactions in one U.S. multi-seller conduit is reviewed by S&P. Transactions in the Canadian multi-seller conduits are reviewed by DBRS and Moody's. Each applicable rating agency also reviews ongoing transaction performance on a monthly basis and may publish reports detailing portfolio and program information related to the conduits.

As at October 31, 2017, the total asset-backed commercial paper (ABCP) issued by the conduits amounted to $24.8 billion, an increase of $44 million or 0.2% from last year. The increase in the amount of ABCP issued by the multi-seller conduits compared to last year is primarily due to an increase in client usage partially offset by foreign exchange translation. The rating agencies that rate the ABCP rated 70% (October 31, 2016 – 67%) of the total amount issued within the top ratings category and the remaining amount in the second highest ratings category.

In October 2014, the U.S. federal regulators adopted regulations related to the credit risk retention requirements of Section 15G of the Securities Exchange Act of 1934 (as added by Section 941 of the Dodd-Frank Act) for asset-backed securities (the Risk Retention Rules). To comply with the Risk Retention Rules, we hold ABCP from RBC administered U.S. multi-seller conduits in an amount equal to at least 5% of the aggregate principal amount of the then outstanding ABCP and any advances under the liquidity loan agreement. As at October 31, 2017, the fair value of the ABCP purchased to comply with the Risk Retention Rules was $1 billion (October 31, 2016 – $670 million). This inventory is classified as Securities – Available-for-sale on our Consolidated Balance Sheet.

We also purchase ABCP issued by the multi-seller conduits in our capacity as a placement agent in order to facilitate overall program liquidity. As at October 31, 2017, the fair value of our inventory was $2 million, a decrease of $3 million from last year. The fluctuations in inventory held reflect normal trading activity. This inventory is classified as Securities – Trading on our Consolidated Balance Sheets.

Structured finance

We invest in auction rate securities (ARS) of certain trusts which fund their long-term investments in student loans by issuing short-term senior and subordinated notes. Our maximum exposure to loss in these ARS trusts as at October 31, 2017 was $443 million (October 31, 2016 – $549 million). The decrease in our maximum exposure to loss is primarily related to the impact of foreign exchange translation. Interest income from the ARS investments, which is reported in Net-interest income, was $9.8 million during the year (October 31, 2016 – $6.3 million).

We also provide liquidity facilities to certain municipal bond Tender Option Bond (TOB) trusts in which we have an interest but do not consolidate because the residual certificates issued by the TOB trusts are held by third parties. As at October 31, 2017, our maximum exposure to loss from these unconsolidated municipal bond TOB trusts was $1,727 million (October 31, 2016 – $1,640 million). The increase in our maximum exposure to loss relative to last year is primarily due to additional TOB trusts. Fee revenue from the provision of liquidity facilities to these entities, reported in Non-interest income, was $5.1 million during the year (October 31, 2016 – $4.7 million).

We provide senior warehouse financing to discrete unaffiliated structured entities that are established by third parties to acquire loans and issue term collateralized loan obligations. A portion of the proceeds from the sale of the term collateralized loan obligations is used to fully repay the senior warehouse financing that we provide. As at October 31, 2017, our maximum exposure to loss associated with the outstanding senior warehouse financing facilities was $263 million (October 31, 2016 – $141 million). The increase in our maximum exposure to loss relative to last year is related to the addition of new financing facilities. We provide senior financing to an unaffiliated structured entity to acquire loans. As at October 31, 2017, our maximum exposure to loss associated with the outstanding senior financing facilities was $1.2 billion (October 31, 2016 – $1.3 billion).

Investment funds

We invest in hedge funds primarily to provide clients with desired exposures to reference funds. As we make investments in the reference funds, exposures to the funds are simultaneously transferred to clients through derivative transactions. Our maximum exposure to loss in the reference funds is limited to our investments in the funds. As at October 31, 2017, our maximum exposure to loss was $2.9 billion (October 31, 2016 – $2.6 billion).

We also provide liquidity facilities to certain third party investment funds. The funds issue unsecured variable-rate preferred shares and invest in portfolios of tax exempt bonds. As at October 31, 2017, our maximum exposure to these funds was $268 million (October 31, 2016 – $764 million). The decrease in our maximum exposure compared to last year is primarily due to unwinds of several third party investment funds.

Third-party securitization vehicles

We hold interests in certain unconsolidated third-party securitization vehicles, which are structured entities. We, as well as other financial institutions, are obligated to provide funding to these entities up to our maximum commitment level and are exposed to credit losses on the underlying assets after various credit enhancements. As at October 31, 2017, our maximum exposure to loss in these entities was $6.1 billion (October 31, 2016 – $9 billion). The decrease in our maximum exposure to loss compared to last year reflects a reduction in the securitized assets in these entities and the impact of foreign currency translation. Interest and non-interest income earned in respect of these investments was $87 million (October 31, 2016 – $95 million).

Guarantees, retail and commercial commitments

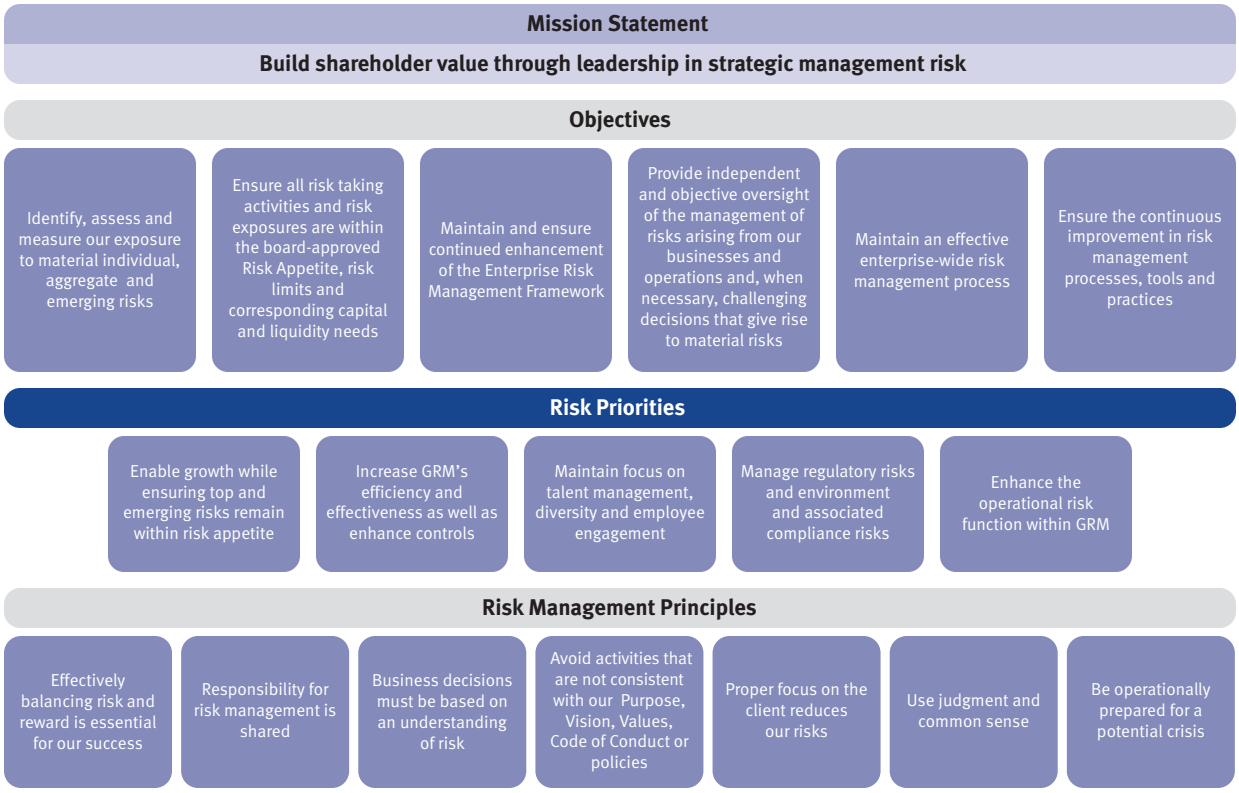
We provide our clients with guarantees and commitments that expose us to liquidity and funding risks. Our maximum potential amount of future payments in relation to our commitments and guarantee products as at October 31, 2017 amounted to $355.8 billion compared to $339.8 billion last year. The increase compared to last year relates primarily to the business growth in both securities lending indemnifications and other credit-related commitments, partially offset by the impact of foreign exchange translation. Refer to Liquidity and funding risk and Note 25 to our 2017 Annual Consolidated Financial Statements for details regarding our guarantees and commitments.

Risk management

Overview

The ability to manage risk is a core competency at RBC, and is supported by our strong risk conduct and culture, and an effective risk management approach. We define risk as the potential for loss or an undesirable outcome with respect to volatility of actual earnings in relation to expected earnings, capital adequacy or liquidity. Organizational design and governance processes ensure that our Group Risk Management (GRM) function is independent from the businesses it supports.

We manage our risks by ensuring that business activities and transactions provide an appropriate balance of return for the risks assumed and remain within our risk appetite, which is collectively managed across RBC, through adherence to our Enterprise Risk Appetite Framework. Our major risk categories include credit, market, liquidity, insurance, operational, regulatory compliance, strategic, reputation, legal and regulatory environment, competitive, and systemic risks.



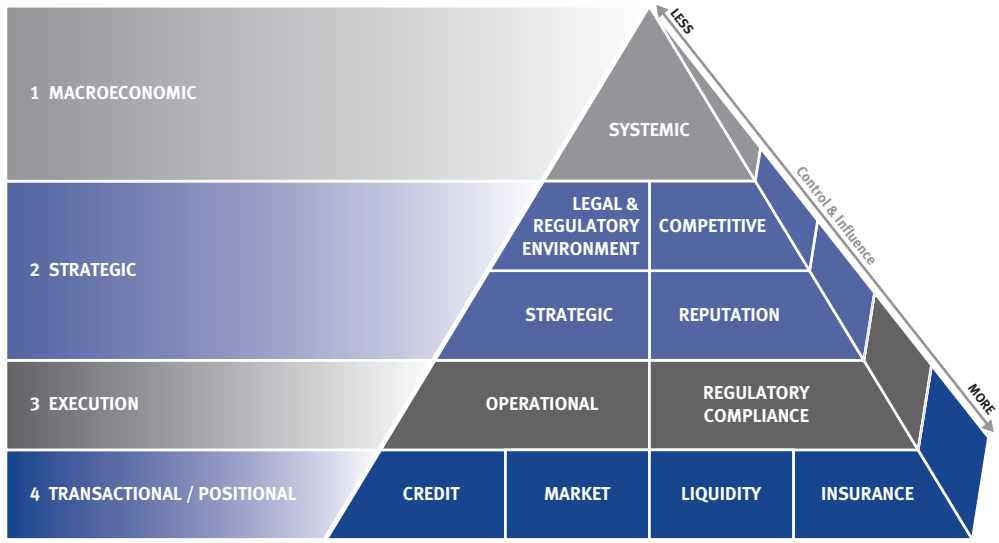
2017 Accomplishments

Throughout 2017, we have:

- Enabled growth while ensuring top and emerging risks remained within our risk appetite;
- Maintained strong credit quality with total PCL ratio of 21 bps and GIL ratio of 46 bps, down 8 bps and 27 bps from last year, respectively;
- Maintained strong capital and liquidity ratios, well above regulatory requirements;
- Avoided major operational risk events;
- Enhanced stress testing capabilities and risk analysis frameworks;
- Continued to strengthen our risk conduct and culture practices; and
- Expanded our risk organization for the U.S. region.

Risk pyramid

Our risk pyramid identifies and categorizes our principal risks and provides a common language and discipline for the identification and assessment of risk in existing businesses, new businesses, products or initiatives, and acquisitions and alliances. It is maintained by GRM and reviewed regularly to ensure all key risks are reflected and ranked appropriately. The placement of the principal risks within the risk pyramid is a function of two primary criteria: risk drivers and level of control and influence.



Risk Drivers

Risk drivers are key factors that would have a strong influence on whether or not one or more of our risks will materialize, which include the following:

1. Macroeconomic: Adverse changes in the macroeconomic environment can lead to a partial or total collapse of the real economy or the financial system in any of the regions in which we operate. Examples include deterioration in the Canadian housing market, abrupt changes in the geopolitical environment, or a severe economic slowdown in China. Resultant impacts can materialize as loss of revenue, as well as realization of credit, market or operational risk losses.
2. Strategic: Business strategy is a major driver of our risk appetite and the strategic choices and capital allocations we make determine how our risk profile changes. Examples include acquisitions, responding to the threats posed by non-traditional competitors and responding to proposed changes in the regulatory framework. These choices also impact our revenue mix, affecting our exposure to earnings volatility and loss absorption capacity.
3. Execution: The complexity and scope of our operations across the globe exposes us to operational and regulatory compliance risks, including fraud, anti-money laundering, cybersecurity and conduct/fiduciary risk.
4. Transactional/Positional: This driver of risk presents a more traditional risk perspective. This involves the risk of credit or market losses arising from the lending transactions and balance sheet positions we undertake every day.

Control and Influence

The risk categories are organized vertically from the top of the pyramid to its base according to the relative degree of control and influence we are considered to have over each risk.

The risk categories along the base level of our risk pyramid are those over which we have the greatest level of control and influence. We understand these risks and earn revenue by taking them. These are credit, market, liquidity and insurance risks. Operational risk and regulatory compliance risk, while still viewed as risks over which we have a greater level of control and influence, are ranked higher on the pyramid than the other more controllable risks. This ranking acknowledges the level of controllability associated with people, systems and external events.

Systemic risk is placed at the top of our risk pyramid, and is generally considered the least controllable type of risk arising from the business environment in which we operate. However, we have in place measures for mitigating the impacts of systemic risk such as our diversified business model and funding sources, financial crisis management strategies and protocols, stress testing programs, and product and geographic diversification. Legal and regulatory environment and competitive risks, which can be viewed as somewhat controllable, can be influenced through our role as a corporate entity, and as an active participant in the Canadian and global financial services industry.

Top and emerging risks

Our view of risks is not static. An important component of our enterprise risk management approach is to ensure that continuously evolving top risks and emerging risks are appropriately identified, managed, and incorporated into existing risk management assessment, measurement, monitoring and escalation processes.

These practices ensure management is forward-looking in its assessment of risks to the organization. Identification of top and emerging risks occurs in the course of business development and as part of the execution of risk oversight responsibilities by GRM, Finance, Corporate Treasury, Global Compliance and other control functions.

A top risk is an identified risk that could have a material adverse effect on our financial results, reputation, business model, or strategy in the short to medium term.

Top Risks	Description
Global Uncertainty	Global uncertainty remained a key risk during 2017. The U.S. administration continues to advocate policy changes related to trade, financial regulation and taxation, which add to overall global uncertainty and volatility. The Canadian economy faces additional risks from the uncertain outcome of negotiations of the North American Free Trade Agreement (NAFTA) and from the U.S. government's posture on financial regulation and tax reform. Concerns remain around the social, political and economic impacts of the changing political landscape in Europe, especially the impact of mass immigration, Brexit negotiations, and the Catalan referendum. Concerns over a possible economic slowdown in China have increased in light of mixed economic data. Global tensions have also increased due to North Korea's military activities.
Canadian Housing and Household Indebtedness	The housing market is a top concern for the Canadian financial system. Housing prices remain elevated in the Greater Toronto Area and Greater Vancouver Area and affordability remains stretched. We are actively monitoring the impact of recent Government of Ontario measures implemented in an attempt to help cool the housing market. As the BoC embarks on a path of gradual rate tightening, the rising interest rate environment adds an additional level of uncertainty since elevated household indebtedness is a key risk. Increasing indebtedness could have material negative credit quality implications for our consumer lending portfolios, including residential mortgages, credit lines, indirect lending, credit cards, automotive lending and other personal loans.
Information Technology and Cyber Risks	Information technology and cyber risks continue to be key risks, not only for the financial services sector, but for other industries in Canada and around the globe. The volume and sophistication of cyber-attacks continue to increase and could result in business interruptions, service disruptions, theft of intellectual property and confidential information, litigation and reputational damage. We continue to develop advancements in cyber defence capabilities in an effort to support our business model, protect our systems and enhance the experience of our clients on a global basis by employing industry best practices and collaborating with peers and experts to provide our customers with confidence in their financial transactions. The adoption of emerging technologies, such as cloud computing, artificial intelligence and robotics, call for continued focus and investment to manage our risks effectively.
Regulatory Changes	We operate in multiple jurisdictions, and the continued expansion of the breadth and depth of regulations may lead to declining profitability and slower response to market needs. Financial reforms coming on stream in multiple jurisdictions may have material impacts on our businesses and could affect their strategies.

An emerging risk is one that could materially impact our financial results, reputation, business model, or strategy, but is not well understood and has not yet materialized. We are actively monitoring our emerging risks, which include the following:

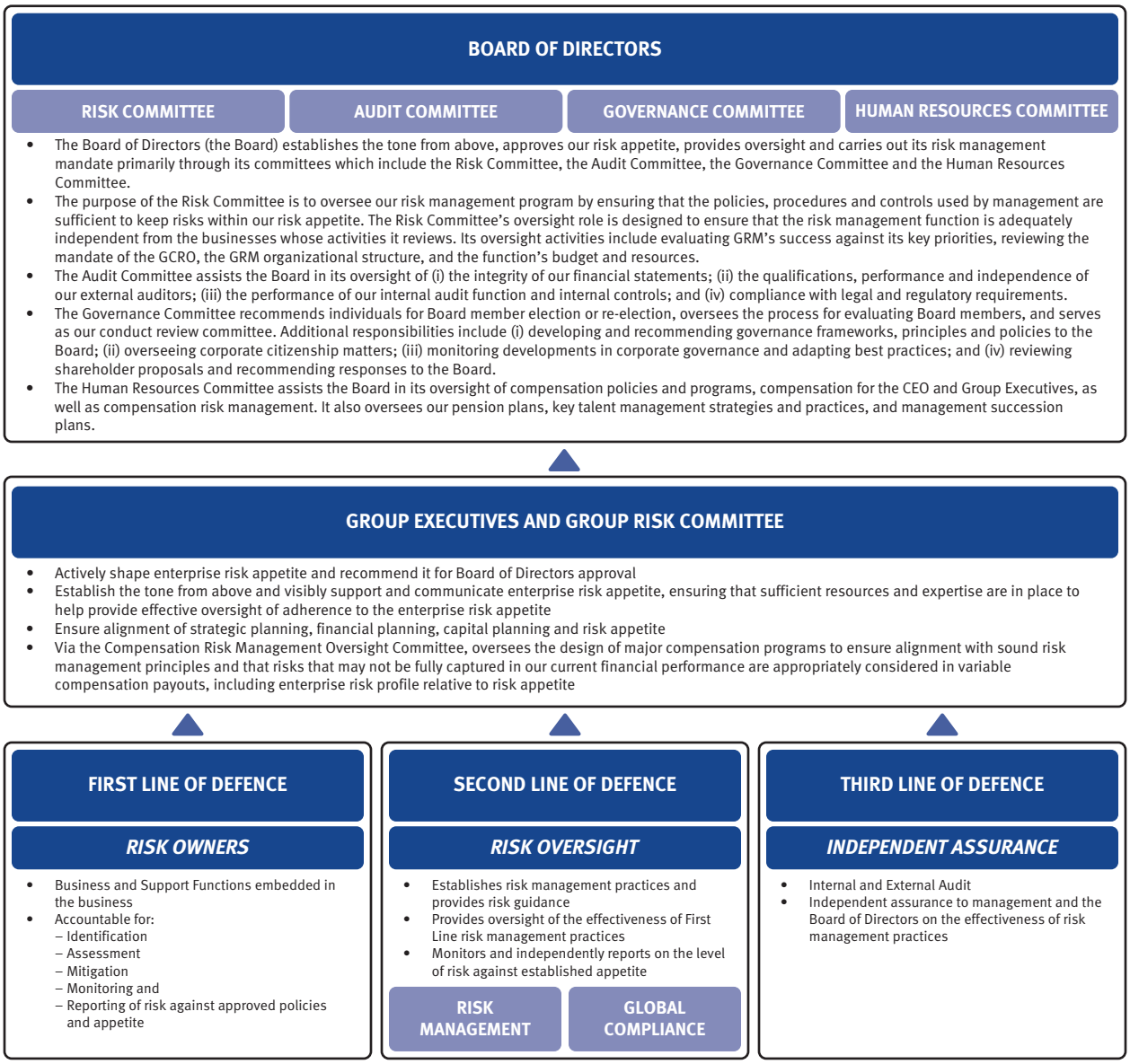
- Technological innovation and non-traditional competitors;
- Global environmental policy and climate change;
- Changes in consumer behavior;
- End of quantitative easing and the implication for global liquidity.

Enterprise risk management

Under the oversight of the Board of Directors and senior management, the Enterprise Risk Management Framework provides an overview of our enterprise-wide programs for managing risk, including identifying, assessing, measuring, controlling, monitoring and reporting on the significant risks that face the organization. While our risk appetite encompasses "what" risks we are able and willing to take, our risk conduct and culture articulates "how" we expect to take those risks.

Risk governance

The risk governance model is well-established. The Board of Directors oversees the implementation of our risk management framework, while employees at all levels of the organization are responsible for managing the day-to-day risks that arise in the context of their mandate. As shown below, we use the three lines of defence governance model to manage risks across the enterprise.



Risk appetite

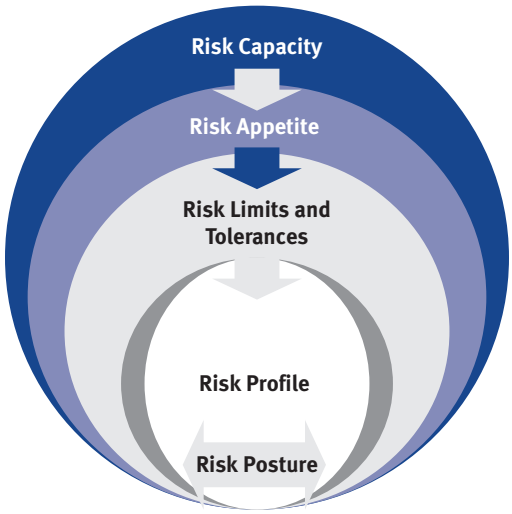
Our risk appetite is the amount and type of risk that we are able and willing to accept in the pursuit of our business objectives. The goal in managing risk is to protect us from an unacceptable loss or an undesirable outcome with respect to earnings volatility, capital adequacy or liquidity, while supporting and enabling our overall business strategy.

Our approach to articulating our risk appetite is focused around three key concepts:

1. The amount of "earnings at risk" that is determined to be acceptable over an economic cycle and including periods of moderate stress, using an expected future loss lens and considering potential revenue and expense contributions to earnings volatility;
2. The amount of "capital at risk" that is determined to be acceptable under severe and very severe stress, using an unexpected future loss lens; and
3. Ensuring adequate liquidity in times of stress.

Our Enterprise Risk Appetite Framework has several major components as follows:

- Define our risk capacity by identifying regulatory constraints that restrict our ability to accept risk.
- Establish and regularly confirm our risk appetite, comprised of strategic drivers and self-imposed constraints that define the maximum amount of risk we are willing to accept given our financial strength, corporate objectives and business strategies.
- Set risk limits and tolerances for management to ensure that risk-taking activities are within our risk appetite.
- Regularly measure and evaluate our risk profile, representing the risks we are exposed to, relative to our risk appetite, and ensure appropriate action is taken to prevent our risk profile from surpassing our risk appetite.
- Assess our risk posture to confirm whether our strategic priorities entail taking on more risk over a one-year time frame, using a scale of contracting, stable or expanding.



We are in the business of taking risk; however, we balance the risk-reward trade-off to ensure the long-term viability of the organization by remaining within our risk appetite. Our risk appetite is articulated in several complementary qualitative and quantitative risk appetite statements.

Risk Appetite Statements

Qualitative Statements

- Undertake only risks we understand. Make thoughtful and future-focused risk decisions.
- Make decisions that balance risk with sustainable and stable business growth.
- Maintain a healthy control environment to protect our stakeholders and meet regulatory and legal requirements.
- Avoid activities that compromise our Purpose, Vision, Values, Goals and Code of Conduct.
- Never compromise our reputation and the trust of our clients for profits.
- Maintain financial resilience and operational readiness for extreme events, to protect our stakeholders, financial markets and the broader economy.

Quantitative Statements

- Manage exposure to future losses and volatility of earnings.
- Avoid excessive concentrations of risk.
- Maintain low exposure to future losses under periods of stress.
- Ensure sound management of liquidity and funding risk.
- Ensure sound management of regulatory compliance risk and operational risk.
- Ensure capital adequacy by maintaining capital ratios in excess of rating agency and regulatory expectations.
- Maintain strong credit ratings and risk profile in the top half of our peer group.

Our risk appetite statements are structured in such a way that they can be applied at the enterprise, business segment, business unit and legal entity levels. Risk appetite is aligned with our business strategies, capital, financial and funding plans. We also ensure that the business strategy aligns with the enterprise and business segment level risk appetite.

Risk measurement

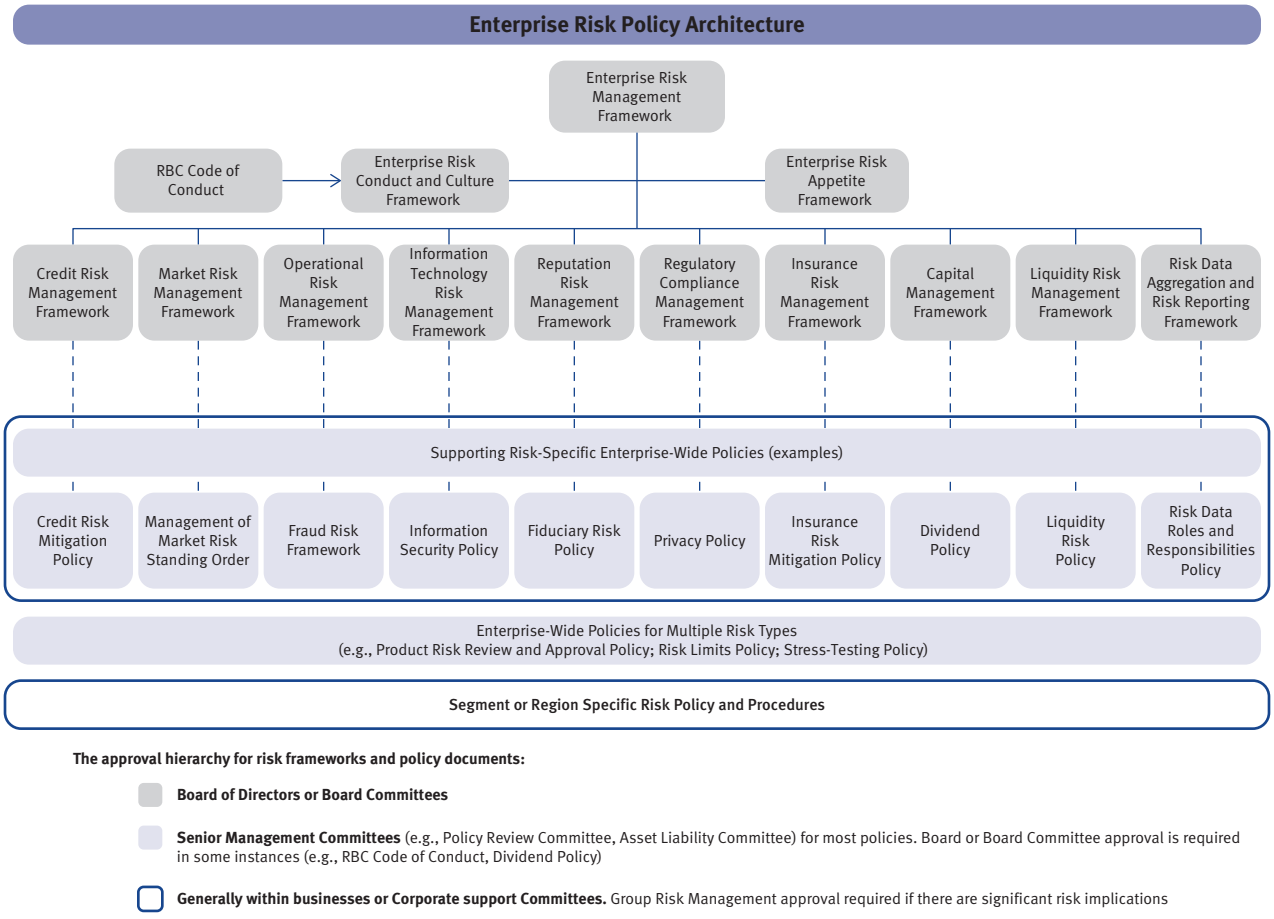
Our ability to measure risks is a key component of our enterprise-wide risk and capital management processes. Certain measurement methodologies are common to a number of risk types, while others only apply to a single risk type. While quantitative risk measurement is important, we also place reliance on qualitative factors. For those risk types that are difficult to quantify, we place greater emphasis on qualitative risk factors and assessment of activities to gauge the overall level of risk to ensure that they are within our risk appetite. In addition, judgmental risk measures are developed, and techniques such as stress testing, and scenario and sensitivity analyses can also be used to assess and measure risks. Our primary methods for measuring risk include:

- *Quantifying expected loss* which is used to assess earnings at risk and is a representation of losses that are statistically expected to occur in the normal course of business in a given time period;
- *Quantifying unexpected loss* which is used to assess capital at risk under stressed conditions and is a statistical estimate of the amount by which actual earnings depart from the expected, over a specified time horizon;
- *Stress testing* which examines potential impacts arising from exceptional but plausible events; and
- *Backtesting* which is performed on a quarterly basis by comparing the realized values to the parameter estimates that are currently used to ensure the parameters remain appropriate for regulatory and economic capital calculations.

Risk control

Our enterprise-wide risk management approach is supported by a comprehensive set of risk controls.

These risk controls are defined in our Enterprise Risk Management and Risk-Specific Frameworks, which lay the foundation for the development and communication of policies, establishment of formal risk review and approval processes, and the establishment of delegated authorities and limits. The implementation of robust risk controls enables the optimization of risk and return on both a portfolio and a transactional basis.



Risk review and approval processes

Risk review and approval processes are established by GRM based on the nature, size and complexity of the risk involved. In general, the risk review and approval process involves a formal review and approval by an individual, group or committee that is independent from the originator. The approval responsibilities are governed by delegated authorities based on the following categories: transactions, structured credit, projects and initiatives, and new products and services.

Authorities and limits

The Risk Committee of the Board of Directors delegates credit, market and insurance risk authorities to the President & Chief Executive Officer (CEO) and the Group Credit Risk Officer (GCRO). The delegated authorities allow these officers to approve single name, geographic (country and region) and industry sector exposures within defined parameters to manage concentration risk, establish underwriting and inventory limits for trading and investment banking activities and set market risk tolerances.

The Board of Directors also delegates liquidity risk authorities to the President & CEO, Chief Financial Officer (CFO) and GCRO. These limits act as a key risk control designed to ensure that reliable and cost-effective sources of cash or its equivalent are available to satisfy our current and prospective commitments.

Reporting

Enterprise and business segment level risk monitoring and reporting are critical components of our enterprise risk management program and support the ability of senior management and the Board of Directors to effectively perform their risk management and oversight responsibilities. In addition, we publish a number of external reports on risk matters to comply with regulatory requirements. On a quarterly basis, we provide to senior management and the Board of Directors the Enterprise Risk Report which includes a comprehensive review of our risk profile relative to our risk appetite, concentrations and limit usage, stress testing results, portfolio quality and focuses on the range of risks we face along with an analysis of the related issues and trends. On an annual basis, we provide a benchmarking review which compares our performance to peers across a variety of risk metrics and includes a composite risk scorecard providing an objective measure of our ranking relative to the peer group. In addition to our regular risk monitoring, other risk specific presentations are provided to and discussed with senior management and the Board of Directors on top and emerging risks or changes in our risk profile.

Stress testing

Stress testing examines potential impacts arising from exceptional but plausible adverse events, and is an important component of our risk management framework. Stress testing results are used in:

- Monitoring our risk profile relative to our risk appetite in terms of earnings and capital at risk;
- Setting limits;

- Identifying key risks to and potential shifts in our capital and liquidity levels, and our financial position;
- Enhancing our understanding of available mitigating actions in response to adverse events; and
- Assessing the adequacy of our target capital and liquidity levels.

Our enterprise-wide stress tests evaluate key balance sheet, income statement, leverage, capital, and liquidity impacts arising from risk exposures and changes in earnings. The results are used by the Group Risk Committee (GRC), the Board of Directors and senior management risk committees to understand our performance drivers under stress, and review stressed capital, leverage, and liquidity ratios against regulatory thresholds and internal targets. The results are also incorporated into our Internal Capital Adequacy Assessment Process (ICAAP) and capital plan analyses.

We annually evaluate a number of enterprise-wide stress scenarios over a multi-year horizon, featuring a range of severities. Our Board of Directors reviews the recommended scenarios, and GRM leads the scenario assessment process. Results from across the organization are integrated to develop an enterprise-wide view of the impacts, with input from subject matter experts in GRM, Corporate Treasury, Finance, and Economics. Recent scenarios evaluated include global recessions, protectionism, isolationism, and real estate price corrections, as well as credit spread and commodity shocks.

Ongoing stress testing and scenario analyses within specific risk types such as market risk, liquidity risk, structural interest rate risk, retail and wholesale credit risk, operational risk, and insurance risk supplement and support our enterprise-wide analyses. Results from these risk-specific programs are used in a variety of decision-making processes including risk limit setting, portfolio composition evaluation, risk appetite articulation, and business strategy implementation.

In addition to ongoing enterprise-wide and risk specific stress testing programs, we also use ad hoc and reverse stress testing to deepen our knowledge of the risks we face. Ad hoc stress tests are one-off analyses used to investigate developing conditions or stress a particular portfolio in more depth. Reverse stress tests, starting with a severe outcome and aiming to reverse-engineer scenarios that might lead to it, are used in risk identification and understanding of risk/return boundaries.

In addition to internal stress tests, we participate in a number of regulator-required stress test exercises, on a periodic basis, across several jurisdictions.

Risk conduct and culture

We define our risk conduct and culture as a shared set of behavioural norms that sustain our core values and enables us to proactively identify, understand and act upon our risks, thereby protecting our clients, safeguarding our shareholders' value, and supporting the integrity, soundness and resilience of financial markets.

Risk behaviour expectations are in place and articulated through:

- Our Values;
- Code of Conduct;
- Risk management principles;
- Risk appetite statements;
- Regulatory conduct rules, practices and policies;
- Performance management processes; and
- The Risk Conduct and Culture Framework.

We align with the Financial Stability Board's four fundamental Risk Culture practices. Our Risk Culture practices include:

- Tone from above;
- Accountability;
- Effective challenge; and
- Incentives and performance management.

These practices are largely grounded in our existing risk management and human resource disciplines and protocols, and, when combined with the elements of effective leadership and values, provide a base from which the resulting risk conduct and culture can be assessed, monitored, sustained and subject to ongoing enhancement.

We hold ourselves to the highest standards of conduct to build the trust of our clients, investors, colleagues and community. The desired outcomes from effective risk conduct and culture practices align with our values and support our risk appetite statements:

The shaded text along with the tables specifically marked with an asterisk (*) in the following sections of the MD&A represent our disclosures on credit, market and liquidity and funding risks in accordance with IFRS 7, *Financial Instruments: Disclosures*, and include discussion on how we measure our risks and the objectives, policies and methodologies for managing these risks. Therefore, these shaded text and marked tables represent an integral part of our 2017 Annual Consolidated Financial Statements.

Transactional/positional risk drivers

Credit risk

Credit risk is the risk of loss associated with an obligor's potential inability or unwillingness to fulfill its contractual obligations on a timely basis. Credit risk may arise directly from the risk of default of a primary obligor (e.g., issuer, debtor, counterparty, borrower or policyholder), or indirectly from a secondary obligor (e.g., guarantor or reinsurer). Credit risk includes counterparty credit risk from both trading and non-trading activities.

The responsibility for managing credit risk is shared broadly following the three lines of defence governance model. The Board of Directors, through its Risk Committee, delegates credit risk approval authorities to the President & CEO and GCRO. Credit transactions in excess of these authorities must be approved by the Risk Committee. To facilitate day-to-day business operations, the GCRO has been empowered to further delegate credit risk approval authorities to individuals within GRM, the business segments, and Corporate Support as necessary.

We balance our risk and return by setting the following objectives for the management of credit risk:

- Ensuring credit quality is not compromised for growth;
- Mitigating credit risks in transactions, relationships and portfolios;
- Using RBC's credit risk rating and scoring systems or other approved credit risk assessment or rating methodologies, policies and tools;
- Pricing appropriately for the credit risk taken;
- Detecting and preventing inappropriate credit risk through effective systems and controls;
- Applying consistent credit risk exposure measurements;
- Ongoing credit risk monitoring and administration;
- Transferring credit risk to third parties where appropriate through approved credit risk mitigation techniques (e.g., sale, hedging, insurance, securitization); and
- Avoiding activities that are inconsistent with RBC's Values, Code of Conduct or policies.

We maintain a Credit Risk Framework and supporting policies that are designed to clearly define roles and responsibilities, acceptable practices, limits and key controls. The Credit Risk Framework describes the principles, methodologies, systems, roles and responsibilities, reports and controls that exist for managing credit risk within RBC.

Credit risk measurement

We quantify credit risk, at both the individual obligor and portfolio levels, to manage expected credit losses in order to limit earnings volatility and minimize unexpected losses.

We employ a variety of risk measurement methodologies to measure and quantify credit risk for our wholesale and retail credit portfolios. The wholesale portfolio is comprised of businesses, sovereigns, public sector entities, banks and other financial institutions, as well as certain individuals and small businesses. The retail portfolio is comprised of residential mortgages, personal loans, credit cards, and small business loans. Our credit risk rating systems are designed to assess and quantify the risk inherent in credit activities in an accurate and consistent manner. The resulting ratings and scores are then used for both client- and transaction-level risk decision making and as key inputs for our risk measurement and capital calculations.

Measurement of regulatory and economic capital

In measuring credit risk to determine regulatory capital, two principal approaches are available: Internal Ratings Based Approach (IRB) and Standardized Approach. Most of our credit risk exposure is measured under the IRB.

Under the Standardized Approach, used primarily for our Caribbean banking operations and City National, risk weights prescribed by the OSFI are used to calculate risk-weighted assets (RWA) for credit risk exposure.

Economic capital, which is our internal quantification of risks, is used for performance measurement, limit setting and internal capital adequacy.

The key parameters that form the basis of our credit risk measures for both regulatory and economic capital are:

- Probability of default (PD): An estimated percentage that represents the likelihood of default within a given time period of an obligor for a specific rating grade or for a particular pool of exposure.
- Exposure at default (EAD): An amount expected to be owed by an obligor at the time of default.
- Loss given default (LGD): An estimated percentage of EAD that is not expected to be recovered during the collections and recovery process.

These parameters are determined based primarily on historical experience from internal credit risk rating systems in accordance with supervisory standards, and are independently validated and updated on a regular basis.

Each credit facility is assigned an LGD rate that is largely driven by factors that impact the extent of losses anticipated in the event the obligor defaults. These factors mainly include seniority of debt, collateral security, and the industry sector in which the obligor operates. Estimated LGD rates draw primarily on internal loss experience. Where we have limited internal loss data, we also refer to appropriate external data to supplement the estimation process. LGD rates are estimated to reflect conditions that might be expected to prevail in a period of an economic downturn, with additional conservatism added to reflect data limitations and statistical uncertainties identified in the estimation process.

EAD is estimated based on the current exposure to the obligor and the possible future changes in that exposure driven by factors such as the nature of the credit commitment. As with LGD, rates are estimated to reflect an economic downturn, with added conservatism to reflect data and statistical uncertainties identified in the modelling process.

Estimates of PD, LGD and EAD are updated, and then validated and back-tested by an independent validation team within the bank, on an annual basis. In addition, quarterly monitoring and back-testing is performed by the estimation team. These ratings and risk measurements are used to determine our expected losses as well as economic and regulatory capital, setting of risk limits, portfolio management and product pricing.

Gross credit risk exposure
Gross credit risk exposure is calculated based on the definitions provided under the Basel III framework. Under this method, EAD is calculated before taking into account any collateral and is inclusive of an estimate of potential future changes to that credit exposure. Gross credit risk is categorized into either lending-related and other, or trading-related.

Lending-related and other includes:
- Loans and acceptances outstanding, undrawn commitments, and other exposures, including contingent liabilities such as letters of credit and guarantees, available-for-sale (AFS) debt securities and deposits with financial institutions. Undrawn commitments represent an estimate of the contractual amount that may be drawn upon at the time of default of an obligor.

Trading-related credit includes:
- Repo-style transactions, which include repurchase and reverse repurchase agreements and securities lending and borrowing transactions. For repo-style transactions, gross exposure represents the amount at which securities were initially financed, before taking into account collateral.
- Derivative amounts which represent the credit equivalent amount, defined by OSFI as the replacement cost plus an add-on amount for potential future credit exposure.

Credit risk assessment

Wholesale credit risk
The wholesale credit risk rating system is designed to measure the credit risk inherent in our wholesale credit activities.

Each obligor is assigned a borrower risk rating (BRR), reflecting an assessment of the credit quality of the obligor. Each BRR has a PD calibrated against it. The BRR differentiates the riskiness of obligors and represents our evaluation of the obligor's ability and willingness to meet its contractual obligations on time over a three year time horizon. The assignment of BRRs is based on the evaluation of the obligor's business risk and financial risk and is based on fundamental credit analysis. The determination of the PD associated with each BRR relies primarily on internal default history since the early 2000s. PD estimates are designed to be a conservative reflection of our experience across the economic cycle including periods of economic downturn.

Our rating system is designed to stratify obligors into 22 grades. The following table aligns the relative rankings of our 22-grade internal risk ratings with the ratings used by S&P and Moody's.

Internal ratings map* **Table 46**

Ratings	PD Bands	BRR	S&P	Moody's	Description
1	0.009%	1+	AAA	Aaa	Investment Grade
2	0.013%	1H	AA+	Aa1	
3	0.025%	1M	AA	Aa2	
4	0.028%	1L	AA-	Aa3	
5	0.045%	2+H	A+	A1	
6	0.066%	2+M	A	A2	
7	0.086%	2+L	A-	A3	
8	0.168%	2H	BBB+	Baa1	
9	0.205%	2M	BBB	Baa2	
10	0.268%	2L	BBB-	Baa3	
11	0.434%	2-H	BB+	Ba1	Non-investment Grade
12	0.702%	2-M	BB	Ba2	
13	1.135%	2-L	BB-	Ba3	
14	2.288%	3+H	B+	B1	
15	3.701%	3+M	B	B2	
16	5.985%	3+L	B-	B3	
17	9.680%	3H	CCC+	Caa1	
18	12.556%	3M	CCC	Caa2	
19	20.306%	3L	CCC-	Caa3	
20	32.840%	4	CC	Ca	
21	100%	5	C	C	Impaired
22	100%	6	Bankruptcy	Bankruptcy	

* This table represents an integral part of our 2017 Annual Consolidated Financial Statements.

Counterparty credit risk
Counterparty credit risk is the risk that a party with whom the bank has entered into a financial or non-financial contract will fail to fulfill its contractual agreement and default on the obligation. It is measured not only by its current value, but also by how this value can move as market conditions change. Counterparty credit risk usually occurs in trading-related derivative and repo-style transactions. Derivative transactions include financial (e.g., forwards, futures, swaps and options) and non-financial (e.g., precious metal and commodities) derivatives. For further details on our derivative instruments and credit risk mitigation, refer to Note 8 of our 2017 Annual Consolidated Financial Statements.

Wrong-way risk
Wrong-way risk is the risk that exposure to a counterparty or obligor is adversely correlated with the credit quality of that counterparty. There are two types of wrong-way risk:
- Specific Wrong-Way Risk, which exists when our exposure to a particular counterparty is positively and highly correlated with the probability of default of the counterparty due to the nature of our transactions with them (e.g., loan collateralized by shares or debt issued by the counterparty or a related party); and

- General Wrong-Way Risk, which exists when there is a positive correlation between the probability of default of counterparties and general macroeconomic or market factors. This typically occurs with derivatives (e.g., the size of the exposure increases) or with collateralized transactions (e.g., the value of the collateral declines).

Retail credit risk
Credit scoring is the primary risk rating system for assessing obligor and transaction risk for retail exposures. Scoring models use internal and external data to assess and "score" borrowers, predict future performance and manage limits for existing loans and collection activities. Credit scores are one of the factors employed in the acquisition of new clients and management of existing clients. The credit score of the borrower is used to assess the predicted risk and revenue for each independent acquisition or account management action, leading to an automated decision or guidance for an adjudicator. Credit scoring improves credit decision quality, adjudication timeframes, consistency in the credit decision process and facilitates risk-based pricing.

Our retail risk rating system is two-dimensional, whereby assessment of internal ratings is based both on PD, which is a borrower risk dimension, and on LGD, which is a facility-specific risk dimension.

The following table maps PD bands to various risk levels:

Internal ratings map* **Table 47**

PD bands	Description
0.000% – 1.718%	Low risk
1.719% – 6.430%	Medium risk
6.431% – 99.99%	High risk
100%	Impaired/Default

* This table represents an integral part of our 2017 Annual Consolidated Financial Statements.

Credit risk mitigation

Credit risk mitigation policies are an integral component of our Credit Risk Framework and set out the minimum requirements for the mitigation of credit risk.

Structuring of transactions
Specific credit policies and procedures set out the requirements for structuring transactions. Risk mitigants include the use of guarantees, collateral, seniority, loan-to-value requirements and covenants. Product-specific guidelines set out appropriate product structuring as well as client and guarantor criteria.

Collateral
We often require obligors to pledge collateral as security when we advance credit. The extent of risk mitigation provided by collateral depends on the amount, type and quality of the collateral taken. Specific requirements relating to collateral valuation and management are set out in our credit risk management policies. The types of collateral used to secure credit or trading facilities within the bank are varied. For example, the majority of our securities financing and over-the-counter (OTC) derivatives activities are secured by cash and liquid government securities such as Organisation for Economic Co-operation and Development (OECD) securities. Wholesale lending is often secured by pledges of the assets of a business, such as accounts receivable, inventory, operating assets and commercial real estate. In our Canadian Banking business and Wealth Management segment, collateral typically consists of a pledge over a real estate property, or a portfolio of debt securities and equities trading on a recognized exchange.

- We employ a risk-based approach to property valuation. Property valuation methods include automated valuation models (AVM) and appraisals. An AVM is a tool that estimates the value of a property by reference to market data including sales of comparable properties and price trends specific to the Metropolitan Statistical Area in which the property being valued is located. Using a risk-based approach, we also employ appraisals which can include drive-by or full on-site appraisals.
- We continue to actively manage our entire mortgage portfolio and perform stress testing, based on a combination of increasing unemployment, rising interest rates and a downturn in real estate markets.
- We are compliant with regulatory requirements that govern residential mortgage underwriting practices, including loan-to-value parameters and property valuation requirements.

Credit risk approval
The Board of Directors and its committees, the Group Executive (GE), the GRC and other senior management risk committees work together to ensure a Credit Risk Framework and supporting policies, processes and procedures exist to manage credit risk and approve related credit risk limits. Reports are distributed to the Board of Directors, the GRC, and senior executives to keep them informed of our risk profile, including trending information and significant credit risk issues and shifts in exposures to ensure appropriate actions can be taken where necessary. Our enterprise-wide credit risk policies set out the minimum requirements for the management of credit risk in a variety of borrower, transactional and portfolio management contexts.

Product approval
- Proposals for credit products and services are comprehensively reviewed and approved under a risk assessment framework. New, amended and existing products must be reviewed relative to all risks in our risk pyramid, including credit risk. All products must be reviewed on a periodic basis, with high risk products being reviewed more frequently.

Credit limits
- Concentration risk is defined as the risk arising from large exposures to borrowers aggregated under one or more single names, industry sectors, countries or credit products within a portfolio that are highly correlated such that their ability to meet contractual obligations could be similarly affected by changes in economic, political or other risk drivers.

- We manage credit exposures and limits to ensure alignment with our risk appetite, to maintain our target business mix and to ensure that there is no undue risk concentration. Credit concentration limits are reviewed on a regular basis after taking into account business, economic, financial and regulatory environments.
- Credit limits are established at the following levels: single name limits (notional and economic capital), underwriting risk limits, leveraged lending limits, geographic (country and region) limits (notional and economic capital), industry sector limits (notional and economic capital), and product and portfolio limits, where deemed necessary.

Credit risk administration

Credit provisioning and allowances

We maintain an Allowance for Credit Losses at an appropriate level to cover identified credit losses in the portfolio as well as losses for loans not yet identified as impaired. In determining the appropriate level of Allowance for Credit Losses, we utilize both quantitative and qualitative assessments using current and historical credit information in accordance with IAS 39 *Financial Instruments: Recognition and Measurement* (IAS 39).

Loan forbearance

In our overall management of borrower relationships, economic or legal reasons may necessitate forbearance to certain clients with respect to the original terms and conditions of their loans. We have specialized groups and formalized policies that direct the management of delinquent or defaulted borrowers. We strive to identify borrowers in financial difficulty early and modify their loan terms in order to maximize collection and to avoid foreclosure, repossession, or other legal remedies. In these circumstances, a borrower may be granted concessions that would not otherwise be considered. Examples of such concessions to retail borrowers may include rate reduction, principal forgiveness, and term extensions. Concessions to wholesale borrowers may include restructuring the agreements, modifying the original terms of the agreement and/or relaxation of covenants. For both retail and wholesale loans, the appropriate remediation techniques are based on the individual borrower's situation, RBC's policy and the customer's willingness and capacity to meet the new arrangement.

Gross credit risk exposure by portfolio, sector and geography* **Table 48**

As at

	October 31 2017						October 31 2016					
	Lending-related and other			Trading-related			Lending-related and other			Trading-related		
	Loans and acceptances						Loans and acceptances					
(Millions of Canadian dollars)	Outstanding	Undrawn commitments (1)	Other (2)	Repo-style transactions	Derivatives (3)	Total exposure (4)	Outstanding	Undrawn commitments (1)	Other (2)	Repo-style transactions	Derivatives (3)	Total exposure (4)
By portfolio												
Residential mortgages	$ 270,348	$ 818	$ 269	$ –	$ –	$ 271,435	$ 254,998	$ 1,063	$ 214	$ –	$ –	$ 256,275
Personal	92,294	88,120	176	–	–	180,590	93,466	82,527	145	–	–	176,138
Credit cards	18,035	21,826	–	–	–	39,861	17,128	24,571	–	–	–	41,699
Small business (5)	4,493	6,888	6	–	–	11,387	3,878	6,188	5	–	–	10,071
Retail	$ 385,170	$ 117,652	$ 451	$ –	$ –	$ 503,273	$ 369,470	$ 114,349	$ 364	$ –	$ –	$ 484,183
Business (5)												
Agriculture	$ 7,380	$ 1,338	$ 78	$ –	$ 63	$ 8,859	$ 6,515	$ 1,310	$ 74	$ –	$ 109	$ 8,008
Automotive	8,248	6,026	376	–	417	15,067	7,279	5,785	567	–	497	14,128
Consumer goods	11,387	8,872	605	–	525	21,389	10,052	9,562	756	–	551	20,921
Energy												
Oil & Gas	6,743	10,322	1,810	–	960	19,835	6,259	10,747	1,656	–	1,198	19,860
Utilities	5,614	14,867	3,689	37	1,347	25,554	7,680	13,694	3,496	–	1,748	26,618
Financing products	6,556	2,062	425	730	628	10,401	8,840	2,649	421	494	611	13,015
Forest products	911	635	85	–	16	1,647	1,099	561	85	–	27	1,772
Health services	6,998	4,602	1,800	1	522	13,923	7,763	4,085	1,684	–	469	14,001
Holding and investments	8,803	929	566	–	203	10,501	7,195	2,270	637	–	279	10,381
Industrial products	5,581	7,533	447	–	692	14,253	5,508	7,757	546	–	632	14,443
Mining & metals	1,113	3,816	1,027	–	101	6,057	1,455	3,640	1,135	–	144	6,374
Non-bank financial services	10,744	14,263	15,597	329,214	38,477	408,295	8,408	13,149	15,830	249,732	41,381	328,500
Other services	14,757	7,529	4,024	950	654	27,914	11,582	9,848	10,049	1,410	1,525	34,414
Real estate & related	46,197	11,267	1,603	3	443	59,513	40,419	11,215	1,847	4	499	53,984
Technology & media	8,890	14,129	633	305	2,456	26,413	11,019	14,758	873	470	1,832	28,952
Transportation & environment	5,950	5,712	3,300	–	841	15,803	6,060	4,393	3,603	–	1,637	15,693
Other sectors	4,570	17	4,694	3,018	563	12,862	7,568	755	5,856	882	507	15,568
Sovereign (5)	11,362	11,406	110,581	35,228	14,356	182,933	10,581	6,972	84,017	38,707	17,319	157,596
Bank (5)	4,261	1,423	132,644	106,346	23,735	268,409	1,930	1,815	119,324	104,314	25,600	252,983
Wholesale	$ 176,065	$ 126,748	$ 283,984	$ 475,832	$ 86,999	$ 1,149,628	$ 167,212	$ 124,965	$ 252,456	$ 396,013	$ 96,565	$ 1,037,211
Total exposure	$ 561,235	$ 244,400	$ 284,435	$ 475,832	$ 86,999	$ 1,652,901	$ 536,682	$ 239,314	$ 252,820	$ 396,013	$ 96,565	$ 1,521,394
By geography (6)												
Canada	$ 458,963	$ 156,249	$ 100,740	$ 68,279	$ 24,018	$ 808,249	$ 430,616	$ 151,481	$ 81,800	$ 76,094	$ 27,647	$ 767,638
U.S.	73,137	64,439	79,782	258,883	14,333	490,574	76,481	69,006	81,168	208,759	14,315	449,729
Europe	13,979	17,934	80,319	87,158	43,312	242,702	14,886	15,367	74,547	71,722	48,318	224,840
Other International	15,156	5,778	23,594	61,512	5,336	111,376	14,699	3,460	15,305	39,438	6,285	79,187
Total Exposure	$ 561,235	$ 244,400	$ 284,435	$ 475,832	$ 86,999	$ 1,652,901	$ 536,682	$ 239,314	$ 252,820	$ 396,013	$ 96,565	$ 1,521,394

* This table represents an integral part of our 2017 Annual Consolidated Financial Statements.

(1) Undrawn commitments represent an estimate of the contractual amount that may be drawn upon at the time of default of an obligor.

(2) Includes credit equivalent amounts for contingent liabilities such as letters of credit and guarantees, outstanding amounts for AFS debt securities, deposits with financial institutions and other assets.

(3) Credit equivalent amount after factoring in master netting agreements.

(4) Gross credit risk exposure is before allowance for loan losses. Exposures under Basel III asset classes of qualifying revolving retail and other retail are largely included within Personal and Credit cards, while home equity lines of credit are included in Personal.

(5) For further information, refer to Note 5 of our 2017 Annual Consolidated Financial Statements.

(6) Geographic profile is based on country of residence of the borrower.

2017 vs. 2016

Total gross credit risk exposure increased $132 billion or 9% from last year, primarily due to growth in repo-style transactions, cash and due from banks, interest-bearing deposits with banks, as well as loans & acceptances. These increases were partially offset by a decrease in derivative exposures and the impact of foreign exchange translation.

Retail exposure increased $19 billion or 4%, largely driven by volume growth in residential mortgages and personal loans, partially offset by a decrease in credit cards related to undrawn commitments.

Wholesale exposure increased $112 billion or 11%, primarily attributable to growth in repo-style transactions, cash and due from banks, interest-bearing deposits with banks largely reflecting higher deposits with central banks, as well as loans and acceptances. These increases were partially offset by a decrease in derivative exposures and the impact of foreign exchange translation. Wholesale loan utilization remained stable compared to the prior year at 39%.

The geographic mix of our gross credit risk exposure remained relatively unchanged from the prior year. Our exposure in Canada, the U.S., Europe and Other International was 49%, 30%, 15% and 6%, respectively (October 31, 2016 – 50%, 30%, 15% and 5%, respectively).

Our exposure in Canada increased $41 billion or 5% compared to the prior year, primarily due to growth in business loans and acceptances, and residential mortgages.

Our exposure in the U.S. increased $41 billion or 9% compared to the prior year, mainly due to repo-style transactions largely attributable to higher client and business activities, partially offset by the impact of foreign exchange translation.

Our exposure in Europe increased $18 billion or 8% compared to the prior year, primarily due to growth in repo-style transactions and increased deposits with central banks.

Our exposure in Other International increased $32 billion or 41% compared to the prior year, primarily due to growth in repo style transactions and increased deposits with central banks.

Loans and acceptances outstanding and undrawn commitments* (1) **Table 49**

	As at											
	October 31 2017						October 31 2016 (2)					
(Millions of Canadian dollars)	Low risk	Medium risk	High risk	Impaired	Standardized and Non-Rated	Total	Low risk (3)	Medium risk	High risk	Impaired (3)	Standardized and Non-Rated (3), (4)	Total
Retail (5)												
Residential mortgages	$ 221,911	$ 12,388	$ 2,383	$ 284	$ 34,200	$ 271,166	$ 209,532	$ 12,750	$ 2,090	$ 337	$ 22,197	$ 246,906
Personal	161,484	12,238	2,736	193	3,763	180,414	158,498	10,624	2,768	222	1,421	173,533
Credit cards	31,883	5,320	1,396	–	1,262	39,861	34,116	5,342	1,437	–	642	41,537
Small business	7,770	1,908	433	31	1,239	11,381	5,822	1,201	1,671	36	1,336	10,066
	$ 423,048	$ 31,854	$ 6,948	$ 508	$ 40,464	$ 502,822	$ 407,968	$ 29,917	$ 7,966	$ 595	$ 25,596	$ 472,042

	As at									
	October 31 2017					October 31 2016 (2)				
(Millions of Canadian dollars)	Investment grade	Non-investment grade	Impaired	Total		Investment grade	Non-investment grade	Impaired	Total	
Wholesale (6)										
Business	$ 108,733	$ 164,256	$ 1,372	$ 274,361		$ 107,510	$ 132,967	$ 2,339	$ 242,816	
Sovereign	21,457	1,311	–	22,768		15,939	786	–	16,725	
Bank	3,519	2,165	–	5,684		1,881	943	2	2,826	
Total	$ 133,709	$ 167,732	$ 1,372	$ 302,813		$ 125,330	$ 134,696	$ 2,341	$ 262,367	

* This table represents an integral part of our 2017 Annual Consolidated Financial Statements.

(1) This table represents our retail and wholesale loans and acceptances outstanding and undrawn commitments by portfolio and risk category. The amounts in the table are before allowance for impaired loans.

(2) City National exposures of $41.6 billion are excluded as at October 31, 2016.

(3) Amounts have been revised from those previously presented.

(4) Under the standardized approach, credit risk exposure is based on risk weights prescribed by OSFI.

(5) Includes undrawn commitments of $1.0 billion, $88.1 billion, $21.8 billion, and $6.9 billion for Residential mortgages, Personal, Credit cards and Small business, respectively (October 31, 2016 – $1.0 billion, $82.4 billion, $24.6 billion and $6.2 billion, respectively).

(6) Includes undrawn commitments of $113.9 billion, $11.4 billion, and $1.4 billion for Business, Sovereign and Bank, respectively (October 31, 2016 – $111.3 billion, $7.0 billion, and $1.2 billion, respectively).

2017 vs. 2016

Growth in retail exposures was largely attributable to volume growth in residential mortgages and personal loans. Growth in wholesale exposures mainly reflects increased volumes in non-investment grade categories across various industry sectors, slightly offset by the impact of foreign exchange.

Net European exposure by country and client type (1), (2) **Table 50**

(Millions of Canadian dollars)	October 31 2017								October 31 2016
	Asset type				Client type				
	Loans Outstanding	Securities (3)	Repo-style transactions	Derivatives	Financials	Sovereign	Corporate	Total	Total
U.K.	$ 7,925	$ 10,428	$ 909	$ 1,241	$ 8,050	$ 4,871	$ 7,582	$ 20,503	$ 17,956
Germany	1,626	12,308	1	260	6,686	5,001	2,508	14,195	11,273
France	615	9,650	2	453	1,909	8,249	562	10,720	8,398
Total U.K., Germany, France	$ 10,166	$ 32,386	$ 912	$ 1,954	$ 16,645	$ 18,121	$ 10,652	$ 45,418	$ 37,627
Ireland	$ 412	$ 30	$ 100	$ 44	$ 142	$ 12	$ 432	$ 586	$ 880
Italy	105	116	–	5	143	9	74	226	120
Portugal	–	16	–	1	1	–	16	17	16
Spain	359	404	–	14	408	–	369	777	446
Total Peripheral (4)	$ 876	$ 566	$ 100	$ 64	$ 694	$ 21	$ 891	$ 1,606	$ 1,462
Luxembourg (5)	$ 939	$ 5,541	$ 2	$ 85	$ 507	$ 5,029	$ 1,031	$ 6,567	$ 6,054
Netherlands (5)	895	2,304	26	246	2,493	–	978	3,471	3,904
Norway	239	4,169	–	5	3,889	247	277	4,413	3,945
Sweden	109	4,599	5	13	3,017	1,585	124	4,726	4,168
Switzerland	413	2,813	168	139	847	2,579	107	3,533	2,271
Other	1,262	2,160	7	81	735	1,601	1,174	3,510	2,982
Total Other Europe	$ 3,857	$ 21,586	$ 208	$ 569	$ 11,488	$ 11,041	$ 3,691	$ 26,220	$ 23,324
Net exposure to Europe (6), (7)	$ 14,899	$ 54,538	$ 1,220	$ 2,587	$ 28,827	$ 29,183	$ 15,234	$ 73,244	$ 62,413

(1) Geographic profile is based on country of risk, which reflects our assessment of the geographic risk associated with a given exposure. Typically, this is the residence of the borrower.
(2) Exposures are calculated on a fair value basis and net of collateral, which includes $77.7 billion against repo-style transactions (October 31, 2016 – $64.0 billion) and $12.6 billion against derivatives (October 31, 2016 – $15.7 billion).
(3) Securities include $20.0 billion of trading securities (October 31, 2016 – $11.1 billion), $19.7 billion of deposits (October 31, 2016 – $12.3 billion), and $14.8 billion of AFS securities (October 31, 2016 – $15.9 billion).
(4) Gross credit risk exposure to peripheral Europe is comprised of Ireland $19.3 billion (October 31, 2016 – $18.9 billion), Italy $0.4 billion (October 31, 2016 – $0.3 billion), Portugal $nil (October 31, 2016 – $0.1 billion), and Spain $1.0 billion (October 31, 2016 – $1.1 billion).
(5) Amounts have been revised from those previously presented.
(6) Excludes $2.7 billion (October 31, 2016 – $1.9 billion) of exposures to supranational agencies.
(7) Reflects $1.4 billion of mitigation through credit default swaps, which are largely used to hedge single name exposures and market risk (October 31, 2016 – $1.5 billion).

2017 vs. 2016

Net credit risk exposure to Europe increased $10.8 billion from last year, largely driven by increased exposure to Germany, U.K., France, and Switzerland. Our net exposure to peripheral Europe, which includes Ireland, Italy, Portugal and Spain remained minimal, with total outstanding exposure increasing $0.1 billion during the year to $1.6 billion.

Our European corporate loan book is managed on a global basis with underwriting standards reflecting the same approach to the use of our balance sheet as we have applied in both Canada and the U.S. PCL taken on this portfolio during the year was not material. The gross impaired loans ratio of this loan book was 100 bps, slightly down from 110 bps in the prior year.

Residential mortgages and home equity lines of credit (insured vs. uninsured)

Residential mortgages and home equity lines of credit are secured by residential properties. The following table presents a breakdown by geographic region:

Residential mortgages and home equity lines of credit — **Table 51**

(Millions of Canadian dollars, except percentage amounts)	As at October 31, 2017							
	Residential mortgages (1)						Home equity lines of credit (2)	
	Insured (3)		Uninsured		Total		Total	
Region (4)								
Canada								
Atlantic provinces	$ 7,670	57%	$ 5,848	43%	$ 13,518		$ 1,986	
Quebec	15,089	48	16,557	52	31,646		3,964	
Ontario	42,610	39	66,549	61	109,159		16,823	
Alberta	21,820	58	15,702	42	37,522		6,950	
Saskatchewan and Manitoba	9,305	54	7,932	46	17,237		2,627	
B.C. and territories	17,169	37	29,521	63	46,690		8,620	
Total Canada (5)	$ 113,663	44%	$ 142,109	56%	$ 255,772		$ 40,970	
U.S.	1	–	11,448	100	11,449		1,557	
Other International	9	–	3,091	100	3,100		1,992	
Total International	$ 10	–%	$ 14,539	100%	$ 14,549		$ 3,549	
Total	$ 113,673	42%	$ 156,648	58%	$ 270,321		$ 44,519	

(Millions of Canadian dollars, except percentage amounts)	As at October 31, 2016							
	Residential mortgages (1)						Home equity lines of credit (2)	
	Insured (3)		Uninsured		Total		Total	
Region (4)								
Canada								
Atlantic provinces	$ 7,633	59%	$ 5,409	41%	$ 13,042		$ 2,034	
Quebec	14,432	50	14,429	50	28,861		4,060	
Ontario	43,314	43	58,016	57	101,330		16,512	
Alberta	21,746	58	15,429	42	37,175		7,066	
Saskatchewan and Manitoba	8,897	54	7,730	46	16,627		2,682	
B.C. and territories	17,657	40	27,024	60	44,681		8,739	
Total Canada (5)	$ 113,679	47%	$ 128,037	53%	$ 241,716		$ 41,093	
U.S.	2	–	10,012	100	10,014		1,464	
Other International	13	–	3,171	100	3,184		2,442	
Total International	$ 15	–%	$ 13,183	100%	$ 13,198		$ 3,906	
Total	$ 113,694	45%	$ 141,220	55%	$ 254,914		$ 44,999	

(1) The residential mortgages amounts exclude our third-party mortgage-backed securities (MBS) of $27 million (2016 – $84 million).

(2) Home equity lines of credit include revolving and non-revolving loans.

(3) Insured residential mortgages are mortgages whereby our exposure to default is mitigated by insurance through the Canada Mortgage and Housing Corporation (CMHC) or other private mortgage default insurers.

(4) Region is based upon address of the property mortgaged. The Atlantic provinces are comprised of Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick, and B.C. and territories are comprised of British Columbia, Nunavut, Northwest Territories and Yukon.

(5) Total consolidated residential mortgages in Canada of $256 billion (2016 – $242 billion) is largely comprised of $231 billion (2016 – $217 billion) of residential mortgages and $6 billion (2016 – $6 billion) of mortgages with commercial clients, of which $4 billion (2016 – $3 billion) are insured mortgages, both in Canadian Banking, and $19 billion (2016 – $19 billion) of residential mortgages in Capital Markets held for securitization purposes.

Home equity lines of credit are uninsured and reported within the personal loan category. As at October 31, 2017, home equity lines of credit in Canadian Banking were $41 billion (2016 – $41 billion). Approximately 98% of these home equity lines of credit (2016 – 98%) are secured by a first lien on real estate, and only 7% (2016 – 7%) of the total homeline clients pay the scheduled interest payment only.

Residential mortgages portfolio by amortization period

The following table provides a summary of the percentage of residential mortgages that fall within the remaining amortization periods based upon current customer payment amounts, which incorporate payments larger than the minimum contractual amount and/or higher frequency of payments:

Residential mortgages portfolio by amortization period — **Table 52**

	As at					
	October 31 2017			October 31 2016		
	Canada	**U.S. and Other International**	**Total**	Canada	U.S. and Other International	Total
Amortization period						
≤ 25 years	**73%**	**43%**	**71%**	74%	40%	72%
> 25 years ≤ 30 years	**24**	**57**	**26**	25	58	27
> 30 years ≤ 35 years	**3**	**–**	**3**	1	2	1
Total	**100%**	**100%**	**100%**	100%	100%	100%

Average loan-to-value (LTV) ratio for newly originated and acquired uninsured residential mortgages and homeline products

The following table provides a summary of our average LTV ratio for newly originated and acquired uninsured residential mortgages and homeline products by geographic region:

Average LTV ratio — **Table 53**

	October 31 2017		October 31 2016	
	Uninsured		Uninsured	
	Residential mortgages (1)	**Homeline products** (2)	Residential mortgages (1)	Homeline products (2)
Region (3)				
Atlantic provinces	**74%**	**74%**	73%	74%
Quebec	**72**	**73**	71	74
Ontario	**70**	**67**	70	69
Alberta	**73**	**72**	73	72
Saskatchewan and Manitoba	**74**	**74**	74	74
B.C. and territories	**69**	**65**	68	65
U.S.	**73**	**n.m.**	72	n.m.
Other International	**62**	**n.m.**	63	n.m.
Average of newly originated and acquired for the year (4), (5)	**70%**	**68%**	71%	69%
Total Canadian Banking residential mortgages portfolio (6)	**53%**	**49%**	54%	51%

(1) Residential mortgages exclude residential mortgages within the homeline products.
(2) Homeline products are comprised of both residential mortgages and home equity lines of credit.
(3) Region is based upon address of the property mortgaged. The Atlantic provinces are comprised of Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick, and B.C. and territories are comprised of British Columbia, Nunavut, Northwest Territories and Yukon.
(4) The average LTV ratio for newly originated and acquired uninsured residential mortgages and homeline products is calculated on a weighted basis by mortgage amounts at origination.
(5) For newly originated mortgages and homeline products, LTV is calculated based on the total facility amount for the residential mortgage and homeline product divided by the value of the related residential property.
(6) Weighted by mortgage balances and adjusted for property values based on the Teranet – National Bank National Composite House Price Index.
n.m. not meaningful

Credit quality performance

Provision for (recovery of) credit loss — Table 54

(Millions of Canadian dollars, except percentage amounts)	2017	2016
Personal & Commercial Banking	$ 1,054	$ 1,122
Wealth Management	34	48
Capital Markets	62	327
Corporate Support and Other (1)	–	49
Total PCL	$ 1,150	$ 1,546
Canada (2)		
Residential mortgages	$ 33	$ 42
Personal	413	459
Credit cards	426	435
Small business	32	34
Retail	904	970
Wholesale	95	213
PCL on impaired loans	999	1,183
U.S. (2), (3)		
Retail	$ 3	$ 1
Wholesale	117	227
PCL on impaired loans	120	228
Other International (2), (3)		
Retail	$ 25	$ 41
Wholesale	6	44
PCL on impaired loans	31	85
PCL on loans not yet identified as impaired	–	50
Total PCL	$ 1,150	$ 1,546
PCL ratio		
Total PCL ratio	0.21%	0.29%
PCL on impaired loans ratio	0.21%	0.28%
Personal & Commercial Banking	0.26%	0.29%
Canadian Banking	0.26%	0.29%
Caribbean Banking	0.44%	0.53%
Wealth Management	0.07%	0.10%
PCL ratio – loans	0.07%	0.08%
PCL ratio – acquired credit-impaired loans	0%	0.02%
Capital Markets	0.07%	0.37%

(1) PCL in Corporate Support and Other primarily comprised of PCL for loans not yet identified as impaired. For further information, refer to the How we measure and report our business segments section.
(2) Geographic information is based on residence of borrower.
(3) Includes acquired credit-impaired loans.

2017 vs. 2016

Total PCL decreased $396 million, or 26% from the prior year. The PCL ratio of 21 bps improved 8 bps.

PCL in Personal & Commercial Banking decreased $68 million or 6% mainly due to lower provisions in our Canadian personal lending portfolios. The PCL ratio of 26 bps improved 3 bps.

PCL in Wealth Management decreased $14 million or 29%, mainly due to a recovery in International Wealth Management. This factor was partially offset by higher provisions in U.S. Wealth Management (including City National).

PCL in Capital Markets decreased $265 million or 81%, primarily due to lower provisions, including higher recoveries, primarily in the oil & gas sector, partially offset by higher provisions in the real estate and related sector.

PCL in Corporate Support and Other decreased $49 million, as the prior year included PCL for loans not yet identified as impaired.

Gross impaired loans (GIL)		Table 55
(Millions of Canadian dollars, except percentage amounts)	2017	2016
Personal & Commercial Banking	$ 1,500	$ 1,651
Wealth Management (1)	549	710
Capital Markets	527	1,524
Investor & Treasury Services	–	2
Corporate Support and Other	–	16
Total GIL	$ 2,576	$ 3,903
Canada (2)		
Retail	$ 559	$ 642
Wholesale	426	522
GIL	985	1,164
U.S. (1), (2)		
Retail	$ 59	$ 56
Wholesale	736	1,736
GIL	795	1,792
Other International (2)		
Retail	$ 345	$ 380
Wholesale	451	567
GIL	796	947
Total GIL	$ 2,576	$ 3,903
Impaired loans, beginning balance	$ 3,903	$ 2,285
Classified as impaired during the period (new impaired) (3)	2,269	3,673
Net repayments (3)	(1,192)	(946)
Amounts written off	(1,425)	(1,523)
Other (3), (4)	(979)	414
Impaired loans, balance at end of period	$ 2,576	$ 3,903
GIL ratio (5)		
Total GIL ratio	0.46%	0.73%
Personal & Commercial Banking	0.36%	0.43%
Canadian Banking	0.24%	0.27%
Caribbean Banking	6.33%	7.56%
Wealth Management	1.04%	1.44%
GIL ratio – loans	0.56%	0.59%
GIL ratio – acquired credit-impaired loans	0.48%	0.85%
Capital Markets	0.63%	1.73%

(1) Includes $256 million (2016 – $418 million) related to acquired credit-impaired loans. For further details refer to Notes 2 and 5 of our 2017 Annual Consolidated Financial Statements.
(2) Geographic information is based on residence of borrower.
(3) Certain GIL movements for Canadian Banking retail and wholesale portfolios are generally allocated to New impaired, as Return to performing status, Net repayments, Sold, and Exchange and other movements amounts are not reasonably determinable. Certain GIL movements for Caribbean Banking retail and wholesale portfolios are generally allocated to Net repayments and New impaired, as Return to performing status, Sold, and Exchange and other movements amounts are not reasonably determinable.
(4) Includes Return to performing status during the year, Recoveries of loans and advances previously written off, Sold, and Exchange and other movements.
(5) GIL as a % of related loans and acceptances.

2017 vs. 2016

Total GIL decreased $1,327 million or 34% from the prior year, and the total GIL ratio of 46 bps improved 27 bps, largely reflecting lower impaired loans in our Capital Markets, Wealth Management and Personal & Commercial Banking portfolios. Total GIL also includes acquired credit-impaired loans (ACI) of $256 million related to City National, which contributed 5 bps to the GIL ratio. For further details on ACI loans, refer to Notes 2 and 5 of our 2017 Annual Consolidated Financial Statements.

GIL in Personal & Commercial Banking decreased $151 million or 9%, and the GIL ratio of 36 bps improved 7 bps, mainly due to lower impaired loans in our Caribbean portfolios, partially offset by higher impaired loans in our Canadian commercial lending portfolios.

GIL in Wealth Management decreased $161 million or 23%, mainly reflecting repayments in U.S. Wealth Management (including City National).

GIL in Capital Markets decreased $997 million or 65%, primarily due to lower impaired loans reflecting loans returning to performing status, and repayments in the oil & gas sector, partially offset by higher impaired loans in the real estate and related sector.

Allowance for credit losses (ACL)		Table 56
(Millions of Canadian dollars)	2017	2016
Allowance for impaired loans		
Personal & Commercial Banking	$ 497	$ 520
Wealth Management (1)	80	73
Capital Markets	160	216
Investor & Treasury Services	–	–
Corporate Support and Other	–	–
Total allowance for impaired loans	$ 737	$ 809
Canada (2)		
Retail	$ 141	$ 160
Wholesale	124	119
Allowance for impaired loans	265	279
U.S. (1), (2)		
Retail	$ 1	$ 2
Wholesale	150	177
Allowance for impaired loans	151	179
Other International (2)		
Retail	$ 168	$ 180
Wholesale	153	171
Allowance for impaired loans	321	351
Total allowance for impaired loans	$ 737	$ 809
Allowance for loans not yet identified as impaired	1,513	1,517
Total ACL	$ 2,250	$ 2,326

(1) Effective Q1 2016, includes ACL related to acquired credit-impaired loans from our acquisition of City National.
(2) Geographic information is based on residence of borrower.

2017 vs. 2016
Total ACL decreased $76 million or 3% from a year ago, largely due to lower ACL in Capital Markets and Personal & Commercial Banking.

For further details, refer to Notes 2 and 5 of our 2017 Annual Consolidated Financial Statements.

Market risk

Market risk is defined to be the impact of market prices upon our financial condition. This includes potential gains or losses due to changes in market determined variables such as interest rates, credit spreads, equity prices, commodity prices, foreign exchange rates and implied volatilities.

The measures of financial condition impacted by market risk are as follows:

1. Positions whose revaluation gains and losses are reported in Revenue, which includes:
   a) Changes in the fair value of instruments classified or designated as fair value through profit and loss (FVTPL), including impaired securities, and
   b) Hedge ineffectiveness.
2. CET1 capital, which includes:
   a) All of the above, plus
   b) Changes in the fair value of AFS securities where revaluation gains and losses are reported as other comprehensive income,
   c) Changes in the Canadian dollar value of investments in foreign subsidiaries, net of hedges, due to foreign exchange translation, and
   d) Remeasurements of employee benefit plans; this includes pension fund assets underperforming in the market resulting in a deficit and volatility between the pension liabilities and the fund assets, and/or estimated actuarial parameters not being realized such that pension liabilities exceed pension fund assets.
3. CET1 ratio, which includes:
   a) All of the above, plus
   b) Changes in risk-weighted assets (RWA) resulting from changes in traded market risk factors, and
   c) Changes in the Canadian dollar value of RWA due to foreign exchange translation.
4. The economic value of the Bank, which includes:
   a) Points 1 and 2 above, plus
   b) Changes in the value of other non-trading positions whose value is a function of market risk factors.

Market risk controls – FVTPL positions

As an element of the Enterprise Risk Appetite Framework, the Board of Directors approves our overall market risk constraints. GRM creates and manages the control structure for FVTPL positions which ensures that business is conducted consistent with Board requirements. The Market and Trading Credit Risk function within GRM is responsible for creating and managing the controls and governance procedures that ensure that risk taken is consistent with risk appetite constraints set by the Board. These controls include limits on probabilistic measures of potential loss such as Value-at-Risk and Stressed Value-at-Risk as defined below:

Value-at-Risk (VaR) is a statistical measure of potential loss for a financial portfolio computed at a given level of confidence and over a defined holding period. We measure VaR at the 99th percentile confidence level for price movements over a one-day holding period using historic simulation of the last two years of equally weighted historic market data. These calculations are updated daily with current risk positions, with the exception of certain less material positions that are not actively traded and are updated on at least a monthly basis.

Stressed Value-at-Risk (SVaR) is calculated in an identical manner as VaR with the exception that it is computed using a fixed historical one-year period of extreme volatility and its inverse rather than the most recent two-year history. The stress period used is the interval from September 2008 through August 2009. SVaR is calculated daily for all portfolios, with the exception of certain less material positions that are not actively traded and are updated on at least a monthly basis.

VaR and SVaR are statistical estimates based on historical market data and should be interpreted with knowledge of their limitations – which include the following:

- VaR and SVaR will not be predictive of future losses if the realized market movements differ significantly from the historical periods used to compute them.
- VaR and SVaR project potential losses over a one-day holding period and do not project potential losses for risk positions held over longer time periods.
- VaR and SVaR are measured using positions at close of business and do not include the impact of trading activity over the course of a day.

We validate our VaR and SVaR measures through a variety of means – including subjecting the models to vetting and validation by a group independent of the model developers and by back-testing the VaR against daily marked-to-market revenue to identify and examine events in which actual outcomes in trading revenue exceed the VaR projections.

Stress Tests – Our market risk stress testing program is used to identify and control risk due to large changes in market prices and rates. We conduct stress testing daily on positions that are marked-to-market. The stress tests simulate both historical and hypothetical events which are severe and long term in duration. Historical scenarios are taken from actual market events over the last 30 years and range in duration up to 90 days. Examples include the equity market crash of 1987 and the global financial crisis of 2008. Hypothetical scenarios are designed to be forward looking at potential future market stresses, and are designed to be severe but plausible. We are constantly evaluating and refining these scenarios as market conditions change. Stress results are calculated assuming an instantaneous revaluation of our positions with no management action.

These measures are computed on all positions that are FVTPL for financial reporting purposes, with the exception of those in a designated hedging relationship and those in our insurance businesses.

Market risk measures – FVTPL positions

VaR and SVaR

The following table presents our Market risk VaR and Market risk SVaR figures for 2017 and 2016.

Market risk VaR* **Table 57**

	2017				2016			
		For the year ended October 31				For the year ended October 31		
(Millions of Canadian dollars)	As at Oct. 31	Average	High	Low	As at Oct. 31	Average	High	Low
Equity	$ 10	$ 12	$ 26	$ 6	$ 13	$ 16	$ 32	$ 7
Foreign exchange	3	4	6	3	5	5	8	3
Commodities	3	3	6	2	5	3	5	2
Interest rate (1)	16	17	25	13	18	21	32	14
Credit specific (2)	4	4	5	4	4	5	7	4
Diversification (3)	(18)	(18)	n.m.	n.m.	(21)	(17)	n.m.	n.m.
Market risk VaR	$ 18	$ 22	$ 35	$ 15	$ 24	$ 33	$ 53	$ 20
Market risk Stressed VaR	$ 43	$ 53	$ 95	$ 34	$ 46	$ 82	$ 150	$ 41

* This table represents an integral part of our 2017 Annual Consolidated Financial Statements.
(1) General credit spread risk and funding spread risk associated with uncollateralized derivatives are included under interest rate VaR.
(2) Credit specific risk captures issuer-specific credit spread volatility.
(3) Market risk VaR is less than the sum of the individual risk factor VaR results due to portfolio diversification.
n.m. not meaningful

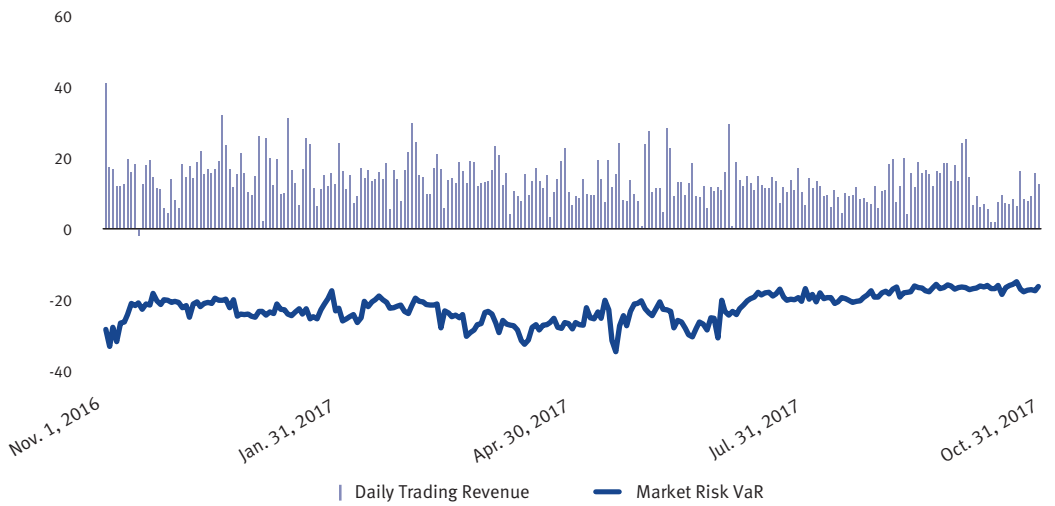
2017 vs. 2016

Average market risk VaR of $22 million decreased $11 million from the prior year. Reduced average equity exposures were observed in 2017 due to lower than expected client-driven activity in rising equity markets, with volatility reaching historical lows. Furthermore, exposures in fixed income and securitized product portfolios have been maintained at lower levels on average. This follows portfolio reductions in 2016 as reflected in the interest rate and credit specific risk metrics. The impact of foreign exchange translation also contributed to the decrease.

Average SVaR of $53 million decreased $29 million from the prior year, largely driven by reduced equity exposures and the impact of foreign exchange translation as noted above, and the winding down of certain legacy trading portfolios in 2016.

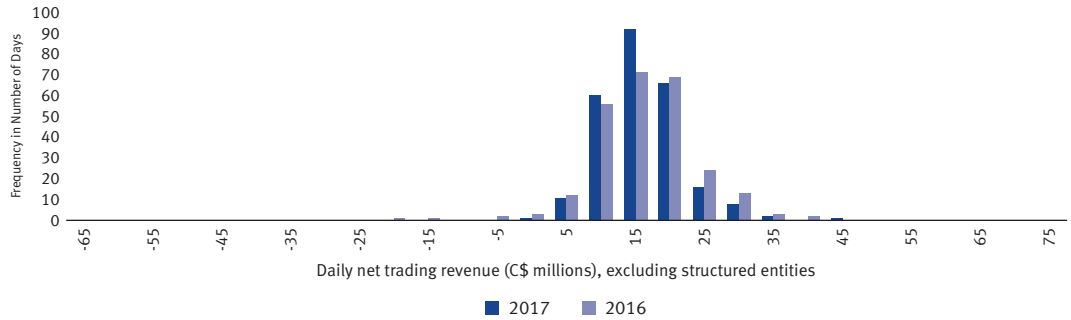
The following chart displays a bar graph of our daily trading profit and loss and a line graph of our daily market risk VaR. We incurred 1 day of losses totalling $2 million in 2017 compared to 7 days of losses totalling $63 million in 2016, with none of the losses exceeding VaR.

Trading revenue and VaR (Millions of Canadian dollars)



The following chart displays the distribution of daily trading profit and loss in 2017. The only daily reported loss during the year was $2 million on November 14, 2016. The largest reported profit was $41 million with an average daily profit of $14 million.

Trading Revenue for the year ended October 31, 2017 (teb)



Market risk measures for other FVTPL positions – Assets and liabilities of RBC Insurance

We offer a range of insurance products to clients and hold investments to meet the future obligations to policyholders. The investments which support actuarial liabilities are predominantly fixed income assets designated as FVTPL. Consequently, changes in the fair values of these assets are recorded in investment income in the consolidated statements of income and are largely offset by changes in the fair value of the actuarial liabilities, the impact of which is reflected in insurance policyholder benefits and claims. As at October 31, 2017, we had liabilities with respect to insurance obligations of $9.7 billion, up from $9.2 billion in the prior year, and trading securities of $7.7 billion in support of the liabilities, up from $7.2 billion last year.

Market risk controls – Structural Interest Rate Risk (SIRR) positions[1]

The interest rate risk arising from traditional banking products, such as deposits and loans, is referred to as SIRR and is subject to limits and controls. SIRR measures also include related hedges as well as the interest rate risk from securities held for liquidity management. Factors contributing to SIRR include the mismatch between asset and liability repricing dates, relative changes in asset and liability rates, and other product features that could affect the expected timing of cash flows, such as options to pre-pay loans or redeem term deposits prior to contractual maturity.

The Board of Directors approves the risk appetite for SIRR, and the Asset-Liability Committee (ALCO), along with GRM, provides ongoing governance of SIRR measurement and management through risk policies, limits, operating standards and other controls. SIRR reports are reviewed regularly by GRM, ALCO, the Group Risk Committee, the Risk Committee of the Board and the Board of Directors.

Details on the non-trading risks included in SIRR are outlined in Table 59.

(1) SIRR positions include impact of derivatives in hedge accounting relationships and AFS securities used for interest rate risk management.

SIRR measurement

To monitor and control SIRR, we assess two primary metrics, 12-month Net Interest Income (NII) risk and Economic Value of Equity (EVE) risk, under a range of market shocks and scenarios. Market scenarios include currency-specific parallel and non-parallel yield curve changes and interest rate volatility shocks.

In measuring NII risk, detailed structural balance sheets and income statements are dynamically simulated to determine the impact of market stress scenarios on projected NII. Assets, liabilities and off-balance sheet positions are simulated using monthly time steps over a one-year horizon. The simulations incorporate product maturities, renewals and growth along with prepayment and redemption behaviour. Product pricing and volumes are forecast based on past experience and expectations for a given market stress scenario. EVE risk captures the market value sensitivity of structural positions to changes in longer-term rates. In measuring EVE risk, deterministic (single-scenario) and stochastic (multiple-scenario) valuation techniques are applied to detailed spot position data. NII and EVE risks are measured for a range of market risk stress scenarios which include extreme but plausible changes in market rates and volatilities. These SIRR measures do not include the benefit of management actions.

Management of NII and EVE risk is complementary and supports our efforts to generate a sustainable high-quality NII stream. NII and EVE risks for specific units are measured daily, weekly or monthly depending on its materiality, complexity and hedge strategy.

A number of assumptions affecting cash flows, product re-pricing and the administration of rates underlie the models used to measure NII and EVE risk. The key assumptions pertain to the expected funding profile for mortgage rate commitments, fixed rate loan prepayment behaviour, term deposit redemption behaviour, and the treatment of non-maturity deposits. All assumptions are derived empirically based on historical client behaviour and product pricing with consideration of future behavioural changes. All models and assumptions used to measure SIRR are subject to independent oversight by GRM.

Market risk measures – Structural Interest Rate Sensitivities

The following table shows the potential before-tax impact of an immediate and sustained 100 bps and 200 bps increase or decrease in interest rates on projected 12-month NII and EVE for our structural balance sheet, assuming no subsequent hedging. Rate floors are applied within the declining rates scenarios, with floor levels set based on rate changes experienced globally. Interest rate risk measures are based upon interest rate exposures at a specific time and continuously change as a result of business activities and management actions.

Market risk – SIRR measures* **Table 58**

	2017						2016	
	EVE risk			NII risk (1)				
(Millions of Canadian dollars)	Canadian dollar impact	U.S. dollar impact (2)	Total	Canadian dollar impact	U.S. dollar impact (2)	Total	EVE risk	NII risk (1)
Before-tax impact of:								
100bps increase in rates	$ (1,105)	$ (110)	$ (1,215)	$ 269	$ 182	$ 451	$ (1,377)	$ 420
100bps decrease in rates	962	(324)	638	(385)	(219)	(604)	644	(465)
Before-tax impact of:								
200bps increase in rates	(2,199)	(308)	(2,507)	472	353	825	(2,883)	711
200bps decrease in rates	1,943	(940)	1,003	(647)	(360)	(1,007)	664	(467)

* This table represents an integral part of our 2017 Annual Consolidated Financial Statements.
(1) Represents the 12-month NII exposure to an instantaneous and sustained shift in interest rates.
(2) Represents the impact on the SIRR portfolios held in our City National and U.S. banking operations.

As at October 31, 2017, an immediate and sustained -100 bps shock would have had a negative impact to our NII of $604 million, up from $465 million last year. An immediate and sustained +100 bps shock at the end of October 31, 2017 would have had a negative impact to the Bank's EVE of $1,215 million, down from $1,377 million reported last year. The year-over-year NII sensitivity to rate increases was positioned marginally higher. Under the declining rate scenarios, NII risk has increased primarily as a result of higher rates, which allows rates to decline further under the down shock scenario. During 2017, NII and EVE risks remained well within approved limits.

Market risk measures for other material non-trading portfolios

AFS securities

We held $75.9 billion of securities classified as AFS as at October 31, 2017, compared to $69.9 billion as at October 31, 2016. We hold debt securities designated as AFS primarily as investments, as well as to manage liquidity risk and hedge interest rate risk in our non-trading banking balance sheet. Certain legacy debt portfolios are also classified as AFS. Changes in the value of these securities are reported in other comprehensive income. As at October 31, 2017, our portfolio of AFS securities exposes us to interest rate risk of a pre-tax change in value of $9.8 million as measured by the change in the value of the securities for a one basis point parallel increase in yields. The portfolio also exposes us to credit spread risk of a pre-tax change in value of $25.0 million, as measured by the change in value for a one basis point widening of credit spreads. The value of the AFS securities included in our SIRR measure as at October 31, 2017 was $36.4 billion. Our AFS securities also include equity exposures of $1.2 billion as at October 31, 2017, down from $1.6 billion in the prior year.

Derivatives related to non-trading activity

Derivatives are also used to hedge market risk exposures unrelated to our trading activity. In aggregate, derivative assets not related to trading activity of $3.2 billion as at October 31, 2017 were down from $5.1 billion last year, and derivative liabilities of $3.2 billion as at October 31, 2017 were down from $4.1 billion last year.

Non-trading derivatives in hedge accounting relationships

The derivative assets and liabilities described above include derivative assets in a designated hedge accounting relationship of $1.3 billion as at October 31, 2017, down from $2.4 billion as at October 31, 2016, and derivative liabilities of $1.5 billion as at October 31, 2017, down from $1.8 billion last year. These derivative assets and liabilities are included in our SIRR measure and other internal non-trading market risk measures. We use interest rate swaps to manage our AFS securities and structural interest rate risk. To the extent these swaps are considered effective, changes in their fair value are recognized in other comprehensive income. The interest rate risk for the swaps designated as cash flow hedges, measured as the change in the fair value of the derivatives for a one basis point parallel increase in yields, was $7.7 million as of October 31, 2017 compared to $5.2 million as of October 31, 2016.

Interest rate swaps are also used to hedge changes in the fair value of certain fixed-rate instruments. Changes in fair value of the hedged instruments that are related to interest rate movements and the corresponding interest rate swaps are reflected in the consolidated statement of income.

We also use foreign exchange derivatives to manage our exposure to equity investments in subsidiaries that are denominated in foreign currencies, particularly the U.S. dollar, British pound, and Euro. Changes in the fair value of these hedges and the cumulative translation adjustment related to our structural foreign exchange risk are reported in other comprehensive income.

Other non-trading derivatives

Derivatives, including interest rate swaps and foreign exchange derivatives, that are not in designated hedge accounting relationships are used to manage other non-trading exposures. Changes in the fair value of these derivatives are reflected in the consolidated statement of income. Derivative assets of $1.9 billion as at October 31, 2017 were down from $2.7 billion as at October 31, 2016, and derivative liabilities of $1.7 billion as at October 31, 2017 were down from $2.3 billion last year.

Non-trading foreign exchange rate risk

Foreign exchange rate risk is the potential adverse impact on earnings and economic value due to changes in foreign currency rates. Our revenue, expenses and income denominated in currencies other than the Canadian dollar are subject to fluctuations as a result of changes in the value of the average Canadian dollar relative to the average value of those currencies. Our most significant exposure is to the U.S. dollar, due to our operations in the U.S. and other activities conducted in U.S. dollars. Other significant exposures are to the British pound and the Euro, due to our activities conducted internationally in these currencies. A strengthening or weakening of the Canadian dollar compared to the U.S. dollar, British pound and the Euro could reduce or increase, as applicable, the translated value of our foreign currency denominated revenue, expenses and earnings and could have a significant effect on the results of our operations. We are also exposed to foreign exchange rate risk arising from our investments in foreign operations. For unhedged equity investments, when the Canadian dollar appreciates against other currencies, the unrealized translation losses on net foreign investments decreases our shareholders' equity through the other components of equity and decreases the translated value of the Risk-weighted Assets (RWA) of the foreign currency-denominated asset. The reverse is true when the Canadian dollar depreciates against other currencies. Consequently, we consider these impacts in selecting an appropriate level of our investments in foreign operations to be hedged.

Our overall trading and non-trading market risk objectives, policies and methodologies have not changed significantly from 2016.

Linkage of market risk to selected balance sheet items

The following table provides the linkages between selected balance sheet items with positions included in our trading market risk and non-trading market risk disclosures, which illustrates how we manage market risk for our assets and liabilities through different risk measures:

Linkage of market risk to selected balance sheet items — **Table 59**

(Millions of Canadian dollars)	As at October 31, 2017			
		Market risk measure		
	Balance sheet amount	Traded risk (1)	Non-traded risk (2)	Non-traded risk primary risk sensitivity
Assets subject to market risk				
Cash and due from banks (3)	$ 28,407	$ –	$ 28,407	Interest rate
Interest-bearing deposits with banks (4)	32,662	20,792	11,870	Interest rate
Securities				
Trading (5)	127,657	119,815	7,842	Interest rate, credit spread
Available-for-sale (6)	90,722	–	90,722	Interest rate, credit spread, equity
Assets purchased under reverse repurchase agreements and securities borrowed (7)	220,977	141,532	79,445	Interest rate
Loans				
Retail (8)	385,170	7,638	377,532	Interest rate
Wholesale (9)	159,606	4,217	155,389	Interest rate
Allowance for loan losses	(2,159)	–	(2,159)	Interest rate
Segregated fund net assets (10)	1,216	–	1,216	Interest rate
Derivatives	95,023	91,791	3,232	Interest rate, foreign exchange
Other assets (11)	68,545	2,006	66,539	Interest rate
Assets not subject to market risk (12)	5,027			
Total assets	$ 1,212,853	$ 387,791	$ 820,035	
Liabilities subject to market risk				
Deposits (13)	$ 789,635	$ 78,194	$ 711,441	Interest rate
Segregated fund liabilities (14)	1,216	–	1,216	Interest rate
Other				
Obligations related to securities sold short	30,008	30,008	–	
Obligations related to assets sold under repurchase agreements and securities loaned (15)	143,084	136,371	6,713	Interest rate
Derivatives	92,127	88,919	3,208	Interest rate, foreign exchange
Other liabilities (16)	65,565	4,275	61,290	Interest rate
Subordinated debentures	9,265	–	9,265	Interest rate
Liabilities not subject to market risk (17)	7,525			
Total liabilities	$ 1,138,425	$ 337,767	$ 793,133	
Total equity	$ 74,428			
Total liabilities and equity	$ 1,212,853			

(1) Traded risk includes positions that are classified or designated as FVTPL and positions whose revaluation gains and losses are reported in revenue. Market risk measures of VaR and SVaR and stress testing are used as risk controls for traded risk.

(2) Non-traded risk includes positions used in the management of the SIRR and other non-trading portfolios. Other material non-trading portfolios include positions from RBC Insurance and AFS securities not included in SIRR.

The following footnotes provide additional information on the Non-traded risk amounts:

(3) Cash and due from banks includes $15,895 million included in SIRR. An additional $12,512 million is included in other risk controls.

(4) Interest-bearing deposits with banks of $11,870 million are included in SIRR.

(5) Trading securities include $7,706 million in securities for asset/liability management of RBC Insurance. An additional $136 million is included in other risk controls.

(6) Includes AFS securities of $75,877 million and held-to-maturity securities of $14,845 million. $51,269 million of the total securities are included in SIRR. An additional $1,946 million are held by RBC Insurance. The remaining $37,507 million are captured in other internal non-trading market risk reporting.

(7) Assets purchased under reverse repurchase agreements include $32,541 million reflected in SIRR. An additional $46,904 million is included in other risk controls.

(8) Retail loans include $366,928 million reflected in SIRR and $241 million is used for asset/liability management of RBC Insurance. An additional $10,363 million is included in other risk controls.

(9) Wholesale loans include $153,829 million reflected in SIRR. An additional $1,560 million is used for asset/liability management of RBC Insurance.

(10) Investments for the account of segregated fund holders are included in RBC Insurance risk measures.

(11) Other assets include $37,999 million reflected in SIRR and $2,428 million is used for asset/liability management of RBC Insurance. An additional $26,112 million is included in other risk controls.

(12) Assets not subject to market risk include $5,027 million of physical and other assets.

(13) Deposits include $650,841 million reflected in SIRR. The remaining $60,600 million are captured in other internal non-trading market risk reporting.

(14) Insurance and investment contracts for the account of segregated fund holders are included in RBC Insurance risk measures.

(15) Obligations related to assets sold under repurchase agreements and securities loaned include $6,713 million included in other risk controls.

(16) Other liabilities include $36,019 million reflected in SIRR and $10,318 million of RBC Insurance liabilities. An additional $14,953 million is included in other risk controls.

(17) Liabilities not subject to market risk include $7,525 million of payroll related and other liabilities.

(Millions of Canadian dollars)	As at October 31, 2016 (1) Balance sheet amount	Market risk measure Traded risk (2)	Market risk measure Non-traded risk (3)	Non-traded risk primary risk sensitivity
Assets subject to market risk				
Cash and due from banks (4)	$ 14,929	$ –	$ 14,929	Interest rate
Interest-bearing deposits with banks (5)	27,851	16,058	11,793	Interest rate
Securities				
Trading (6)	151,292	144,001	7,291	Interest rate, credit spread
Available-for-sale (7)	84,801	–	84,801	Interest rate, credit spread, equity
Assets purchased under reverse repurchase agreements and securities borrowed (8)	186,302	121,692	64,610	Interest rate
Loans				
Retail (9)	369,470	9,081	360,389	Interest rate
Wholesale (10)	154,369	2,341	152,028	Interest rate
Allowance for loan losses	(2,235)	–	(2,235)	Interest rate
Segregated fund net assets (11)	981	–	981	Interest rate
Derivatives	118,944	113,862	5,082	Interest rate, foreign exchange
Other assets (12)	68,363	1,440	66,923	Interest rate
Assets not subject to market risk (13)	5,191			
Total assets	$ 1,180,258	$ 408,475	$ 766,592	
Liabilities subject to market risk				
Deposits (14)	$ 757,589	$ 81,986	$ 675,603	Interest rate
Segregated fund liabilities (15)	981	–	981	Interest rate
Other				
Obligations related to securities sold short	50,369	50,369	–	
Obligations related to assets sold under repurchase agreements and securities loaned (16)	103,441	88,863	14,578	Interest rate
Derivatives	116,550	112,500	4,050	Interest rate, foreign exchange
Other liabilities (17)	62,625	5,439	57,186	Interest rate
Subordinated debentures	9,762	–	9,762	Interest rate
Liabilities not subject to market risk (18)	7,329			
Total liabilities	$ 1,108,646	$ 339,157	$ 762,160	
Total equity	$ 71,612			
Total liabilities and equity	$ 1,180,258			

(1) Amounts have been revised from those previously presented.
(2) Traded risk includes positions that are classified or designated as FVTPL and positions whose revaluation gains and losses are reported in revenue. Market risk measures of VaR and SVaR and stress testing are used as risk controls for traded risk.
(3) Non-traded risk includes positions used in the management of the SIRR and other non-trading portfolios. Other material non-trading portfolios include positions from RBC Insurance and AFS securities not included in SIRR.

The following footnotes provide additional information on the Non-traded risk amounts:
(4) Cash and due from banks includes $12,644 million included in SIRR. An additional $2,285 million is included in other risk controls.
(5) Interest-bearing deposits with banks of $11,793 million are included in SIRR.
(6) Trading securities include $7,171 million in securities for asset/liability management of RBC Insurance. An additional $120 million is included in other risk controls.
(7) Includes AFS securities of $69,922 million and held-to-maturity securities of $14,879 million. $51,239 million of the total securities are included in SIRR. An additional $1,901 million are held by RBC Insurance. The remaining $31,661 million are captured in other internal non-trading market risk reporting.
(8) Assets purchased under reverse repurchase agreements include $24,838 million reflected in SIRR. An additional $39,772 million is included in other risk controls.
(9) Retail loans include $350,019 million reflected in SIRR and $251 million is used for asset/liability management of RBC Insurance. An additional $10,119 million is included in other risk controls.
(10) Wholesale loans include $150,619 million reflected in SIRR. An additional $1,409 million is used for asset/liability management of RBC Insurance.
(11) Investments for the account of segregated fund holders are included in RBC Insurance risk measures.
(12) Other assets include $39,272 million reflected in SIRR and $2,463 million is used for asset/liability management of RBC Insurance. An additional $25,188 million is included in other risk controls.
(13) Assets not subject to market risk include $5,191 million of physical and other assets.
(14) Deposits include $644,812 million reflected in SIRR. The remaining $30,791 million are captured in other internal non-trading market risk reporting.
(15) Insurance and investment contracts for the account of segregated fund holders are included in RBC Insurance risk measures.
(16) Obligations related to assets sold under repurchase agreements and securities loaned include $14,578 million included in other risk controls.
(17) Other liabilities include $35,526 million reflected in SIRR and $9,900 million of RBC Insurance liabilities. An additional $11,760 million is included in other risk controls.
(18) Liabilities not subject to market risk include $7,329 million of payroll related and other liabilities.

Liquidity and funding risk

Liquidity and funding risk (liquidity risk) is the risk that we may be unable to generate sufficient cash or its equivalents in a timely and cost-effective manner to meet our commitments as they come due. Liquidity risk arises from mismatches in the timing and value of on-balance sheet and off-balance sheet cash flows.

Our liquidity profile is structured to ensure that we have sufficient liquidity to satisfy current and prospective commitments in both normal and stressed business and liquidity environments. To achieve these goals, we operate under a comprehensive Liquidity Risk Management Framework (LRMF) and Pledging Policy. We also employ several liquidity risk mitigation strategies that include:

- An appropriate balance between the level of exposure allowed under our risk appetite and the cost of risk mitigation;
- Broad funding access, including preserving and promoting a reliable base of core client deposits and ongoing access to diversified sources of wholesale funding;
- A comprehensive liquidity stress testing program, contingency, recovery and resolution planning and status monitoring to ensure sufficiency of unencumbered marketable securities and demonstrated capacities to monetize specific asset classes;
- Governance of pledging activity through limits and liquid asset buffers for potential pledging activity;
- Timely and granular risk measurement information;
- Transparent liquidity transfer pricing and cost allocation; and
- A rigorous first and second line of defense governance model.

Risk control

Our liquidity risk objectives, policies and methodologies are reviewed regularly, and updated to reflect changing market conditions and business mix, to align with local regulatory developments and to position ourselves for the phase-in of Basel III regulatory liquidity standards. We continue to maintain liquidity and funding that is appropriate for the execution of our strategy. Liquidity risk remains well within our risk appetite.

The Board of Directors annually approves the delegation of liquidity risk authorities to senior management. The Risk Committee of the Board annually approves the LRMF and the Pledging Policy and is responsible for their oversight. The Board of Directors, the Risk Committee of the Board, the GRC and the ALCO regularly review reporting on our enterprise-wide liquidity position and status. The GRC, the Policy Review Committee (PRC) and/or the ALCO also review liquidity documents prepared for the Board of Directors or its committees.

- The PRC annually approves the Liquidity Risk Policy (LRP), which establishes minimum risk control elements in accordance with the Board-approved risk appetite and the LRMF.
- The ALCO annually approves the Liquidity Contingency Plan (LCP) and provides strategic direction and oversight to Corporate Treasury, other functions, and business segments on the management of liquidity.

These policies are supported by operational, desk and product-level policies that implement risk control elements, such as parameters, methodologies, management limits and authorities that govern the measurement and management of liquidity. Stress testing is also employed to assess the robustness of the control framework and inform liquidity contingency plans.

Risk measurement

Liquidity risk is measured by applying scenario-based assumptions against our assets and liabilities and off-balance sheet commitments to derive expected cash flow profiles over varying time horizons. For instance, government bonds can be quickly and reliably monetized without significant loss of value to generate cash inflow prior to their contractual maturity, and similarly, relationship demand deposits can be deemed as having little risk of short-term cash outflow, although depositors have the contractual right to redeem on demand. Risk methodologies and underlying assumptions are periodically reviewed and validated to ensure alignment with our operating environment, expected economic and market conditions, rating agency preferences, regulatory requirements and accepted practices.

To manage liquidity risk within our liquidity risk appetite, we set limits on various metrics reflecting a range of time horizons and severity of stress conditions and develop contingency, recovery and resolution plans. Our liquidity risk measurement and control activities are divided into three categories as follows:

Structural (longer-term) liquidity risk

To guide our secured and unsecured wholesale term funding activities, we employ an internal metric to focus on the structural alignment between long-term illiquid assets and longer-term funding sourced from wholesale investors and core relationship deposits.

Tactical (shorter-term) liquidity risk

To address more immediate cash flow risks we may experience in times of stress, we use short-term net cash flow limits, in conjunction with stress testing, to contain risk within the risk appetite at branch, subsidiary and currency levels. Net cash flow positions are derived from the application of internally generated risk assumptions and parameters to known and anticipated cash flows for all material unencumbered assets, liabilities and off-balance sheet activities. Encumbered assets are not considered a source of available liquidity. We also control tactical liquidity by adhering to enterprise-wide and unit-specific prescribed regulatory standards, such as LCR.

Contingency liquidity risk

Contingency liquidity risk planning assesses the impact of and our intended responses to sudden stressful events. Our LCP, maintained and administered by Corporate Treasury, guides our actions and responses to liquidity crises. This plan establishes a Liquidity Crisis Team, led by Corporate Treasury, and consisting of senior representatives with relevant subject matter expertise from key business segments, Group Risk Management, Finance, and Operations. This team contributes to the development of stress tests and funding plans and meets regularly to assess our liquidity status, conduct stress tests and review liquidity contingency preparedness.

Our stress tests, which include elements of scenario and sensitivity analyses, measure our prospective exposure to global, country-specific and RBC-specific events over a period of several weeks. Different levels of severity are considered for each type of crisis with some scenarios reflecting multiple notch downgrades to our credit ratings.

The contingency liquidity risk planning process identifies contingent funding needs (e.g., draws on committed credit and liquidity lines, demands for more collateral and deposit run-off) and sources (e.g., contingent liquid asset sales and incremental wholesale funding capacity) under various stress scenarios, and as a result, informs requirements for our earmarked contingent unencumbered liquid asset pools.

Our contingent liquid asset pools consist of diversified, highly rated and liquid marketable securities, overnight government reverse repos, and deposits with central banks. These portfolios are subject to minimum asset quality levels and, as appropriate, other strict eligibility guidelines (e.g., maturity, diversification and eligibility for central bank advances) to maximize ready access to cash in emergencies. These securities, when added to other unencumbered liquid assets that we hold as a result of capital markets or other activities, combine to populate our liquidity reserve and asset encumbrance disclosures provided below.

Liquidity reserve and asset encumbrance

The following tables provide summaries of our liquidity reserve and asset encumbrance. In both tables, unencumbered assets represent, for the most part, a ready source of funding that can be accessed quickly. For the purpose of constructing the following tables, encumbered assets include: (i) bank-owned liquid assets that are either pledged as collateral (e.g., repo financing and derivative pledging) or not freely available due to regulatory or internal policy requirements (e.g., earmarked to satisfy mandatory reserve or local capital adequacy requirements and to maintain continuous access to payment and settlement systems); (ii) securities received as collateral from securities financing and derivative transactions which have either been re-hypothecated where permissible (e.g., to obtain financing through repos or to cover securities sold short) or have no liquidity value since re-hypothecation is prohibited; and (iii) illiquid assets that have been securitized and sold into the market or that have been pledged as collateral in support of structured term funding vehicles. As per our liquidity management framework and practice, we do not include encumbered assets as a source of available liquidity in measuring liquidity risk. Unencumbered assets are the difference between total and encumbered assets from both on- and off-balance sheet sources.

Liquidity reserve

In the liquidity reserve table, available liquid assets consist of on-balance sheet cash and securities holdings, as well as securities received as collateral from securities financing (reverse repos and off-balance sheet collateral swaps) and derivative transactions, and constitute the preferred source for quickly accessing liquidity. The other component of our liquidity reserve consists primarily of uncommitted and undrawn central bank credit facilities that could be accessed under exceptional circumstances, provided certain pre-conditions could be met and where advances could be supported by eligible assets (e.g., certain unencumbered loans) not included in the liquid assets category.

The liquidity reserve is mainly affected by routine flows of client banking activity where liquid asset portfolios adjust to the change in cash balances, and additionally from capital markets activities where business strategies and client flows may also affect the addition or subtraction of liquid assets in the overall calculation of the liquidity reserve. Corporate Treasury also affects liquidity reserves through the management of funding issuances where reserves absorb timing mismatches between debt issuances and deployment into business activities.

Liquidity reserve — **Table 60**

(Millions of Canadian dollars)	As at October 31, 2017 Bank-owned liquid assets (1)	Securities received as collateral from securities financing and derivative transactions	Total liquid assets	Encumbered liquid assets	Unencumbered liquid assets
Cash and holding at central banks	$ 46,581	$ –	$ 46,581	$ 2,045	$ 44,536
Deposits in other banks available overnight	4,004	–	4,004	203	3,801
Securities issued or guaranteed by sovereigns, central banks or multilateral development banks (2)	303,003	27,534	330,537	187,465	143,072
Other securities	142,272	44,487	186,759	77,696	109,063
Liquidity assets eligible at central banks (not included above) (3)	436	–	436	–	436
Undrawn credit lines granted by central banks (4)	12,007	–	12,007	–	12,007
Other assets eligible as collateral for discount (5)	94,207	–	94,207	–	94,207
Other liquid assets (6)	19,520	–	19,520	19,520	–
Total liquid assets	$ 622,030	$ 72,021	$ 694,051	$ 286,929	$ 407,122

(Millions of Canadian dollars)	As at October 31, 2016 Bank-owned liquid assets (1)	Securities received as collateral from securities financing and derivative transactions	Total liquid assets	Encumbered liquid assets	Unencumbered liquid assets
Cash and holding at central banks	$ 31,771	$ –	$ 31,771	$ 1,781	$ 29,990
Deposits in other banks available overnight	1,679	–	1,679	262	1,417
Securities issued or guaranteed by sovereigns, central banks or multilateral development banks (2), (3)	281,313	28,564	309,877	154,105	155,772
Other securities	146,269	34,386	180,655	72,765	107,890
Liquidity assets eligible at central banks (not included above) (4)	600	–	600	–	600
Undrawn credit lines granted by central banks (5)	13,558	–	13,558	–	13,558
Other assets eligible as collateral for discount (6)	141,888	–	141,888	–	141,888
Other liquid assets (7)	23,307	–	23,307	23,307	–
Total liquid assets	640,385	$ 62,950	$ 703,335	$ 252,220	$ 451,115

(Millions of Canadian dollars)	As at October 31 2017	October 31 2016
Royal Bank of Canada	$ 204,999	$ 264,522
Foreign branches	63,283	53,006
Subsidiaries	138,840	133,587
Total unencumbered liquid assets	$ 407,122	$ 451,115

(1) The Bank-owned liquid assets amount includes securities owned outright by the Bank as well as collateral received through reverse repurchase transactions.
(2) Includes liquid securities issued by provincial governments and U.S. government-sponsored entities working under U.S. Federal government's conservatorship (e.g., Federal National Mortgage Association and Federal Home Loan Mortgage Corporation).
(3) Amounts have been revised from those previously presented.
(4) Includes Auction Rate Securities.
(5) Includes loans that qualify as eligible collateral for the discount window facility available to us at the Federal Reserve Bank of New York (Federal Reserve Bank). Amounts are face value and would be subject to collateral margin requirements applied by the Federal Reserve Bank to determine collateral value/borrowing capacity. Access to the discount window borrowing program is conditional on meeting requirements set by the Federal Reserve Bank and borrowings are typically expected to be infrequent and due to uncommon occurrences requiring temporary accommodation.
(6) Represents our unencumbered Canadian dollar non-mortgage loan book (at face value) that could, subject to satisfying conditions precedent to borrowing and application of prescribed collateral margin requirements, be pledged to the Bank of Canada for advances under its Emergency Lending Assistance (ELA) program. ELA and other central bank facilities are not considered sources of available liquidity in our normal liquidity risk profile but could in extraordinary circumstances, where normal market liquidity is seriously impaired, allow us and other banks to monetize assets eligible as central bank collateral to meet requirements and mitigate further market liquidity disruption.
(7) Represents pledges related to OTC and exchange-traded derivative transactions.

2017 vs. 2016

Total liquid assets decreased $23.6 billion or 3%, primarily due to a reduction in non-mortgage loans that qualify to be pledged under the ELA program due to the change of the eligibility criteria by the BoC. This decline was partially offset by higher balances of cash and holdings at central banks.

Asset encumbrance

The table below provides a summary of cash, securities and other assets, distinguishing between those that are encumbered assets and those available for sale or use as collateral in secured funding transactions. Other assets, such as mortgages and credit card receivables can also be monetized, although over a longer timeframe than that required for marketable securities. As at October 31, 2017, our Unencumbered assets available as collateral comprised 33% of our total assets (October 31, 2016 – 38%).

Asset encumbrance **Table 61**

	As at									
	October 31 2017					October 31 2016				
	Encumbered		Unencumbered			Encumbered		Unencumbered		
(Millions of Canadian dollars)	Pledged as collateral	Other (1)	Available as collateral (2)	Other (3)	Total	Pledged as collateral	Other (1)	Available as collateral (2)	Other (3)	Total
Cash and due from banks	$ 6	$ 2,039	$ 26,362	$ –	$ 28,407	$ –	$ 1,781	$ 13,148	$ –	$ 14,929
Interest-bearing deposits with banks	–	204	32,458	–	32,662	–	262	27,589	–	27,851
Securities										
Trading	51,344	–	74,922	1,391	127,657	66,734	–	83,219	1,339	151,292
Available-for-sale	3,184	–	86,442	1,096	90,722	2,858	–	78,966	2,977	84,801
Assets purchased under reverse repurchase agreements and securities borrowed (4), (5)	222,128	23,131	74,950	–	320,209	166,449	20,450	82,749	–	269,648
Loans										
Retail										
Mortgage securities	35,861	–	32,589	–	68,450	34,624	–	35,591	–	70,215
Mortgage loans	38,504	–	14,737	148,657	201,898	40,293	–	12,796	131,694	184,783
Non-mortgage loans	8,776	–	65,449	40,597	114,822	10,422	–	100,612	3,438	114,472
Wholesale	3,713	–	27,637	128,256	159,606	3,477	–	41,445	109,447	154,369
Allowance for loan losses	–	–	–	(2,159)	(2,159)	–	–	–	(2,235)	(2,235)
Segregated fund net assets	–	–	–	1,216	1,216	–	–	–	981	981
Other – Derivatives	–	–	–	95,023	95,023	–	–	–	118,944	118,944
– Others (6)	19,520	–	–	54,052	73,572	23,307	–	–	50,247	73,554
Total assets	$ 383,036	$ 25,374	$ 435,546	$ 468,129	$ 1,312,085	$ 348,164	$ 22,493	$ 476,115	$ 416,832	$ 1,263,604

(1) Includes assets restricted from use to generate secured funding due to legal or other constraints.

(2) Includes loans that could be used to collateralize central bank advances. Our unencumbered Canadian dollar non-mortgage loan book (at face value) could, subject to satisfying conditions for borrowing and application of prescribed collateral margin requirements, be pledged to the Bank of Canada for advances under its ELA program. We also lodge loans that qualify as eligible collateral for the discount window facility available to us at the Federal Reserve Bank of New York. ELA and other central bank facilities are not considered sources of available liquidity in our normal liquidity risk profile. However, banks could monetize assets meeting central bank collateral criteria during periods of extraordinary and severe disruption to market-wide liquidity.

(3) Other unencumbered assets are not subject to any restrictions on their use to secure funding or as collateral but would not be considered readily available since they may not be acceptable at central banks or for other lending programs.

(4) Includes bank-owned liquid assets and securities received as collateral from off-balance sheet securities financing, margin lending, and derivative transactions. Includes $21.7 billion (2016: $19.5 billion) of collateral received through reverse repurchase transactions that cannot be rehypothecated in its current legal form.

(5) Amounts have been revised from those previously presented.

(6) The Pledged as collateral amounts relate to OTC and exchange-traded derivative transactions.

Funding

Funding strategy

Core funding, comprising capital, longer-term wholesale liabilities and a diversified pool of personal and, to a lesser extent, commercial and institutional deposits, is the foundation of our structural liquidity position.

Deposit and funding profile

As at October 31, 2017, relationship-based deposits, which are the primary source of funding for retail loans and mortgages, were $525 billion or 54% of our total funding (October 31, 2016 – $506 billion or 55%). The remaining portion is comprised of short- and long-term wholesale funding.

Funding for highly liquid assets consists primarily of short-term wholesale funding that reflects the monetization period of those assets. Long-term wholesale funding is used mostly to fund less liquid wholesale assets and to support liquidity asset buffers.

For further details on our wholesale funding, refer to the Composition of wholesale funding tables below.

Long-term debt issuance

During 2017, we continued to experience more favourable unsecured wholesale funding access and pricing compared to many of our global peers. We also continued to expand our unsecured long-term funding base by selectively issuing, either directly or through our subsidiaries, $22.3 billion of term funding in various currencies and markets. Total unsecured long-term funding outstanding decreased $2.7 billion from the prior year due to maturities.

We primarily use residential mortgage and credit card securitization programs as alternative sources of funding and for liquidity and asset/liability management purposes. Our total secured long-term funding includes outstanding mortgage-backed securities (MBS) sold, covered bonds that are collateralized with residential mortgages, and securities backed by credit card receivables.

Compared to 2016, our outstanding MBS sold decreased $271 million. Our covered bonds and securitized credit card receivables decreased $2.7 billion and $2.3 billion, respectively.

For further details, refer to the Off-balance sheet arrangements section.

Long-term funding sources* **Table 62**

(Millions of Canadian dollars)	As at October 31 2017	As at October 31 2016
Unsecured long-term funding	$ 96,112	$ 98,827
Secured long-term funding	64,758	69,971
Commercial mortgage-backed securities sold	1,366	1,297
Subordinated debentures	9,362	9,597
	$ 171,598	$ 179,692

* This table represents an integral part of our 2017 Annual Consolidated Financial Statements.

Our wholesale funding activities are well-diversified by geography, investor segment, instrument, currency, structure and maturity. We maintain an ongoing presence in different funding markets, which allows us to continuously monitor market developments and trends, identify opportunities and risks, and take appropriate and timely actions. We operate longer-term debt issuance registered programs. The following table summarizes these programs with their authorized limits by geography.

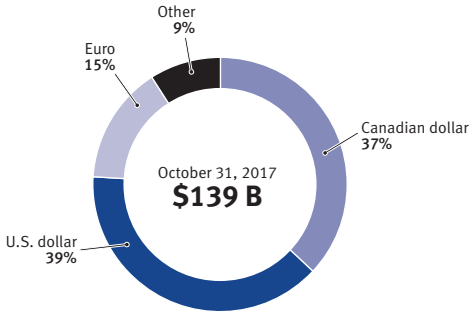
Programs by geography **Table 63**

Canada	U.S.	Europe/Asia
• Canadian Shelf Program – $25 billion	• SEC Shelf Program – US$40 billion • SEC Registered Covered Bond Program – US$15 billion (1)	• European Debt Issuance Program – US$40 billion • Global Covered Bond Program – €32 billion • Japanese Issuance Programs – ¥1 trillion

(1) Subject to the €32 billion Global Covered Bond Program limit. Upon the enactment of U.S. SEC Regulation AB II on November 23, 2016, we are not currently able to issue new series of SEC-registered covered bonds under the existing program.

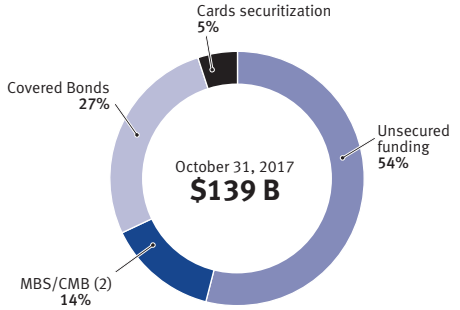
We also raise long-term funding using Canadian Deposit Notes, Canadian NHA MBS, Canada Mortgage Bonds, credit card receivable-backed securities, Kangaroo Bonds (issued in the Australian domestic market by foreign firms) and Yankee Certificates of Deposit (issued in the U.S. domestic market by foreign firms). We continuously evaluate opportunities to expand into new markets and untapped investor segments since diversification expands our wholesale funding flexibility, minimizes funding concentration and dependency, and generally reduces financing costs. As presented in the following charts, our current long-term debt profile is well-diversified by both currency and product. Maintaining competitive credit ratings is also critical to cost-effective funding.

Long-term debt (1) – funding mix by currency of issuance
($139 billion as at October 31, 2017)



(1) Based on original term to maturity greater than 1 year

Long-term debt (1) – funding mix by product
($139 billion as at October 31, 2017)



(1) Based on original term to maturity greater than 1 year
(2) Mortgage-backed securities and Canada Mortgage Bonds

The following table provides our composition of wholesale funding based on remaining term to maturity:

Composition of wholesale funding (1) **Table 64**

(Millions of Canadian dollars)	Less than 1 month	1 to 3 months	3 to 6 months	6 to 12 months	Less than 1 year sub-total	1 year to 2 years	2 years and greater	Total
	As at October 31, 2017							
Deposits from banks (2)	$ 5,054	$ 39	$ 47	$ 13	$ 5,153	$ –	$ –	$ 5,153
Certificates of deposit and commercial paper	1,092	8,801	14,194	13,501	37,588	1,549	39	39,176
Asset-backed commercial paper (3)	997	1,385	4,300	5,555	12,237	–	–	12,237
Senior unsecured medium-term notes (4)	–	2,625	3,402	16,691	22,718	17,311	38,695	78,724
Senior unsecured structured notes (5)	188	192	980	1,545	2,905	1,332	6,270	10,507
Mortgage securitization	–	571	1,310	1,549	3,430	4,094	12,650	20,174
Covered bonds/asset-backed securities (6)	–	2,685	1,777	6,179	10,641	10,017	23,925	44,583
Subordinated liabilities	–	–	–	–	–	1,106	8,256	9,362
Other (7)	4,669	2,005	173	1,488	8,335	5	5,344	13,684
Total	$ 12,000	$ 18,303	$ 26,183	$ 46,521	$ 103,007	$ 35,414	$ 95,179	$ 233,600
Of which:								
– Secured	$ 5,265	$ 5,541	$ 7,388	$ 13,283	$ 31,477	$ 14,111	$ 36,575	$ 82,163
– Unsecured	6,735	12,762	18,795	33,238	71,530	21,303	58,604	151,437

(Millions of Canadian dollars)	Less than 1 month	1 to 3 months	3 to 6 months	6 to 12 months	Less than 1 year sub-total	1 year to 2 years	2 years and greater	Total
	As at October 31, 2016							
Deposits from banks (2)	$ 1,375	$ 80	$ 30	$ 38	$ 1,523	$ –	$ –	$ 1,523
Certificates of deposit and commercial paper	3,072	8,950	10,692	5,199	27,913	1,220	54	29,187
Asset-backed commercial paper (3)	1,503	1,600	3,551	2,923	9,577	–	–	9,577
Senior unsecured medium-term notes (4)	1,135	9,140	7,582	7,282	25,139	18,156	43,073	86,368
Senior unsecured structured notes (5)	141	305	213	554	1,213	1,871	6,493	9,577
Mortgage securitization	–	686	514	1,435	2,635	3,432	14,378	20,445
Covered bonds/asset-backed securities (6)	–	1,674	626	5,834	8,134	10,700	30,692	49,526
Subordinated liabilities	–	–	–	128	128	–	9,469	9,597
Other (7)	1,173	2,053	43	738	4,007	13	5,073	9,093
Total	$ 8,399	$ 24,488	$ 23,251	$ 24,131	$ 80,269	$ 35,392	$ 109,232	$ 224,893
Of which:								
– Secured	$ 2,502	$ 5,528	$ 4,691	$ 10,192	$ 22,913	$ 14,132	$ 45,071	$ 82,116
– Unsecured	5,897	18,960	18,560	13,939	57,356	21,260	64,161	142,777

(1) Excludes bankers' acceptances and repos.
(2) Only includes deposits raised by treasury. Excludes deposits associated with services we provide to these banks (e.g., custody, cash management).
(3) Only includes consolidated liabilities, including our collateralized commercial paper program.
(4) Includes deposit notes.
(5) Includes notes where the payout is tied to movements in foreign exchange, commodities and equities.
(6) Includes credit card, auto and mortgage loans.
(7) Includes tender option bonds (secured) of $5,168 million (October 31, 2016 – $2,567 million), bearer deposit notes (unsecured) of $3,342 million (October 31, 2016 – $1,652 million) and other long-term structured deposits (unsecured) of $5,176 million (October 31, 2016 – $4,874 million).

Credit ratings

Our ability to access unsecured funding markets and to engage in certain collateralized business activities on a cost-effective basis are primarily dependent upon maintaining competitive credit ratings. Credit ratings and outlooks provided by rating agencies reflect their views and methodologies. Ratings are subject to change, based on a number of factors including, but not limited to, our financial strength, competitive position, liquidity and other factors not completely within our control.

The following table presents our major credit ratings[1]:

Credit ratings — **Table 65**

	As at November 28, 2017		
	Short-term debt	**Senior long-term debt**	**Outlook**
Moody's (2)	**P-1**	**A1**	**negative**
Standard & Poor's (3)	**A-1+**	**AA-**	**negative**
Fitch Ratings (4)	**F1+**	**AA**	**stable**
DBRS (5)	**R-1(high)**	**AA**	**stable**

(1) Credit ratings are not recommendations to purchase, sell or hold a financial obligation inasmuch as they do not comment on market price or suitability for a particular investor. Ratings are determined by the rating agencies based on criteria established from time to time by them, and are subject to revision or withdrawal at any time by the rating organization.
(2) On May 10, 2017, Moody's lowered our senior long-term debt rating one notch, along with our large Canadian peers, due to Moody's change to Canada's macroeconomic profile. Moody's also affirmed our negative outlook.
(3) On June 6, 2016, S&P revised our outlook to negative from stable.
(4) On October 27, 2017, Fitch Ratings revised our outlook to stable from negative.
(5) On July 31, 2017, DBRS revised our outlook to stable from negative.

Additional contractual obligations for rating downgrades

We are required to deliver collateral to certain counterparties in the event of a downgrade to our current credit rating. The following table presents the additional collateral obligations required at the reporting date in the event of a one-, two- or three-notch downgrade to our credit ratings. These additional collateral obligations are incremental requirements for each successive downgrade and do not represent the cumulative impact of multiple downgrades. The amounts reported change periodically as a result of several factors, including the transfer of trading activity to centrally cleared financial market infrastructures and exchanges, the expiration of transactions with downgrade triggers, the imposition of internal limitations on new agreements to exclude downgrade triggers, as well as normal course mark-to-market of positions with collateralized counterparties moving from a negative to a positive position. There is no outstanding senior debt issued in the market that contains rating triggers that would lead to early prepayment of principal.

Additional contractual obligations for rating downgrades — **Table 66**

	As at					
	October 31 2017			October 31 2016		
(Millions of Canadian dollars)	**One-notch downgrade**	**Two-notch downgrade**	**Three-notch downgrade**	One-notch downgrade	Two-notch downgrade	Three-notch downgrade
Contractual derivatives funding or margin requirements	**$ 61**	**$ 102**	**$ 307**	$ 487	$ 117	$ 501
Other contractual funding or margin requirements (1)	**231**	**100**	**–**	293	473	–

(1) Includes GICs issued by our municipal markets business out of New York.

Liquidity Coverage Ratio (LCR)

The LCR is a Basel III metric that measures the sufficiency of high-quality liquid assets (HQLA) available to meet liquidity needs over a 30-day period in an acute stress scenario. The Basel Committee on Banking Supervision (BCBS) and OSFI regulatory minimum coverage level for LCR is currently 100%.

OSFI requires Canadian banks to disclose the LCR using the standard Basel disclosure template and calculated using the average of daily LCR positions during the quarter.

Liquidity coverage ratio (1) **Table 67**

(Millions of Canadian dollars, except percentage amounts)	For the three-months ended October 31 2017		October 31 2016	
	Total unweighted value (average) (2)	**Total weighted value (average)**	Total unweighted value (average) (2)	Total weighted value (average)
High-quality liquid assets				
Total high-quality liquid assets (HQLA)		211,735		207,541
Cash outflows				
Retail deposits and deposits from small business customers, of which:	243,794	19,118	224,518	17,372
Stable deposits (3)	75,160	2,255	72,570	2,177
Less stable deposits	168,634	16,863	151,948	15,195
Unsecured wholesale funding, of which:	260,993	117,451	234,455	99,877
Operational deposits (all counterparties) and deposits in networks of cooperative banks (4)	106,980	25,775	106,040	25,491
Non-operational deposits	137,475	75,138	113,719	59,690
Unsecured debt	16,538	16,538	14,696	14,696
Secured wholesale funding		18,735		26,069
Additional requirements, of which:	229,048	74,047	226,706	67,106
Outflows related to derivative exposures and other collateral requirements	61,901	41,364	59,910	34,299
Outflows related to loss of funding on debt products	7,108	7,108	5,364	5,364
Credit and liquidity facilities	160,039	25,575	161,432	27,443
Other contractual funding obligations (5)	26,252	26,252	30,951	30,951
Other contingent funding obligations (6)	429,706	6,902	448,854	6,814
Total cash outflows		262,505		248,189
Cash inflows				
Secured lending (e.g., reverse repos)	138,867	28,062	126,615	31,978
Inflows from fully performing exposures	11,626	8,310	10,559	7,042
Other cash inflows	51,878	51,878	45,207	45,207
Total cash inflows		88,250		84,227
		Total adjusted value		Total adjusted value
Total HQLA		211,735		207,541
Total net cash outflows		174,255		163,962
Liquidity coverage ratio		122%		127%

(1) The LCR is calculated in accordance with OSFI's LAR guideline, which, in turn, reflects liquidity-related requirements issued by the BCBS. Effective in the first quarter of 2017, OSFI requires Canadian banks to disclose the LCR based on the average of daily positions during the quarter. Previously, the disclosed LCR was based on the average month-end positions during the quarter. The LCR for the quarter ended October 31, 2017 is calculated as an average of 63 daily positions.

(2) With the exception of other contingent funding obligations, unweighted inflow and outflow amounts are items maturing or callable in 30 days or less. Other contingent funding obligations also include debt securities with remaining maturity greater than 30 days.

(3) As defined by the BCBS, stable deposits from retail and small business customers are deposits that are insured and are either held in transactional accounts or the bank has an established relationship with the client making the withdrawal unlikely.

(4) Operational deposits from non-retail and non-small and medium-sized enterprise customers are deposits which clients need to keep with the bank in order to facilitate their access and ability to use payment and settlement systems primarily for clearing, custody and cash management activities.

(5) Other contractual funding obligations primarily include outflows from unsettled securities trades and outflows from obligations related to securities sold short.

(6) Other contingent funding obligations include outflows related to other off-balance sheet facilities that carry low LCR runoff factors (0% – 5%).

We manage our LCR position within a target range that reflects our liquidity risk tolerance and takes into account business mix, asset composition and funding capabilities. The range is subject to periodic review in light of changes to internal requirements and external developments.

We maintain HQLAs in major currencies with dependable market depth and breadth. Our treasury management practices ensure that the levels of HQLA are actively managed to meet target LCR objectives. Our Level 1 assets, as calculated according to OSFI LAR and the BCBS LCR requirements, represent 82% of total HQLA. These assets consist of cash, placements with central banks and highly rated securities issued or guaranteed by governments, central banks and supranational entities.

LCR captures cash flows from on- and off-balance sheet activities that are either expected or could potentially occur within 30 days in an acute stress scenario. Cash outflows result from the application of withdrawal and non-renewal factors to demand and term deposits, differentiated by client type (wholesale, retail and small- and medium-sized enterprises). Cash outflows also arise from business activities that create contingent funding and collateral requirements, such as repo funding, derivatives, short sales of securities and the extension of credit and liquidity commitments to clients. Cash inflows arise primarily from maturing secured loans, interbank loans and non-HQLA securities.

LCR does not reflect any market funding capacity that we believe would be available in a stress situation. All maturing wholesale debt is assigned 100% outflow in the LCR calculation.

Q4 2017 vs. Q4 2016

The average LCR for the quarter ended October 31, 2017 of 122% was generally consistent with prior quarters and translates into a surplus of approximately $37 billion. Compared to the prior year, the average LCR decreased 5%, mainly due to expected balance sheet growth and optimization of surplus liquidity.

Contractual maturities of financial assets, financial liabilities and off-balance sheet items

The following tables provide remaining contractual maturity profiles of all our assets, liabilities, and off-balance sheet items at their carrying value (e.g., amortized cost or fair value) at the balance sheet date. Off-balance sheet items are allocated based on the expiry date of the contract.

Details of contractual maturities and commitments to extend funds are a source of information for the management of liquidity risk. Among other purposes, these details form a basis for modelling a behavioural balance sheet with effective maturities to calculate liquidity risk measures. For further details, refer to the Risk measurement section.

Contractual maturities of financial assets, financial liabilities and off-balance sheet items — Table 68

	As at October 31, 2017									
(Millions of Canadian dollars)	Less than 1 month	1 to 3 months	3 to 6 months	6 to 9 months	9 to 12 months	1 year to 2 years	2 years to 5 years	5 years and greater	With no specific maturity	Total
Assets										
Cash and deposits with banks	$ 58,675	$ 27	$ 22	$ 4	$ –	$ –	$ –	$ –	$ 2,341	$ 61,069
Securities										
Trading (1)	88,083	9	72	3	12	91	61	6,374	32,952	127,657
Available-for-sale	1,748	4,690	4,145	2,552	1,545	9,608	24,445	40,772	1,217	90,722
Assets purchased under reverse repurchase agreements and securities borrowed	106,342	47,726	26,207	13,696	14,327	6,624	–	–	6,055	220,977
Loans (net of allowance for loan losses)	15,228	16,024	23,572	27,220	24,086	104,059	206,201	40,028	86,199	542,617
Other										
Customers' liability under acceptances	10,825	5,541	77	–	–	11	5	–	–	16,459
Derivatives	5,619	10,004	4,530	3,290	2,849	9,351	19,459	39,919	2	95,023
Other financial assets	24,577	767	523	90	88	183	184	1,697	1,243	29,352
Total financial assets	$ 311,097	$ 84,788	$ 59,148	$ 46,855	$ 42,907	$ 129,927	$ 250,355	$ 128,790	$ 130,009	$ 1,183,876
Other non-financial assets	1,820	1,204	92	337	229	745	1,814	986	21,750	28,977
Total assets	$ 312,917	$ 85,992	$ 59,240	$ 47,192	$ 43,136	$ 130,672	$ 252,169	$ 129,776	$ 151,759	$ 1,212,853
Liabilities and equity										
Deposits (2)										
Unsecured borrowing	$ 40,373	$ 24,425	$ 33,825	$ 35,891	$ 30,641	$ 34,737	$ 48,980	$ 14,709	$ 429,152	$ 692,733
Secured borrowing	1,156	3,989	6,289	5,799	4,064	10,178	20,495	7,659	–	59,629
Covered bonds	–	1,898	1,107	1,331	4,862	7,118	19,732	1,225	–	37,273
Other					–					
Acceptances	10,825	5,541	77	–	–	11	5	–	–	16,459
Obligations related to securities sold short	30,008	–	–	–	–	–	–	–	–	30,008
Obligations related to assets sold under repurchase agreements and securities loaned	98,409	32,026	4,374	–	93	–	12	–	8,170	143,084
Derivatives	5,765	9,436	4,787	3,388	3,038	9,410	16,924	39,378	1	92,127
Other financial liabilities	25,137	1,118	466	222	296	138	366	3,532	574	31,849
Subordinated debentures	–	–	–	–	–	106	207	8,952	–	9,265
Total financial liabilities	$ 211,673	$ 78,433	$ 50,925	$ 46,631	$ 42,994	$ 61,698	$ 106,721	$ 75,455	$ 437,897	$ 1,112,427
Other non-financial liabilities	835	3,910	312	135	180	2,747	920	9,170	7,789	25,998
Equity	–	–	–	–	–	–	–	–	74,428	74,428
Total liabilities and equity	$ 212,508	$ 82,343	$ 51,237	$ 46,766	$ 43,174	$ 64,445	$ 107,641	$ 84,625	$ 520,114	$ 1,212,853
Off-balance sheet items										
Financial guarantees	$ 511	$ 2,986	$ 1,428	$ 2,768	$ 1,279	$ 1,792	$ 6,450	$ 1,486	$ 46	$ 18,746
Lease commitments	63	125	182	181	181	720	1,471	2,859	–	5,782
Commitments to extend credit	4,532	4,000	7,735	12,105	9,198	26,719	141,732	15,260	7,176	228,457
Other credit-related commitments	526	801	1,185	1,521	1,274	412	749	246	101,863	108,577
Other commitments	38	–	–	–	–	–	–	–	442	480
Total off-balance sheet items	$ 5,670	$ 7,912	$ 10,530	$ 16,575	$ 11,932	$ 29,643	$ 150,402	$ 19,851	$ 109,527	$ 362,042

(1) Trading debt securities classified as fair value through profit or loss have been included in the less than 1 month category as there is no expectation to hold these assets to their contractual maturity.

(2) A major portion of relationship-based deposits are repayable on demand or at short notice on a contractual basis while, in practice, these customer balances form a core base for our operations and liquidity needs, as explained in the preceding Deposit and funding profile.

(Millions of Canadian dollars)	Less than 1 month	1 to 3 months	3 to 6 months	6 to 9 months	9 to 12 months	1 year to 2 years	2 years to 5 years	5 years and greater	With no specific maturity	Total
	As at October 31, 2016									
Assets										
Cash and deposits with banks	$ 38,931	$ 342	$ 2	$ –	$ 192	$ –	$ –	$ –	$ 3,313	$ 42,780
Securities										
Trading (1)	98,843	5	18	–	24	40	117	6,183	46,062	151,292
Available-for-sale	1,648	4,854	2,011	1,810	1,687	8,869	25,709	36,587	1,626	84,801
Assets purchased under reverse repurchase agreements and securities borrowed	81,801	42,092	24,771	14,988	11,090	3,380	303	–	7,877	186,302
Loans (net of allowance for loan losses)	15,526	13,154	16,863	21,512	23,120	109,075	198,054	38,887	85,413	521,604
Other										
Customers' liability under acceptances	8,362	4,403	73	3	–	–	2	–	–	12,843
Derivatives	8,443	10,367	4,800	3,355	3,511	12,794	26,563	49,099	12	118,944
Other financial assets	28,659	741	484	222	62	43	38	414	1,372	32,035
Total financial assets	$ 282,213	$ 75,958	$ 49,022	$ 41,890	$ 39,686	$ 134,201	$ 250,786	$ 131,170	$ 145,675	$ 1,150,601
Other non-financial assets	1,259	887	130	295	237	2,579	1,824	2,991	19,455	29,657
Total assets	$ 283,472	$ 76,845	$ 49,152	$ 42,185	$ 39,923	$ 136,780	$ 252,610	$ 134,161	$ 165,130	$ 1,180,258
Liabilities and equity										
Deposits (2)										
Unsecured borrowing	$ 30,680	$ 35,333	$ 35,540	$ 16,684	$ 23,586	$ 34,044	$ 55,239	$ 15,123	$ 415,130	$ 661,359
Secured borrowing	1,545	4,788	4,947	5,700	2,290	7,256	20,660	8,569	–	55,755
Covered bonds	–	–	–	–	3,348	9,376	24,936	2,815	–	40,475
Other										
Acceptances	8,362	4,403	73	3	–	–	2	–	–	12,843
Obligations related to securities sold short	50,369	–	–	–	–	–	–	–	–	50,369
Obligations related to assets sold under repurchase agreements and securities loaned (3)	61,170	31,499	1,568	–	756	8	21	–	8,419	103,441
Derivatives	7,334	10,904	5,809	3,939	2,976	13,562	25,945	46,081	–	116,550
Other financial liabilities	22,700	2,212	375	125	218	154	290	4,762	482	31,318
Subordinated debentures	–	–	–	–	–	–	115	9,647	–	9,762
Total financial liabilities	$ 182,160	$ 89,139	$ 48,312	$ 26,451	$ 33,174	$ 64,400	$ 127,208	$ 86,997	$ 424,031	$ 1,081,872
Other non-financial liabilities	863	3,692	276	155	154	1,199	2,466	9,408	8,561	26,774
Equity	–	–	–	–	–	–	–	–	71,612	71,612
Total liabilities and equity	$ 183,023	$ 92,831	$ 48,588	$ 26,606	$ 33,328	$ 65,599	$ 129,674	$ 96,405	$ 504,204	$ 1,180,258
Off-balance sheet items										
Financial guarantees	$ 736	$ 2,255	$ 1,897	$ 3,199	$ 1,251	$ 3,010	$ 6,403	$ 79	$ 56	$ 18,886
Lease commitments	62	123	184	181	177	661	1,528	2,131	–	5,047
Commitments to extend credit	3,723	5,481	9,783	7,190	12,074	31,384	132,092	18,284	3,220	223,231
Other credit-related commitments	433	791	1,420	1,339	1,158	678	758	306	90,241	97,124
Other commitments	477	63	–	–	–	–	–	–	–	540
Total off-balance sheet items	$ 5,431	$ 8,713	$ 13,284	$ 11,909	$ 14,660	$ 35,733	$ 140,781	$ 20,800	$ 93,517	$ 344,828

(1) Trading debt securities classified as fair value through profit or loss have been included in the less than 1 month category as there is no expectation to hold these assets to their contractual maturity.

(2) A major portion of relationship-based deposits are repayable on demand or at short notice on a contractual basis while, in practice, these customer balances form a core base for our operations and liquidity needs, as explained in the preceding Deposit and funding profile.

(3) Amounts have been revised from those previously presented.

Contractual maturities of financial liabilities and off-balance sheet items – undiscounted basis

The following tables provide remaining contractual maturity analysis of our financial liabilities and off-balance sheet items. The amounts disclosed in the following table are the contractual undiscounted cash flows of all financial liabilities (e.g., par value or amount payable upon maturity). The amounts do not reconcile directly with those in our consolidated balance sheets as the table incorporates only cash flows relating to payments on maturity and do not recognize premiums, discounts or mark-to-market adjustments recognized in the instruments' carrying values as at the balance sheet date. Financial liabilities are based upon the earliest period in which they are required to be paid. For off-balance sheet items, the undiscounted cash flows potentially payable under financial guarantees and commitments to extend credit are classified on the basis of the earliest date they can be called.

Contractual maturities of financial liabilities and off-balance sheet items – undiscounted basis* **Table 69**

(Millions of Canadian dollars)	On demand	Within 1 year	1 year to 2 years	2 years to 5 years	5 years and greater	Total
	As at October 31, 2017					
Financial liabilities						
Deposits (1)	$ 372,108	$ 253,825	$ 52,026	$ 89,456	$ 22,280	$ 789,695
Other						
Acceptances	–	16,443	10	6	–	16,459
Obligations related to securities sold short	–	30,009	–	–	–	30,009
Obligations related to assets sold under repurchase agreements and securities loaned	8,171	134,904	–	12	–	143,087
Other liabilities	1,124	26,730	78	261	3,553	31,746
Subordinated debentures	–	–	106	207	8,952	9,265
	381,403	461,911	52,220	89,942	34,785	1,020,261
Off-balance sheet items						
Financial guarantees (2)	$ 18,569	$ 177	$ –	$ –	$ –	$ 18,746
Lease commitments	–	732	720	1,471	2,859	5,782
Commitments to extend credit (2)	187,078	41,369	9	1	–	228,457
	205,647	42,278	729	1,472	2,859	252,985
Total financial liabilities and off-balance sheet items	$ 587,050	$ 504,189	$ 52,949	$ 91,414	$ 37,644	$ 1,273,246

(Millions of Canadian dollars) (3)	On demand	Within 1 year	1 year to 2 years	2 years to 5 years	5 years and greater	Total
	As at October 31, 2016					
Financial liabilities						
Deposits (1)	$ 358,254	$ 221,852	$ 50,293	$ 100,295	$ 25,422	$ 756,116
Other						
Acceptances	–	12,842	–	1	–	12,843
Obligations related to securities sold short	–	50,366	–	–	–	50,366
Obligations related to assets sold under repurchase agreements and securities loaned	8,420	95,005	8	21	–	103,454
Other liabilities	445	24,198	112	289	4,761	29,805
Subordinated debentures	–	–	–	115	9,646	9,761
	367,119	404,263	50,413	100,721	39,829	962,345
Off-balance sheet items						
Financial guarantees (2)	$ 18,689	$ 197	$ –	$ –	$ –	$ 18,886
Lease commitments	–	727	661	1,528	2,131	5,047
Commitments to extend credit (2)	181,496	41,671	5	59	–	223,231
	200,185	42,595	666	1,587	2,131	247,164
Total financial liabilities and off-balance sheet items	$ 567,304	$ 446,858	$ 51,079	$ 102,308	$ 41,960	$ 1,209,509

* This table represents an integral part of our 2017 Annual Consolidated Financial Statements.

(1) A major portion of relationship-based deposits are repayable on demand or at short notice on a contractual basis while, in practice, these customer balances form a core base for our operations and liquidity needs, as explained in the preceding Deposit and funding profile.

(2) We believe that it is highly unlikely that all or substantially all of these guarantees and commitments will be drawn or settled within one year, and contracts may expire without being drawn or settled. The management of the liquidity risk associated with potential extensions of funds is outlined in the preceding Risk measurement section.

(3) Amounts have been revised from those previously presented.

Insurance risk

Insurance risk refers to the potential financial loss that may arise where the amount, timing and/or frequency of benefit payments under insurance and reinsurance contracts are different than expected. Insurance risk is distinct from those risks covered by other parts of our risk management framework (e.g., credit, market and operational risk) where those risks are ancillary to, or accompany the risk transfer. The four insurance sub-risks are: morbidity, mortality, longevity and travel risk.

Our Insurance Risk Framework provides an overview of our processes and tools for identifying, assessing, managing, mitigating and reporting on the insurance risks that face the organization. These are also supported by our robust three lines of defence governance structure.

Execution risk drivers

Operational risk

Operational risk is the risk of loss or harm resulting from people, inadequate or failed internal processes and systems or from external events.

Operational risk is inherent in all our activities, including the practices and controls used to manage other risks. Failure to manage operational risk can result in direct or indirect financial loss, reputational impact, regulatory censure, or failure in the management of other risks such as credit or market risk.

Our management of operational risk follows our established three lines of defence governance model. This model encompasses the organizational roles and responsibilities for a co-ordinated enterprise-wide approach for the management of operational risk. For further details, refer to the Risk management – Enterprise risk management section.

Operational Risk Framework

We have put in place an Enterprise Operational Risk Framework, which is founded on the principles of our Enterprise Risk Management Framework and sets out the processes to identify, assess, manage, monitor and report operational risk. The processes are established through the following core programs:

- *Internal events* – Internal events are specific instances where operational risk leads to or could have led to an unintended, identifiable impact. The internal events program provides a structured and consistent approach for collecting and analyzing internal event data to facilitate the analysis of the operational risk events affecting us.
- *External events* – External events are operational risk events that affect institutions other than RBC. External event monitoring and analysis is critical to gain awareness of operational risk experience within the industry and to identify emerging industry trends.
- *Business Environment and Internal Control Factors (BEICF) Assessments* – BEICF Assessments are conducted to improve business decision-making by gaining awareness of the key risks and the strengths and vulnerabilities of internal controls. Key BEICF Assessment processes include: risk and control self-assessments conducted at both enterprise and business levels; change initiatives and new/amended product assessments conducted to ensure understanding of the risk and reward trade-off for initiatives (e.g., new products, acquisitions, changes in business processes, implementation of new technology, etc.) and that we do not assume risks not aligned with our risk appetite.
- *Scenario analysis* – Scenario analysis is a structured and disciplined process for making reasonable assessments of infrequent, yet plausible, severe operational risk events. Understanding how vulnerable we are to such "tail risks" identifies mitigating actions and informs the determination of related operational risk thresholds as part of the articulation of operational risk appetite.
- *BEICF monitoring* – BEICF monitoring is conducted on an ongoing basis through key risk indicators (KRIs) and other assurance/monitoring programs (e.g., business unit monitoring, second line of defence monitoring, audit results, etc.).

Conclusions from the operational risk programs enable learning based on "what has happened to us, could it happen again elsewhere in RBC and what controls do we need to amend or implement," support the articulation of operational risk appetite and are used to inform the overall level of exposure to operational risk, which defines our operational risk profile. The profile includes significant operational risk exposures, potential new and emerging exposures and trends, and overall conclusions on the control environment and risk outlook. We proactively identify and investigate corporate insurance opportunities to mitigate and reduce potential future impacts of operational risk.

We consider risk/reward decisions in striking the balance between accepting potential losses versus incurring costs of mitigation, the expression of which is in the form of our operational risk appetite. Our operational risk appetite is established at the board level and cascaded throughout each of our business segments.

Management reports have been implemented at various levels in order to support proactive management of operational risk and transparency of risk exposures. Reports are provided on a regular basis and provide detail on the main drivers of the risk status and trend for each of our business segments and RBC overall. In addition, changes to the operational risk profile that are not aligned to our business strategy or operational risk appetite are identified and discussed.

Our operations expose us to many different operational risks, which may adversely affect our businesses and financial results. The following list is not exhaustive, as other factors could also adversely affect our results.

Risk	Description
Information Technology and Cyber Risks	We use information technology for business operations and the enablement of strategic business goals and objectives. Information technology risk is the risk to our business associated with the use, ownership, operation, involvement, influence and adoption of information technology within the enterprise. It consists of information technology related events (e.g., cybersecurity incidents, including data breaches) that could have a material adverse impact on our business. Such events could result in business interruption, service disruptions, theft of intellectual property and confidential information, litigation and reputational damage. To manage our information technology risk, we have established an enterprise-wide Information Technology Risk Management Framework and we continue to develop advancements in cyber defence capabilities to support our business model and protect our clients.
Third Party Risk	Failing to effectively manage our service providers may expose us to service disruptions, regulatory action, financial loss, litigation or reputational damage. Third-party and outsourcing risk has received increased oversight from regulators and attention from the media. We formalized and standardized our expectations of our suppliers with a principles-based supplier code of conduct to ensure their behaviour aligns with our standards in the following key areas: business integrity, responsible business practices, responsible treatment of individuals, and the environment.
Processing and Execution Risk	Processing and execution risk is the risk of failure to effectively design, implement and execute a process. Exposure to this risk is global, existing in all of our locations and operations, and in our employee's actions. Examples of processing and execution events range from selecting the wrong interest rates, duplicating wire payment instructions, processing a foreign exchange transaction incorrectly, underinsuring a property and incorrectly investing funds. The potential impacts of such events include financial loss, legal and regulatory consequences and reputational damage. When identified, these situations are assessed, analyzed and mitigating actions are undertaken.
Fraud Risk	Fraud risk is defined as the risk of intentional unauthorized activities designed to obtain benefits either from us or assets under our care, or using our products. Fraud can be initiated by one or more parties who can include employees, potential or existing clients, agents, suppliers or outsourcers, or other external parties. We have extensive professional resources allocated for the recovery of lost assets and the improvement of loss avoidance through both enhanced intelligence and aggressive pursuit of those who attack enterprise assets.
Model Risk	The use of models plays an important role in many of our business activities. We use a variety of models for many purposes, including the valuation of financial products, risk measurement and management of different types of risk. Model risk is the risk of error in the design, development, implementation or subsequent use of models. We have established an enterprise-wide Model Risk Management Policy, including principles, policies and procedures, roles and responsibilities to manage model risk. One of the key factors in the policy to mitigate model risk is independent validation.

Operational risk capital

We received approval from OSFI on May 10, 2016 for the use of the Advance Measurement Approach (AMA) for operational risk capital measurement subject to the application of a Standardized Approach (TSA) floor. We commenced reflecting operational risk capital under the AMA in the third quarter of 2016. As such, we currently perform parallel runs of the TSA and the AMA of determining operational risk capital. Under TSA, operational risk capital is determined based on an OSFI-established percentage of 3 years' average gross income for pre-determined industry standardized business activities. Under AMA, operational risk capital is determined by using our internal Operational Risk Measurement System, which includes internal loss experience, external loss experience, scenario analysis, and Business Environment Internal Control Factors. RBC Bank (Georgia), RBC Caribbean, and City National will continue using TSA. RBC Insurance (including insurance recoveries) is not in the scope of operational risk capital calculations. We do not account for mitigation through insurance or any other risk transfer mechanism in our AMA model.

Operational risk loss events

During 2017, we did not experience any material operational risk loss event. For further details on our contingencies, including litigation, refer to Notes 25 and 26 of our 2017 Annual Consolidated Financial Statements.

Regulatory compliance risk

Regulatory compliance risk is the risk of potential non-conformance with laws, rules, regulations and prescribed practices in any jurisdiction in which we operate. Issues regarding compliance with laws and regulations can arise in a number of areas in a large complex financial institution such as RBC, and are often the result of inadequate or failed internal processes, people or systems.

Laws and regulations are in place to protect the financial and other interests of our clients, investors and the public. As a large-scale global financial institution, we are subject to numerous laws and to extensive and evolving regulation by governmental agencies, supervisory authorities and self-regulatory organizations in Canada, the U.S., Europe and other jurisdictions in which we operate. In recent years, such regulation has become increasingly extensive and complex. In addition, the enforcement of regulatory matters has intensified. Recent resolution of such matters involving other global financial institutions have involved the payment of substantial penalties, agreements with respect to future operation of their business, actions with respect to relevant personnel and guilty pleas with respect to criminal charges.

Operating in this increasingly complex regulatory environment and intense regulatory enforcement environment, we are and have been subject to a variety of legal proceedings, including civil claims and lawsuits, criminal charges, regulatory examinations, investigations, audits and requests for information by various governmental regulatory agencies and law enforcement authorities in various jurisdictions, and we anticipate that our ongoing business activities will give rise to such matters in the future. Changes to laws, including tax laws, regulations or regulatory policies, as well as the changes in how they are interpreted, implemented or enforced, could adversely affect us, for example, by lowering barriers to entry in the businesses in which we operate, increasing our costs of compliance or limiting our activities and ability to execute our strategic plans. Further, there is no assurance that we always will be or will be deemed to be in compliance with laws, regulations or regulatory policies. Accordingly, it is possible that we could receive a judicial or regulatory judgment or decision that results in fines, damages, penalties, and other costs or injunctions, criminal convictions or loss of licences or registrations that would damage our reputation and negatively impact our ability to conduct some of our businesses and our earnings. In addition, we are subject to litigation arising in the ordinary course of our business and the adverse resolution of any litigation could have a significant adverse effect on our results or could give rise to significant reputational damage, which in turn could impact our future business prospects.

Global compliance has developed a Regulatory Compliance Management Framework designed to manage and mitigate the regulatory compliance risks associated with failing to comply with, or adapt to, current and changing laws and regulations in the jurisdictions in which we operate.

Regulatory compliance risk includes the regulatory risks associated with financial crime (which includes, but is not limited to, money laundering, bribery and sanctions), privacy, market conduct, consumer protection, business conduct and prudential requirements. Specific compliance policies, procedures and supporting frameworks have been developed to manage regulatory compliance risk.

Strategic risk drivers

Strategic risk

Strategic risk is the risk that the enterprise or particular business areas will make inappropriate strategic choices, or will be unable to successfully implement selected strategies or related plans and decisions. Business strategy is the major driver of our risk profile and consequently the strategic choices we make in terms of business mix determine how our risk profile changes.

Responsibility for selecting and successfully implementing business strategies is mandated to the individual heads of the businesses. Oversight of strategic risk is the responsibility of the heads of the business segments and their operating committees, the Enterprise Strategy Office, Group Executive, and the Board of Directors. The Enterprise Strategy group supports the management of strategic risk through the strategic planning process (articulated within our Enterprise Strategic Planning Policy) ensuring alignment across our business, financial, capital and risk planning.

Our annual business portfolio review and project approval request processes help identify and mitigate strategic risk by ensuring strategies for new initiatives, lines of business, and the enterprise as a whole align with our risk appetite and risk posture. GRM provides oversight of strategic risk by providing independent review of these processes, establishing enterprise risk frameworks, and independently monitoring and reporting on the level of risk established against our risk appetite metrics in accordance with the three lines of defence governance model.

For details on the key strategic priorities for our business segments, refer to the Business segment results section.

Reputation risk

Reputation risk is the risk that an activity undertaken by an organization or its representatives will impair its image in the community or lower public confidence in it, resulting in the loss of business, legal action or increased regulatory oversight.

Reputation risk can arise from a number of events and primarily occurs in connection with credit risk, regulatory, legal and operational risks and failure to maintain strong risk conduct. Operational failures and non-compliance with laws and regulations can have a significant reputational impact on us.

Our Reputation Risk Framework provides an overview of our approach to the management of this risk. It focuses on our organizational responsibilities, and controls in place to mitigate reputation risks.

The following principles guide our management of reputation risk:

- We must operate with integrity at all times in order to sustain a strong and positive reputation.
- Protecting our reputation is the responsibility of all our employees, including senior management, and this responsibility extends to the Board of Directors.

Legal and regulatory environment risk

Legal and regulatory environment risk is the risk that new or modified laws and regulations, and the interpretation or application of those laws and regulations, will negatively impact the way in which we operate, both in Canada and abroad. The full impact of some of these changes on our business will not be known until final rules are implemented and market practices have developed in response. We continue to respond to these and other developments and are working to minimize any potential adverse business or economic impact. The following provides a high-level summary of some of the key regulatory changes that have potential to increase our operational, compliance, and technology costs and to impact our profitability, as well as to potentially increase the cost and complexity of our operations.

Canadian Housing Market and Consumer Debt
The Government of Canada (GoC) continues to express concerns with the level and sustainability of Canadian household debt. A number of measures to address these concerns have been introduced by both the federal government and a number of provinces, including changes to federal mortgage rules (e.g. changes to OSFI B-20 Guideline). Going forward, other initiatives continue to be explored, such as an assessment by the Department of Finance on a lender risk-sharing model.

Payments Issues
The federal government is engaged in several initiatives that could have an impact on the payment system in Canada. This includes the following: an ongoing review of the interchange framework; a consultation process on the regulatory framework for the retail payments system in Canada; and initiatives under consideration by Payments Canada to modernize the payments system in Canada.

Other Regulatory Initiatives Impacting Financial Services in Canada
The federal government continues to assess a number of issues relating to consumer protection. Previously withdrawn legislative proposals to update the consumer protection framework and to clarify federal jurisdiction in this area continue to be reviewed by the government. In addition, federal regulatory agencies are also undertaking a review of sales practices at Canadian banks and will be providing reports to the government on these issues. Provincial consumer protection initiatives are also being monitored to assess their possible implications from a financial services perspective.

Other regulatory initiatives include a review of the deposit insurance framework by the Department of Finance and the Canada Deposit Insurance Corporation, consultations by the Financial Consumer Agency of Canada on indirect auto lending, and initiatives by the Canadian Securities Administrators to regulate market conduct activities relating to OTC derivatives products.

Negotiations on North American Free Trade Agreement (NAFTA)
Canada, Mexico and the United States are currently engaged in negotiations on potential changes to NAFTA. The existing chapters in NAFTA such as those relating to financial services, cross-border trade, and temporary entry rules, could be changed as a result of these discussions. In addition, there may be efforts made to update the agreement to address new areas like electronic commerce. While the outcome of the negotiations remain unclear, changes to NAFTA may adversely affect certain of our businesses, either directly or indirectly through adverse effects on portions of the Canadian and U.S. economies.

United States Regulatory Initiatives
Policymakers are beginning to consider financial regulatory reforms that could result in reduced cost and complexity of U.S. regulations. These include possible reforms to the Volcker rule that could simplify compliance requirements regarding proprietary trading activity and investments in private equity and hedge funds; revisions to the new fiduciary rule that could have implications for financial services firms, investors and markets; potential changes to the framework for the regulation of OTC derivatives; and ongoing adjustments to key aspects of the capital, leverage, liquidity, and oversight framework in the U.S. (e.g. foreign bank organization rules; comprehensive capital analysis and review requirements; single counterparty credit limits; total loss absorbing capacity rules). In addition, U.S. policymakers are considering reforms to the tax code that could be beneficial in terms of lowering corporate tax rates; however, they are also considering measures to raise revenues to pay for those lower rates, including measures that could target the financial sector and many of its employees, such as: reductions in the deductibility of interest on corporate debt, of mortgage interest, and of state and local taxes; revisions to the tax exemption for interest on municipal debt; changes to tax credits for low-income housing and renewable fuels; changes to the tax treatment of derivatives; and a large-bank tax and/or financial transactions tax. The impact of the Tax Reform Framework, if enacted, could include a reduction in our deferred tax asset and tax reductions on future earnings. Congress may opt for a more modest, and less costly, package of reforms.

Regulatory Capital and Related Requirements
We continue to monitor and prepare for developments related to regulatory capital. The Basel Committee on Banking Supervision (BCBS) has issued a number of proposed revisions and new measures that would reform the manner in which banks calculate, measure and report regulatory capital and related risks, including with respect to the use of banks' own internal risk models. The impact of these proposals on us will depend on the final standards adopted by the BCBS and how these standards are implemented by our regulators. For further details on regulatory capital and related requirements, refer to the Capital Management section.

Canadian Bail-in Regime
Bail-in regimes are being implemented in a number of jurisdictions in an effort to limit taxpayer exposure to losses of a failing institution and ensure the institution's shareholders and creditors remain responsible for bearing such losses. On June 22, 2016, legislation came into force, amending certain federal statutes pertaining to banks to create a bank recapitalization or "bail-in" regime for the six domestic systemically important banks (D-SIBs) in Canada. On June 16, 2017, the Department of Finance announced the publication of draft regulations under the Canada Deposit Insurance Corporation (CDIC) Act and the Bank Act, which provide key details of the conversion, issuance and compensation regimes for bail-in instruments issued by D-SIBs. The proposed regulations provide that, pursuant to the CDIC Act, in circumstances when the Superintendent of Financial Institutions has determined that a bank may no longer be viable, the Governor in Council may, upon a recommendation of the Minister of Finance that he or she is of the opinion that it is in the public interest to do so, grant an order directing the CDIC to convert all or a portion of certain shares and liabilities of that bank into common shares. These changes are not expected to have a material impact on our cost of long-term unsecured funding.

Total Loss Absorbing Capacity (TLAC)
On June 16, 2017, OSFI released a draft guideline on TLAC, which will apply to Canada's D-SIBs as part of the Federal Government's bail-in regime. The draft guideline is consistent with the TLAC standard released on November 9, 2015 by the FSB for institutions designated as global systemically important banks (G-SIBs), but tailored to the Canadian context. The standards are intended to address the sufficiency of a systemically important bank's loss absorbing capacity in supporting its recapitalization in the event of its failure. TLAC is defined as the aggregate of Tier 1 capital, Tier 2 capital, and other TLAC instruments, which allow conversion in whole or in part into common shares under the CDIC Act and meet all of the eligibility criteria under the guideline. We are expected to comply with the disclosure requirements beginning the first quarter of 2019 and the remaining TLAC standard requirements by November 1, 2021. The final guidance is expected to be issued in 2018. We do not anticipate any challenges in meeting these TLAC requirements.

Step-In Risk
On October 25, 2017, the BCBS finalized its guidelines on the identification and management of step-in risk. Step-in risk is the risk that a bank may provide financial support to an unconsolidated entity beyond their contractual obligations, should the entity experience financial distress,

in order to minimize any potential reputational risk to the bank. The guidelines aim to strengthen the oversight and regulation surrounding systemic risks arising from a bank's interaction with shadow banking entities. The guidelines provide that banks will be required to at a minimum annually self-assess their step-in risk based on a number of indicators, including the impact on liquidity and capital positions of stepping in to provide support to an unconsolidated entity. These new guidelines do not impose an automatic liquidity or capital charge for step-in risk but do require banks and supervisors to take appropriate actions to respond to and mitigate material step-in risk as outlined in the guideline. We are reviewing these new guidelines along with future OSFI guidance and incorporating them into our risk management activities as recommended by BCBS. The BCBS expects banks and supervisors to implement the guidelines no later than 2020.

U.K. and European Regulatory Reform

The revised directive and regulation on Markets in Financial Instruments (MiFID II/MiFIR) become effective January 2018 and will have a significant technological and procedural impact for certain businesses operating in the European Union. The reforms will introduce changes to pre- and post-trade transparency, market structure, trade and transaction reporting, algorithmic trading, and conduct of business. The U.K. is in negotiations to exit the European Union. Until those negotiations are concluded, and the resulting changes are implemented, the U.K. will remain a European Union Member State, subject to all European Union legislation.

Other regulatory initiatives include: the General Data Protection Regulation, effective May 2018, introducing significant obligations on data handling globally; the extension of the Senior Managers Regime to all U.K. regulated firms from 2018; the Benchmarks Regulation impacting users of, contributors to, and administrators of benchmarks; and the publication of the Foreign Exchange Global Code, setting out global principles of good practice in foreign exchange markets.

Competitive risk

The competition for clients among financial services companies in the markets in which we operate is intense. Client loyalty and retention can be influenced by a number of factors, including new technology used or services offered by our competitors, relative service levels and prices, product and service attributes, our reputation, actions taken by our competitors, and adherence with competition and anti-trust laws. Other companies, such as insurance companies and non-financial companies, are increasingly offering services traditionally provided by banks. This competition could also reduce net interest income and fee revenue and adversely affect our results.

We identify and assess competitive risks as part of our overall risk management process. Our products and services are regularly benchmarked against existing and potential competitors. In addition, we regularly conduct risk reviews of our products, services, alliances and acquisitions as well as ensure adherence to competition and anti-trust laws. Our annual strategy-setting process also plays an integral role in managing competitive risk.

Macroeconomic risk drivers

Systemic risk

Systemic risk is the risk that the financial system as a whole, or a major part of it – either in an individual country, a region, or globally – is put in real and immediate danger of collapse or serious damage with the likelihood of material damage to the economy, and that this will result in financial, reputation or other risks for us.

Our earnings are significantly affected by the general business and economic conditions in the geographic regions in which we operate. These conditions include consumer saving and spending habits as well as consumer borrowing and repayment patterns, business investment, government spending, exchange rates, sovereign debt risks, the level of activity and volatility of the capital markets, strength of the economy and inflation. For example, an extended economic downturn may result in high unemployment and lower family income, corporate earnings, business investment and consumer spending, and could adversely affect the demand for our loan and other products and result in higher provisions for credit losses. Given the importance of our Canadian operations, an economic downturn in Canada or in the U.S. impacting Canada would largely affect our personal and business lending activities in our Canadian banking businesses, including mortgages and credit cards, and could significantly impact our results of operations.

Our earnings are also sensitive to changes in interest rates, which have increased in Canada and the U.S. over the last year but remain historically low. A continuing low interest rate environment in Canada, the U.S. and globally would result in net interest income being unfavourably impacted by spread compression largely in Personal & Commercial Banking and Wealth Management. While a further increase in interest rates would benefit our businesses that are currently impacted by spread compression, a significant increase in interest rates could also adversely impact household balance sheets. This could result in credit deterioration which might negatively impact our financial results, particularly in some of our Personal & Commercial Banking and Wealth Management businesses.

Deterioration in global capital markets could result in volatility that would impact results in Capital Markets while in Wealth Management, weaker market conditions would lead to lower average fee-based client assets and transaction volumes. In addition, worsening financial and credit market conditions may adversely affect our ability to access capital markets on favourable terms and could negatively affect our liquidity, resulting in increased funding costs and lower transaction volumes in Capital Markets and Investor & Treasury Services.

Systemic risk is considered to be the least controllable risk facing us. Our ability to mitigate this risk when undertaking business activities is limited, other than through collaborative mechanisms between key industry participants, and, as appropriate, the public sector, to reduce the frequency and impact of these risks. The two most significant measures in mitigating the impact of systemic risk are diversification and stress testing.

Our diversified business portfolios, products, activities and funding sources help mitigate the potential impacts from systemic risk. We also mitigate systemic risk by establishing risk limits to ensure our portfolio is well-diversified, and concentration risk is reduced and remains within our risk appetite.

Stress testing involves consideration of the simultaneous movements in a number of risk factors. It is used to ensure our business strategies and capital planning are robust by measuring the potential impacts of credit, market, liquidity and funding and operational risks on us, under adverse economic conditions. Our enterprise-wide stress testing program uses stress scenarios featuring a range of severities based on plausible adverse economic and financial market events. These stress scenarios are evaluated across the organization, and results are integrated to develop an enterprise-wide view of the impacts on our financial results and capital requirements. For further details on our stress testing, refer to the Risk management – Enterprise risk management section.

Overview of other risks

In addition to the risks described in the Risk management section, there are other risk factors, described below, which may adversely affect our businesses and financial results. The following discussion is not exhaustive as other factors could also adversely affect our results.

Government fiscal, monetary and other policies

Our businesses and earnings are affected by monetary policies that are adopted by the Bank of Canada, the Fed in the U.S., the ECB in the European Union and monetary authorities in other jurisdictions in which we operate; as well as the fiscal policies of the governments of Canada, the U.S., Europe and such other jurisdictions. Such policies can also adversely affect our clients and counterparties in Canada, the U.S. and internationally, which may increase the risk of default by such clients and counterparties.

Tax risk and transparency

Tax risk refers to the risk of loss related to unexpected tax liabilities. The tax laws and systems that are applicable to RBC are complex and wide ranging. As a result, we ensure that any decisions or actions related to tax always reflect our assessment of the long-term costs and risks involved, including their impact on our relationship with clients, shareholders, and regulators, and our reputation.

Our approach to tax is governed by our Taxation Policy and Risk Management Framework, and reflects the fundamentals of our Risk Pyramid. Oversight of our tax policy and the management of tax risk is the responsibility of Group Executive, the CFO and the Senior Vice President, Taxation. We discuss our tax position with the Audit Committee on a regular basis and discuss our tax strategy with the Audit and Risk Committees.

Our tax strategy is designed to ensure transparency and support our business strategy, and is aligned with our corporate vision and values. We seek to maximize shareholder value by ensuring that our businesses are structured in a tax-efficient manner while considering reputational risk by being in compliance with all laws and regulations. Our framework seeks to ensure that we:

- Act with integrity and in a straightforward, open and honest manner in all tax matters;
- Ensure tax strategy is aligned with our business strategy supporting only bona fide transactions with a business purpose and economic substance;
- Ensure all intercompany transactions are conducted on arm's length terms;
- Ensure our full compliance and full disclosure to tax authorities of our statutory obligations; and
- Endeavour to work with the tax authorities to build positive long-term relationships and where disputes occur, address them constructively.

With respect to assessing the needs of our clients, we consider a number of factors including the purposes of the transaction. We seek to ensure that we only support bona fide client transactions with a business purpose and economic substance. Should we become aware of client transactions that are aimed at evading their tax obligations, we will not proceed with the transactions.

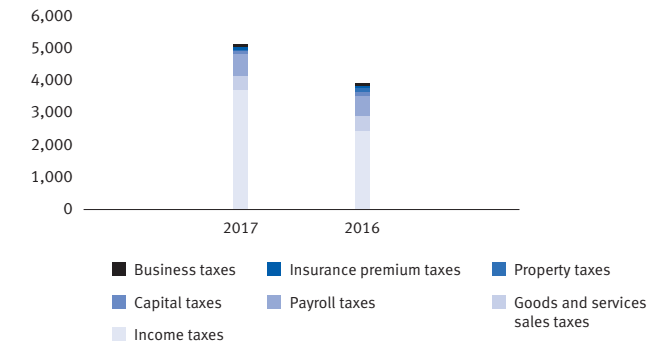
We operate in 37 countries worldwide. Our activities in these countries are subject to both Canadian and international tax legislation and other regulations, and are fully disclosed to the relevant tax authorities. The Taxation group and GRM both regularly review the activities of all entities to ensure compliance with tax requirements and other regulations.

Given that we operate globally, complex tax legislation and accounting principles have resulted in differing legal interpretations between the respective tax authorities we deal with and ourselves, and we are at risk of tax authorities disagreeing with prior positions we have taken for tax purposes. When this occurs, we are committed to an open and transparent dialogue with the tax authorities to ensure a quick assessment and prompt resolution of the issues where possible. Failure to adequately manage tax risk and resolve issues with tax authorities in a satisfactory manner could adversely impact our results, potentially to a material extent in a particular period, and/or significantly impact our reputation.

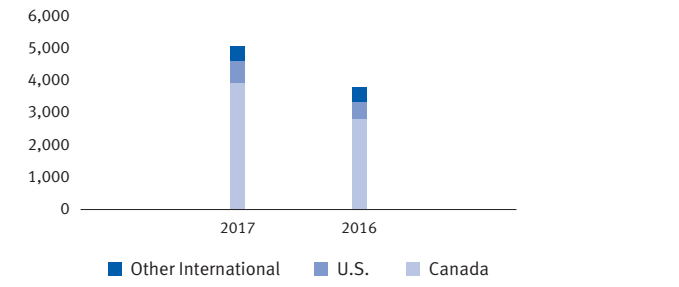
Tax contribution

In 2017, total income and other tax expense, including income taxes in the Consolidated Statements of Comprehensive Income and Changes in Equity, to various levels of governments globally totalled $5.1 billion (2016 – $3.8 billion). In Canada, total income and other tax expense for the year ended October 31, 2017 to various levels of government totalled $3.9 billion (2016 – $2.8 billion).

Income and other tax expense – by category
(Millions of Canadian dollars)



Income and other tax expense – by geography
(Millions of Canadian dollars)



For further details on income and other tax expense, refer to the Financial performance section.

Environmental and social risk

Environmental and social (E&S) risk is the risk that an environmental or social issue associated with a client, transaction, product, supplier or activity will create a risk of loss of financial, operational, legal and/or reputational value to RBC. E&S issues include, but are not limited to: site contamination, waste management, land and resource use, biodiversity, water quality and availability, climate change, environmental regulation, human rights, Indigenous Peoples' rights and consultation, and community engagement. GRM is responsible for developing policies to identify, assess, monitor and report on E&S risk, and for their regular review and update. E&S risk policies seek to identify sectors, clients and business activities exposed to E&S risk; apply enhanced due diligence and escalation procedures; and establish requirements to manage,

mitigate and monitor E&S risk. Business segments and corporate functions are responsible for incorporating E&S risk management requirements within their operations.

RBC recognizes the importance of E&S risk management practices and processes and is committed to the regular and transparent disclosure of these. As a signatory to the Equator Principles (EP), we report annually on projects assessed for E&S risk according to the EP framework. As a signatory to the Carbon Disclosure Project, we annually disclose information on climate change risks as well as our energy and emissions performance. In 2017, we published our first Modern Slavery Act Statement, which sets out the steps that RBC has taken to ensure that slavery and human trafficking are not taking place in the supply chains or our businesses. A number of companies in our RBC Global Asset Management business and BlueBay Asset Management LLP are signatories to the United Nations Principles for Responsible Investment and they report annually on their responsible investment activities. Their approach integrates environmental, social and governance issues into the investment process when doing so may have a material impact on investment risk or return. RBC Europe Limited is a signatory to the Green Bond Principles and they report annually on green bond underwriting activities. RBC Corporate Citizenship sets corporate environmental strategy and reports annually on our performance in the Corporate Citizenship Report and Public Accountability Statement.

RBC believes we have a role to play in the transition to a clean, low-carbon economy. We are encouraged by the recent efforts of the Financial Stability Board's (FSB) Task Force on Climate-related Financial Disclosures (TCFD) and are participants in a pilot-test of the TCFD recommendations, which will be coordinated by the United Nations Environment Programme – Finance Initiative (UNEP–FI). We continue to investigate and assess climate-related risks and seek to develop and continually improve our climate-related financial disclosures.

Other factors

Other factors that may affect our results include changes in government trade policy, changes in accounting standards, including their effect on our accounting policies, estimates and judgments, currency and interest rate movements in Canada, the U.S., and other jurisdictions in which we operate, changes to our credit ratings, the timely and successful development of new products and services, technological changes, effective design, implementation and execution of processes and their associated controls, fraud by internal and external parties, the possible impact on our business from disease or illness that affects local, national or global economies, disruptions to public infrastructure, including transportation, communication, power and water, international conflicts and other political developments including those relating to the war on terrorism, and our success in anticipating and managing the associated risks.

We caution that the foregoing discussion of risk factors, many of which are beyond our control, is not exhaustive and other factors could also affect our results.

Capital management

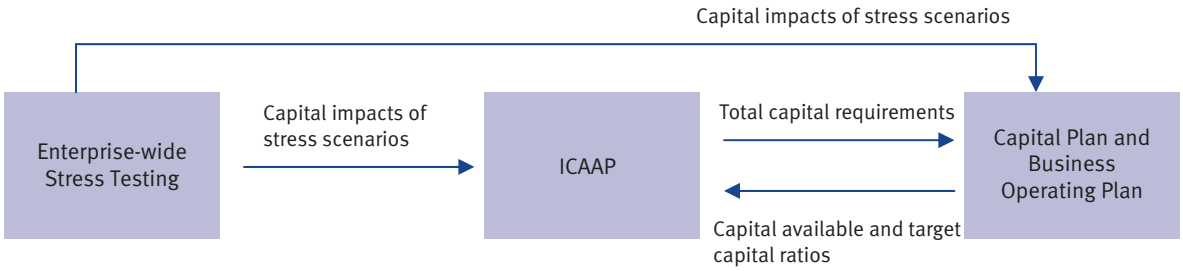
We actively manage our capital to maintain strong capital ratios and high ratings while providing strong returns to our shareholders. In addition to the regulatory requirements, we consider the expectations of credit rating agencies, depositors and shareholders, as well as our business plans, stress tests, peer comparisons and our internal capital ratio targets. Our goal is to optimize our capital usage and structure, and provide support for our business segments and clients and generate better returns for our shareholders, while protecting depositors and senior creditors.

Capital management framework

Our capital management framework establishes policies and processes for defining, measuring, raising and investing all forms of capital in a co-ordinated and consistent manner. It sets our overall approach to capital management, including guiding principles and roles and responsibilities relating to capital adequacy and transactions, dividends, solo capital and management of risk-weighted assets (RWA) and leverage ratio exposures. We manage and monitor capital from several perspectives, including regulatory capital, economic capital and solo capital.

Our capital planning process is dynamic and involves various teams including Finance, Corporate Treasury, GRM, Economics and our businesses, and covers internal capital ratio targets, potential capital transactions as well as projected dividend payouts and share repurchases. This process considers our business operating plans, enterprise-wide stress test and Internal Capital Adequacy Assessment Process (ICAAP), regulatory capital and accounting changes, internal capital requirements, rating agency metrics and solo capital.

Our capital plan is established on an annual basis and is aligned with the management actions included in the annual business operating plan, which includes forecast growth in assets and earnings taking into account our business strategies, the projected market and economic environment, and peer positioning. This includes incorporating potential capital transactions based on our projected internal capital generation, business forecasts, market conditions and other developments, such as accounting and regulatory changes that may impact capital requirements. All of the components in the capital plan are monitored throughout the year and are revised as deemed appropriate.



Our Enterprise-wide stress test and annual ICAAP provide key inputs for capital planning, including setting internal capital ratio targets. The stress scenarios are evaluated across the organization, and results are integrated to develop an enterprise-wide view of financial impacts and capital requirements, which in turn facilitate the planning of mitigating actions to absorb adverse events. ICAAP assesses capital adequacy and requirements covering all material risks, with a cushion for plausible contingencies. In accordance with OSFI guideline, major components of our ICAAP process include comprehensive risk assessment, stress testing, capital assessment and planning (both economic and regulatory), Board and senior management oversight, monitoring and reporting and internal control review.

Our internal capital targets are established to maintain robust capital positions in excess of OSFI's Basel III "all-in" regulatory targets. The stress test results of our Enterprise-wide stress testing and ICAAP are incorporated into the OSFI capital conservation buffer and D-SIBs surcharge, with a view to ensuring the bank has adequate capital to underpin risks and absorb losses under all plausible stress scenarios given our risk profile and appetite. In addition, we include a discretionary cushion on top of OSFI regulatory targets to maintain capital strength for forthcoming regulatory and accounting changes, peer comparatives, rating agencies sensitivities and solo capital level.

The Board of Directors is responsible for the ultimate oversight of capital management, including the annual review and approval of the capital plan. ALCO and GE share responsibility for capital management and receive regular reports detailing our compliance with approved limits and guidelines. The Risk Committee annually approves the Capital Management Framework. The Audit and Risk Committees jointly approve the ICAAP process. The Audit Committee is also responsible for the ongoing review of internal controls over capital management.

Basel III

Our consolidated regulatory capital requirements are determined by guidelines issued by OSFI, which are based on the minimum Basel III capital ratios adopted by the Basel Committee on Banking Supervision (BCBS).

The BCBS sets out the Basel III transitional requirements for Common Equity Tier 1 capital (CET1), Tier 1 capital and Total capital ratios at 5.75%, 7.25% and 9.25%, respectively for 2017, which would be required to be fully phased-in ("all-in") to 7.0%, 8.5% and 10.5%, respectively, by January 1, 2019 (including minimums plus capital conservation buffer of 2.5%). However, other than providing phase-out rules for non-qualifying capital instruments, OSFI required Canadian banks to meet the BCBS Basel III "all-in" targets for CET1, Tier 1 capital and Total capital ratios in 2013. Effective January 1, 2016, we were required to include an additional 1% risk-weighted capital surcharge to each tier of capital for the above all-in requirements given our designation as a D-SIB by OSFI in 2013 (similar to five other Canadian banks designated as D-SIBs).

In 2014, OSFI also advised Canadian banks that it would begin phasing in the Credit Valuation Adjustment (CVA) risk capital charge required under the Basel III framework. In accordance with OSFI's guidance, there are two possible options to phase in the CVA capital charge. Under the option selected by RBC, the 2017 CVA capital charge for CET1, Tier 1 capital and Total capital was 72%, 77%, and 81%, respectively. In 2018, the CVA capital charge will be 80%, 83% and 86%, respectively, and will reach 100% for each tier of capital by 2019.

Under Basel III, banks select from two main approaches, the Standardized Approach or the Internal Ratings Based (IRB) Approach, to calculate their minimum regulatory capital required to support credit, market and operational risks. We adopted the Basel III IRB approach to calculate credit risk capital for consolidated regulatory reporting purposes. While the majority of our credit risk exposures are reported under the Basel III IRB Approach for regulatory capital purposes, certain portfolios continue to use the Basel III Standardized Approach for credit risk (for example, our Caribbean banking operations and City National). For consolidated regulatory reporting of market risk capital, we use both Internal Models-based and Standardized Approaches. For consolidated regulatory reporting of operational risk, we use the higher of the Standardized Approach and the Advanced Measurement Approach. We determine our regulatory leverage ratio based on OSFI's Leverage Requirements (LR) Guideline, which reflects the BCBS Basel III leverage ratio requirements. We are required to maintain a minimum leverage ratio that meets or exceeds 3%.

All federally regulated banks with a Basel III leverage ratio total exposure exceeding €200 billion at their financial year-end are required, at a minimum, to publicly disclose in the first quarter following their year-end, the twelve indicators used in the G-SIB assessment methodology, with the goal of enhancing the transparency of the relative scale of banks' potential global systemic importance and data quality. The FSB publishes an updated list of G-SIBs annually. On November 21, 2017, we were designated a G-SIB in the 2017 FSB list. For further details refer to the Regulatory developments section.

In April 2017, OSFI issued final guidelines for the first phase of the Pillar 3 disclosure requirements, indicating that all D-SIBs are expected to implement the "Revised Pillar 3 Disclosure Requirements", issued by the BCBS in January 2015 for the reporting period ending October 31, 2018 (and referenced by BCBS as phase one). These guidelines replace existing disclosure requirements in the areas of credit risk, counterparty credit risk and securitization activities. We are making progress and expect to meet OSFI's stated timeline.

In March 2017, the BCBS issued its second phase of the Pillar 3 disclosure requirements entitled, "Pillar 3 disclosure requirements – consolidated and enhanced framework". The enhancements include the addition of a dashboard of key metrics and incorporates disclosure requirements related to ongoing reforms to the regulatory environment, such as the TLAC regime for G-SIBs, the proposed operational risk requirements, and the final standard for market risk. The disclosure standard also consolidates all existing Pillar 3 disclosure requirements of the Basel III framework, including the leverage and liquidity ratios disclosure templates. This phase two requirement, together with the phase one Revised Pillar 3 disclosure requirements, issued in January 2015, comprise the single Pillar 3 framework. OSFI has not yet released the implementation date for the BCBS phase two disclosure requirements.

The BCBS has commenced its work on the final phase of the Pillar 3 disclosure requirements, which includes the standardized approach RWA to benchmark internally modelled capital requirements, asset encumbrance, operational risk, and ongoing policy reform.

On August 21, 2017, OSFI announced its intention to delay the domestic implementation of the BCBS frameworks related to the Standardized Approach to Counterparty Credit Risk (SA-CCR) and the revisions to the capital requirements for bank exposures to Central counterparties until Q1 2019. In addition, in its communication, OSFI also announced its intention to delay the implementation of the BCBS Revised Securitization Framework until Q1 2019.

We continue to monitor the finalization of Basel III post-crisis regulatory reforms and assess their expected impact to our capital and leverage ratios. BCBS issued consultation papers on revisions relating to how regulatory capital is calculated under the Basel III Standardized and IRB approaches along with changes to operational risk methodology and the leverage framework. In addition, the BCBS expects to finalize a capital floor based on its revised Standardized Approach. Once these frameworks are finalized, OSFI's guidance will provide implementation timelines. Our aim is to ensure we maintain robust capital ratios in expectation of these pending regulatory changes.

The following table provides a summary of OSFI regulatory target ratios under Basel III:

Basel III – OSFI regulatory target — **Table 70**

Basel III Capital ratios and leverage	OSFI regulatory target requirements for large banks under Basel III					RBC capital and leverage ratios as at October 31, 2017	Meet or exceed OSFI regulatory target ratios
	Minimum	Capital Buffers (1)	Minimum including Capital Buffers	D-SIB Surcharge (2)	Minimum including Capital Buffers and D-SIB surcharge (2)		
Common Equity Tier 1	› 4.5%	2.5%	› 7.0%	1.0%	› 8.0%	10.9%	✓
Tier 1 capital	› 6.0%	2.5%	› 8.5%	1.0%	› 9.5%	12.3%	✓
Total capital	› 8.0%	2.5%	› 10.5%	1.0%	› 11.5%	14.2%	✓
Leverage ratio	› 3.0%	n.a.	› 3.0%	n.a.	› 3.0%	4.4%	✓

(1) The capital buffers include the capital conservation buffer and the countercyclical capital buffer as prescribed by OSFI.
(2) Effective January 1, 2016, the D-SIBs surcharge is applicable to risk-weighted capital.
n.a. not applicable

Regulatory capital, RWA and capital ratios

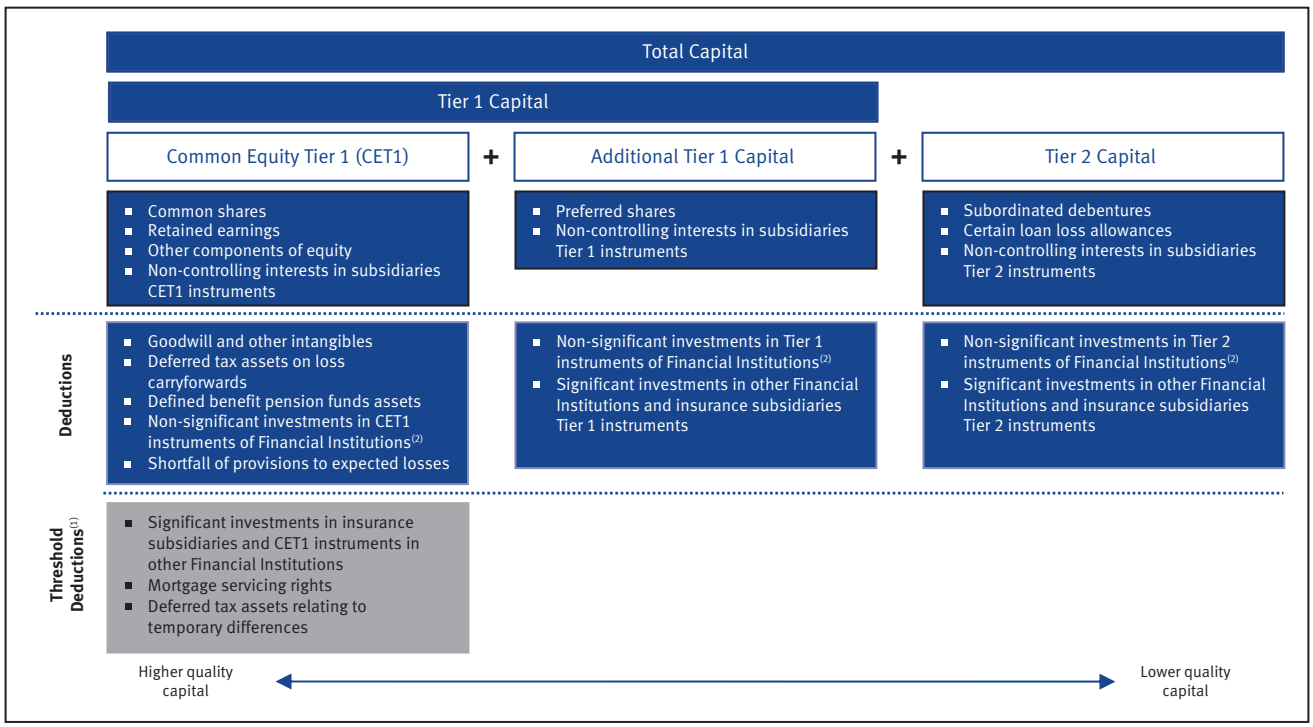
Under Basel III, regulatory capital consists of CET1, Additional Tier 1 and Tier 2 capital.

CET1 capital comprises the highest quality of capital. Regulatory adjustments under Basel III include full deductions of certain items and additional capital components that are subject to threshold deductions.

Tier 1 capital comprises predominantly CET1 and Additional Tier 1 items including non-cumulative preferred shares that meet certain criteria. Tier 2 capital includes subordinated debentures that meet certain criteria, certain loan loss allowances and non-controlling interests in subsidiaries Tier 2 instruments. Total capital is defined as the sum of Tier 1 and Tier 2 capital. Preferred shares and subordinated debentures issued after January 1, 2013 require Non-viability contingent capital requirement (NVCC) features to be included into regulatory capital. NVCC requirements ensure that non-common regulatory capital instruments bear losses before banks seek government funding.

Regulatory capital ratios are calculated by dividing CET1, Tier 1 and Total capital by their respective RWA.

The following chart provides a summary of the major components of CET1, Additional Tier 1 and Tier 2 capital.



(1) First level: The amount by which each of the items exceeds a 10% threshold of CET1 capital (after all deductions but before threshold deductions) will be deducted from CET1 capital. Second level: The aggregate amount of the three items not deducted from the first level above and in excess of 15% of CET1 capital after regulatory adjustments will be deducted from capital, and the remaining balance not deducted will be risk-weighted at 250%.
(2) Non-significant investments are subject to certain Capital Adequacy Requirements (CAR) criteria that drive the amount eligible for deduction.

The following tables provide details on our regulatory capital, RWA and capital and leverage ratios. Our capital position remains strong and our capital and leverage ratios remain well above OSFI regulatory targets:

Regulatory capital, risk-weighted assets (RWA) and capital and leverage ratios **Table 71**

(Millions of Canadian dollars, except percentage amounts and as otherwise noted)	As at October 31 2017	October 31 2016
Capital (1)		
CET1 capital	**$ 51,572**	$ 48,181
Tier 1 capital	**58,361**	55,270
Total capital	**67,556**	64,950
Risk-weighted Assets (RWA) used in calculation of capital ratios (1), (2)		
CET1 capital RWA	**$ 474,478**	$ 447,436
Tier 1 capital RWA	**474,478**	448,662
Total capital RWA	**474,478**	449,712
Total capital RWA consisting of: (1)		
Credit risk	**$ 376,519**	$ 369,751
Market risk	**27,618**	23,964
Operational risk	**59,203**	55,997
Regulatory floor adjustment (3)	**11,138**	–
Total capital RWA	**$ 474,478**	$ 449,712
Capital ratios and Leverage ratio (1), (4)		
CET1 ratio	**10.9%**	10.8%
Tier 1 capital ratio	**12.3%**	12.3%
Total capital ratio	**14.2%**	14.4%
Leverage ratio	**4.4%**	4.4%
Leverage ratio exposure (billions)	**$ 1,315.5**	$ 1,265.1

(1) Capital, RWA, and capital ratios are calculated using OSFI Capital Adequacy Requirements based on the Basel III framework ("all-in" basis). The leverage ratio is calculated using OSFI Leverage Requirements Guideline based on the Basel III framework.

(2) In 2016, the CVA scalars of 64%, 71% and 77% were applied to CET1, Tier 1 and Total capital, respectively. In fiscal 2017, the scalars were 72%, 77% and 81%, respectively. In 2018, the scalars will be 80%, 83% and 86%, respectively.

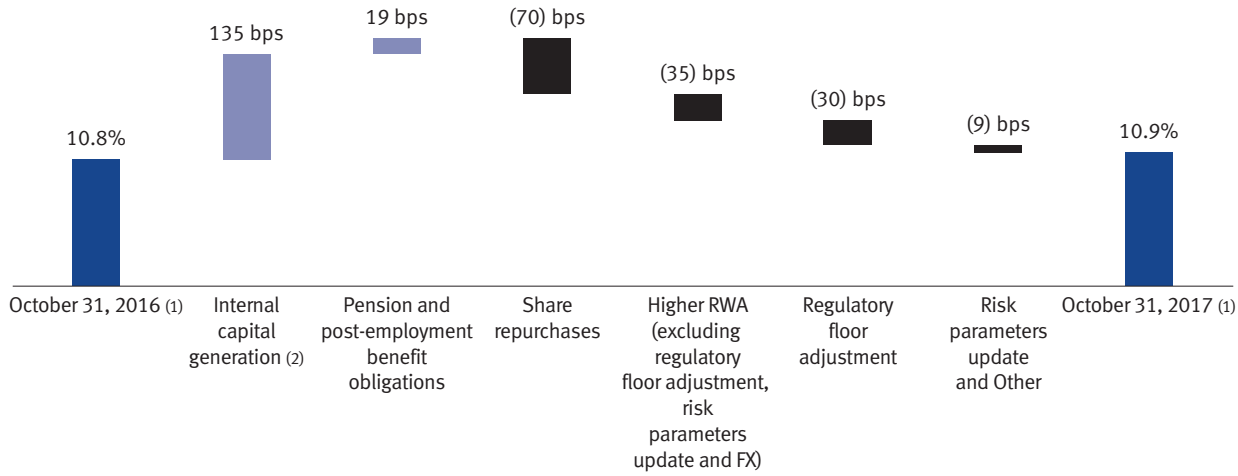
(3) Before any capital floor requirement as applicable, there are three different levels of RWAs for the calculation of the CET1, Tier 1, and Total capital ratios arising from the option we have chosen for the phase-in of the CVA capital charge. Since the introduction of Basel II in 2008, OSFI has prescribed a capital floor requirement for institutions that use the advanced internal ratings-based (AIRB) approach for credit risk. The capital floor is determined by comparing a capital requirement under Basel I and Basel III, as specified by OSFI. If the capital requirement under the Basel III standards is less than 90% of the capital requirements as calculated under the Basel I standards, the difference is added to the RWAs.

(4) To enhance comparability among other global financial institutions, our transitional CET1, Tier 1, Total capital and leverage ratios as at October 31, 2017 were 11.3%, 12.3%, 14.1%, and 4.5%, respectively. Transitional is defined as capital calculated according to the current year's phase-in of regulatory adjustments and phase-out of non-qualifying capital instruments.

Regulatory Capital		Table 72
	All-in basis	
(Millions of Canadian dollars)	2017	2016
CET1 capital: instruments and reserves and regulatory adjustments		
Directly issued qualifying common share capital (and equivalent for non-joint stock companies) plus related stock surplus	$ 18,019	$ 18,161
Retained earnings	45,043	41,217
Accumulated other comprehensive income (and other reserves)	4,354	4,926
Directly issued capital subject to phase out from CET1 (only applicable to non-joint stock companies)	–	–
Common share capital issued by subsidiaries and held by third parties (amount allowed in group CET1)	13	13
Regulatory adjustments applied to CET1 under Basel III	(15,857)	(16,136)
Common Equity Tier 1 capital (CET1)	$ 51,572	$ 48,181
Additional Tier 1 capital: instruments and regulatory adjustments		
Directly issued qualifying Additional Tier 1 instruments plus related stock surplus	$ 3,825	$ 3,825
Directly issued capital instruments to phase out from Additional Tier 1	2,961	3,261
Additional Tier 1 instruments issued by subsidiaries and held by third parties (amount allowed in group AT1)	3	3
Regulatory adjustments applied to Additional Tier 1 under Basel III	–	–
Additional Tier 1 capital (AT1)	$ 6,789	$ 7,089
Tier 1 capital (T1 = CET1 + AT1)	$ 58,361	$ 55,270
Tier 2 capital: instruments and provisions and regulatory adjustments		
Directly issued qualifying Tier 2 instruments plus related stock surplus	$ 6,346	$ 6,630
Directly issued capital instruments subject to phase out from Tier 2	2,550	2,738
Tier 2 instruments issued by subsidiaries and held by third parties (amount allowed in group Tier 2)	12	18
Collective allowance	287	294
Regulatory adjustments applied to Tier 2 under Basel III	–	–
Tier 2 capital (T2)	$ 9,195	$ 9,680
Total capital (T1 + T2)	$ 67,556	$ 64,950

2017 vs. 2016

Continuity of CET1 ratio (Basel III)



(1) Represents rounded figures.
(2) Internal capital generation of $6.0 billion which represents Net income available to shareholders, less common and preferred shares dividends.

Our CET1 ratio was 10.9%, up 10 bps from last year. Changes reflect internal capital generation and returns on our pension assets, partially offset by share repurchases, higher RWA due to business growth and a regulatory floor adjustment, and an update to our corporate and business lending risk parameters.

Our Tier 1 capital ratio of 12.3% was flat, mainly due to the factors noted above under the CET1 ratio, along with the redemption of preferred shares.

Our Total capital ratio of 14.2% was down 20 bps, mainly due to the factors noted above under the Tier 1 capital ratio.

Our Leverage ratio of 4.4% was flat, mainly due to internal capital generation and returns on our pension assets, fully offset by share repurchases and growth in leverage exposures, primarily in loans, repos-style transactions, and cash and deposits.

Basel III RWA

OSFI requires banks to meet minimum risk-based capital requirements for exposures to credit risk, operational risk, and, where they have significant trading activity, market risk. RWA is calculated for each of these risk types and added together to determine total RWA. In addition, OSFI requires the minimum risk-based capital to be no less than 90% of the capital requirements as calculated under the Basel I standards. If the capital requirement is less than 90%, a floor adjustment to RWA must be applied as prescribed by OSFI CAR guidelines.

Total capital risk-weighted assets — Table 73

As at October 31 (Millions of Canadian dollars, except percentage amounts)	2017						2016
			Risk-weighted assets				
	Exposure (1)	Average of risk weights (2)	Standardized approach	Advanced approach	Other	Total	Total
Credit risk							
Lending-related and other							
Residential mortgages	$ 243,462	7%	$ 5,823	$ 12,374	$ –	$ 18,197	$ 17,364
Other retail	239,041	22%	7,638	46,111	–	53,749	52,164
Business	313,550	60%	41,187	145,976	–	187,163	186,285
Sovereign	135,450	9%	2,930	8,805	–	11,735	9,776
Bank	135,527	8%	2,802	8,465	–	11,267	11,801
Total lending-related and other	$ 1,067,030	26%	$ 60,380	$ 221,731	$ –	$ 282,111	$ 277,390
Trading-related							
Repo-style transactions	$ 475,832	2%	$ 66	$ 8,379	$ 75	$ 8,520	$ 7,924
Derivatives – including CVA – CET1 phase-in adjustment	86,999	33%	603	15,977	11,808	28,388	29,796
Total trading-related	$ 562,831	7%	$ 669	$ 24,356	$ 11,883	$ 36,908	$ 37,720
Total lending-related and other and trading-related	$ 1,629,861	20%	$ 61,049	$ 246,087	$ 11,883	$ 319,019	$ 315,110
Bank book equities	3,096	113%	–	3,485	–	3,485	2,362
Securitization exposures	58,418	14%	2,386	6,076	–	8,462	9,591
Regulatory scaling factor	n.a.	n.a.	n.a.	15,306	–	15,306	15,028
Other assets	51,139	56%	n.a.	n.a.	28,836	28,836	25,384
Total credit risk	$ 1,742,514	22%	$ 63,435	$ 270,954	$ 40,719	$ 375,108	$ 367,475
Market risk							
Interest rate			$ 2,562	$ 4,348	$ –	$ 6,910	$ 4,484
Equity			1,461	1,371	–	2,832	3,005
Foreign exchange			671	64	–	735	931
Commodities			232	13	–	245	326
Specific risk			5,117	2,076	–	7,193	5,730
Incremental risk charge			–	9,703	–	9,703	9,488
Total market risk			$ 10,043	$ 17,575	$ –	$ 27,618	$ 23,964
Operational risk			$ 4,470	$ 54,733	n.a.	$ 59,203	$ 55,997
Regulatory floor adjustment (3)					12,549	12,549	–
CET1 capital risk-weighted assets (4)	$ 1,742,514		$ 77,948	$ 343,262	$ 53,268	$ 474,478	$ 447,436
Additional CVA adjustment, prescribed by OSFI, for Tier 1 capital					784	784	1,226
Regulatory floor adjustment (3)					(784)	(784)	–
Tier 1 capital risk-weighted assets (4)	$ 1,742,514		$ 77,948	$ 343,262	$ 53,268	$ 474,478	$ 448,662
Additional CVA adjustment, prescribed by OSFI, for Total capital					627	627	1,050
Regulatory floor adjustment (3)					(627)	(627)	–
Total capital risk-weighted assets (4)	$ 1,742,514		$ 77,948	$ 343,262	$ 53,268	$ 474,478	$ 449,712

(1) Total exposure represents exposure at default which is the expected gross exposure upon the default of an obligor. This amount is before any allowance against impaired loans or partial write-offs and does not reflect the impact of credit risk mitigation and collateral held.

(2) Represents the average of counterparty risk weights within a particular category.

(3) Before any capital floor requirement as applicable, there are three different levels of RWAs for the calculation of the CET1, Tier 1, and Total capital ratios arising from the option we have chosen for the phase-in of the CVA capital charge. Since the introduction of Basel II in 2008, OSFI has prescribed a capital floor requirement for institutions that use the advanced internal ratings-based (AIRB) approach for credit risk. The capital floor is determined by comparing a capital requirement under Basel I and Basel III, as specified by OSFI. If the capital requirement under the Basel III standards is less than 90% of the capital requirements as calculated under the Basel I standards, the difference is added to the RWAs.

(4) In 2017, the CVA scalars of 72%, 77% and 81% were applied to CET1, Tier 1 and Total capital, respectively. In 2016, the CVA scalars were 64%, 71% and 77%, respectively.

n.a. not applicable.

2017 vs. 2016

During the year, CET1 RWA was up $27 billion, primarily reflecting business growth, mainly in loans, securities lending and securitizations, and trading portfolios, the regulatory floor adjustment, and an update to our corporate and business lending risk parameters, partially offset by the impact of foreign exchange translation.

Selected capital management activity

The following table provides our selected capital management activity:

Selected capital management activity — Table 74

(Millions of Canadian dollars, except number of shares)	2017 Issuance or redemption date	Number of shares (000s)	Amount
Tier 1 capital			
Common shares activity			
Issued in connection with share-based compensation plans (1)		3,477	$ 227
Purchased for cancellation (2)		(35,973)	(436)
Redemption of preferred shares, Series AB	September 27, 2017	(12,000)	(300)
Tier 2 capital			
Redemption of June 26, 2037 subordinated debentures	June 26, 2017		119

(1) Amounts include cash received for stock options exercised during the period and includes fair value adjustments to stock options.

(2) During the year ended October 31, 2017, we purchased common shares for cancellation at an average cost of $86.47 per share with a book value of $12.15 per share.

On March 9, 2017, we announced a normal course issuer bid (NCIB) to purchase up to 30 million of our common shares, commencing on March 14, 2017 and continuing until March 10, 2018, or such earlier date as we complete the repurchase of all shares permitted under the bid. We determine the amount and timing of the purchases under the NCIB, subject to prior consultation with OSFI. Purchases may be made through the TSX, the NYSE and other designated exchanges and alternative Canadian trading systems. The price paid for such repurchased shares has been and will be the prevailing market price at the time of acquisition. Purchases may also be made through other means permitted by the TSX and applicable securities laws, including under specific share repurchase programs pursuant to issuer bid exemption orders issued by applicable securities regulatory authorities. Any purchases made under an exemption order will generally be at a discount to the prevailing market price. In 2016, we announced a normal course issuer bid for the purchase of 20 million shares, which commenced on June 1, 2016 and was completed on March 7, 2017. In 2017, the total number of common shares repurchased under our NCIB programs was approximately 36 million. The total cost of the shares repurchased was $3,110 million, comprised of a book value of $436 million and an additional premium paid on repurchase of $2,674 million.

On June 26, 2017, we redeemed all ¥10,000 million outstanding 2.86% subordinated debentures due June 26, 2037 for 100% of their principal amount plus accrued interest to the redemption date. The redemption was completed on June 26, 2017.

On September 27, 2017, we redeemed all 12 million issued and outstanding Non-cumulative First Preferred Shares, Series AB, for cash at a redemption price of $25 per share.

On November 13, 2017, we redeemed all 82,050 issued and outstanding Non-cumulative Perpetual First Preferred Shares, Series C-1, for cash at a redemption price of US$1,000 per share.

Dividends

Our common share dividend policy reflects our earnings outlook, payout ratio objective and the need to maintain adequate levels of capital to support business plans. In 2017, our dividend payout ratio was 46%, which met our dividend payout ratio target of 40% to 50%. Common share dividends paid during the year were $5.1 billion.

Selected share data (1) **Table 75**

As at October 31 (Millions of Canadian dollars, except number of shares and as otherwise noted)	2017 Number of shares (000s)	2017 Amount	2017 Dividends declared per share	2016 Number of shares (000s)	2016 Amount	2016 Dividends declared per share
Common shares outstanding (1)	1,452,898	$ 17,730	$ 3.48	1,485,394	$ 17,939	$ 3.24
First preferred shares outstanding						
Non-cumulative Series W (2)	12,000	300	1.23	12,000	300	1.23
Non-cumulative Series AA	12,000	300	1.11	12,000	300	1.11
Non-cumulative Series AB (3)	–	–	0.99	12,000	300	1.18
Non-cumulative Series AC	8,000	200	1.15	8,000	200	1.15
Non-cumulative Series AD	10,000	250	1.13	10,000	250	1.13
Non-cumulative Series AE	10,000	250	1.13	10,000	250	1.13
Non-cumulative Series AF	8,000	200	1.11	8,000	200	1.11
Non-cumulative Series AG	10,000	250	1.13	10,000	250	1.13
Non-cumulative Series AJ (4)	13,579	339	0.88	13,579	339	0.88
Non-cumulative Series AK (4)	2,421	61	0.62	2,421	61	0.60
Non-cumulative Series AL (4)	12,000	300	1.07	12,000	300	1.07
Non-cumulative Series AZ (4), (5)	20,000	500	1.00	20,000	500	1.00
Non-cumulative Series BB (4), (5)	20,000	500	0.98	20,000	500	0.98
Non-cumulative Series BD (4), (5)	24,000	600	0.90	24,000	600	0.90
Non-cumulative Series BF (4), (5)	12,000	300	0.90	12,000	300	0.90
Non-cumulative Series BH (5)	6,000	150	1.23	6,000	150	1.23
Non-cumulative Series BI (5)	6,000	150	1.23	6,000	150	1.23
Non-cumulative Series BJ (5)	6,000	150	1.31	6,000	150	1.51
Non-cumulative Series BK (4), (5)	29,000	725	1.38	29,000	725	1.29
Non-cumulative Series BM (4), (5)	30,000	750	1.38	30,000	750	0.98
Non-cumulative Series C-1 (6)	82	107	US$ 55.00	82	107	US$55.00
Non-cumulative Series C-2 (6)	20	31	US$ 67.50	20	31	US$67.50
Treasury shares held – preferred	6	–		31	–	
Treasury shares held – common	(363)	(27)		(1,159)	(80)	
Stock options						
Outstanding	9,315			11,388		
Exercisable	4,337			6,909		
Available for grant (7)	9,933			9,267		
Dividends						
Common		5,096			4,817	
Preferred		300			294	

(1) For further details about our capital management activity, refer to Note 21 of our 2017 Annual Consolidated Financial Statements.
(2) Effective February 24, 2010, we have the right to convert these shares into common shares at our option, subject to certain restrictions.
(3) On September 27, 2017, we redeemed all 12 million issued and outstanding Non-cumulative First Preferred Shares, Series AB, for cash at a redemption price of $25 per share.
(4) Dividend rate will reset every five years.
(5) Non-viable contingent capital (NVCC) instruments.
(6) Represents 3,282,000 and 815,400 depositary shares relating to preferred shares Series C-1 and Series C-2, respectively. Each depositary share represents one-fortieth interest in a share of Series C-1 and Series C-2, respectively.
(7) 2016 amount excludes 2.1 million stock options available for grant, which became available upon the exercise of tandem stock appreciation rights prior to November 1, 2015.

As at November 24, 2017, the number of outstanding common shares and stock options and awards was 1,453,039,318 and 9,124,811, respectively, and the number of Treasury shares – preferred and Treasury shares – common was (99,367) and (202,634), respectively.

NVCC provisions require the conversion of the capital instrument into a variable number of common shares in the event that OSFI deems a bank to be non-viable or a federal or provincial government in Canada publicly announces that a bank has accepted or agreed to accept a capital injection. If a NVCC trigger event were to occur, our NVCC capital instruments, which are the preferred shares Series AZ, preferred shares Series BB, preferred shares Series BD, preferred shares Series BF, preferred shares Series BH, preferred shares Series BI, preferred shares Series BJ, preferred shares Series BK, preferred shares Series BM, subordinated debentures due on July 17, 2024, subordinated debentures due on September 29, 2026, subordinated debentures due on June 4, 2025, subordinated debentures due on January 20, 2026 and subordinated debentures due on January 27, 2026, would be converted into RBC common shares pursuant to an automatic conversion formula with a conversion price based on the greater of: (i) a contractual floor price of $5.00, and (ii) the current market price of our common shares at the time of the trigger event (10-day weighted average). Based on a floor price of $5.00 and including an estimate for accrued dividends and interest, these NVCC capital instruments would convert into a maximum of 2,739 million RBC common shares, in aggregate, which would represent a dilution impact of 65.34% based on the number of RBC common shares outstanding as at October 31, 2017.

Attributed capital

Our methodology for allocating capital to our business segments is based on the higher of fully diversified economic capital and the Basel III regulatory capital requirements. Risk-based capital attribution provides a uniform base for performance measurement among business segments, which compares to our overall corporate return objective and facilitates management decisions in resource allocation in conjunction with other factors.

Attributed capital is calculated and attributed on a wider array of risks compared to Basel III regulatory capital requirements, which are calibrated predominantly to target credit, market (trading) and operational risk measures. Economic capital is our internal quantification of risks associated with business activities which is the capital required to remain solvent under extreme market conditions, reflecting our objective to maintain strong credit ratings. Economic capital is calculated based on credit, market (trading and non-trading), operational, business and fixed asset, and insurance risks, along with capital attribution for goodwill and other intangibles. The common risks between the two frameworks are aligned to reflect increased regulatory requirements.

- Business risk is the risk of loss or harm due to variances in volumes, prices and costs caused by competitive forces, regulatory changes, reputation and strategic risks.
- Fixed asset risk is defined as the risk that the value of fixed assets will be less than their book value at a future date.

For further discussion on Credit, Market, Operational and Insurance risks, refer to the Risk management section.

Attributed capital is also used to assess the adequacy of our capital base. Our policy is to maintain a level of available capital, defined as common equity and other capital instruments with equity-like loss absorption features such as preferred shares that exceed Economic capital with a comfortable cushion.

The calculation and attribution of capital involves a number of assumptions and judgments by management which are monitored to ensure that the economic capital framework remains comprehensive and consistent. The models are benchmarked to leading industry practices via participation in surveys, reviews of methodologies and ongoing interaction with external risk management industry professionals.

The following outlines our attributed capital:

Attributed capital — **Table 76**

(Millions of Canadian dollars)	2017	2016
Credit risk	$ 21,450	$ 20,550
Market risk (trading and non-trading)	3,250	3,200
Operational risk	5,200	4,900
Business and fixed asset risk	3,200	3,100
Insurance risk	650	650
Goodwill and other intangibles	15,550	16,100
Regulatory capital allocation	10,950	8,900
Attributed capital	$ 60,250	$ 57,400
Unattributed capital	5,050	4,800
Average common equity	$ 65,300	$ 62,200

2017 vs. 2016

Attributed capital increased $3 billion, mainly reflecting business growth, higher capital attribution rate, and the update to our corporate and business lending risk parameters.

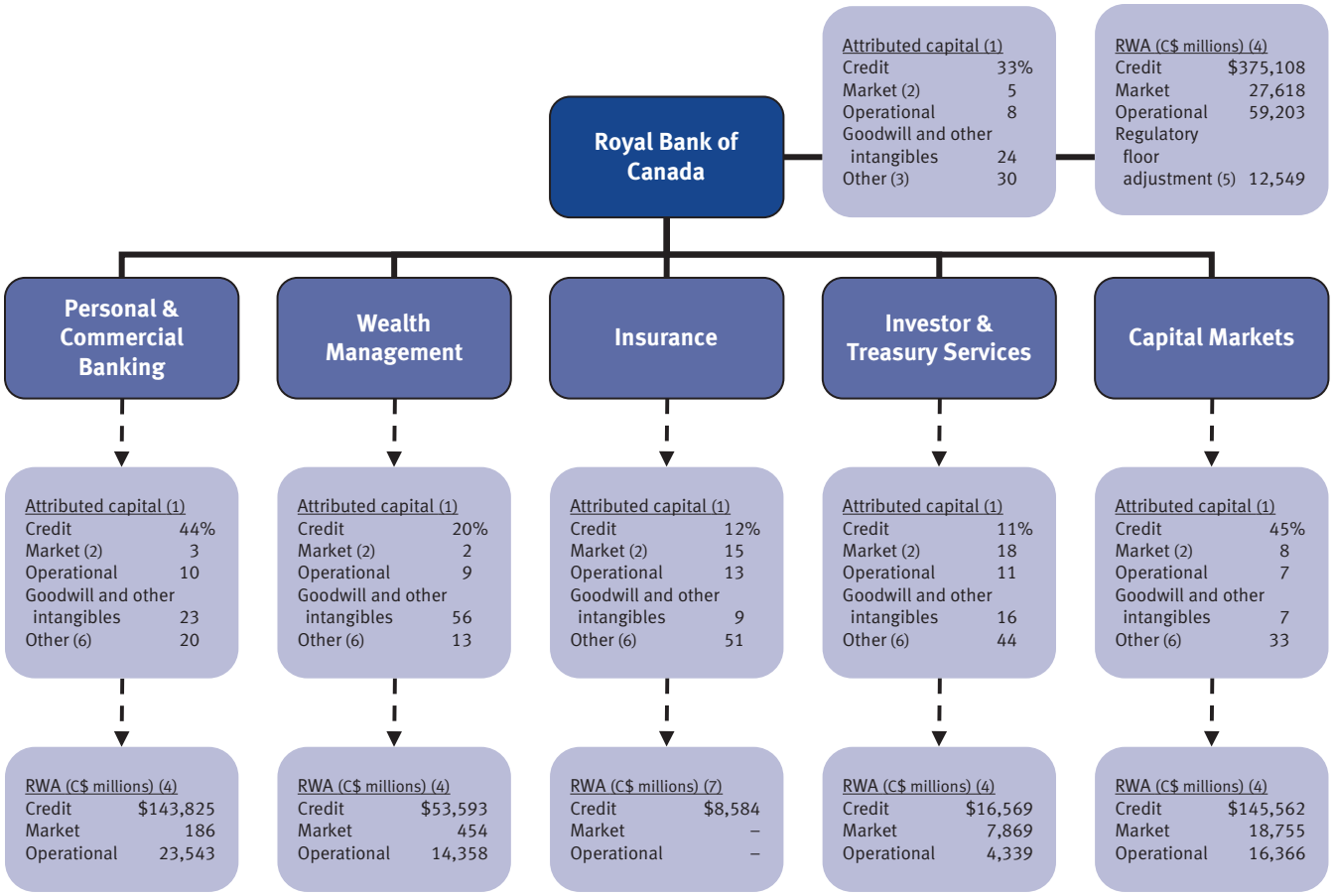
We remain well capitalized with current levels of available capital exceeding the attributed capital required to underpin all of our material risks.

Attributed capital in the context of our business activities

In carrying out our business activities, we are exposed to a range of risks. The following chart provides a high level view of risks within our business segments, which includes credit, market and operational risks. We have used attributed capital to illustrate the relative size of the risks in each of our businesses. The attributed capital distribution reflects the diversified nature of our business activities. RWA represents our exposure to credit, market and operational risk for regulatory capital requirements.

Within Personal & Commercial Banking, credit risk is the most significant risk, largely related to our personal financial services, business financial services and cards businesses. The primary risks within Wealth Management, which provides services to institutional and individual clients, are operational risk and credit risk. Risks within our Insurance operations are primarily related to insurance risk in our life and health businesses followed by market risk and operational risk. The largest risk within Investor & Treasury Services is market risk, followed by credit risk and operational risk. The most significant risk within Capital Markets is credit risk, followed by market risk.

For additional information on the risks highlighted below, refer to the Risk management section.



(1) Attributed capital: An estimate of the amount of equity capital required to underpin risks. It is calculated by estimating the level of capital that is necessary to support our various businesses, given their risks, consistent with our desired solvency standard and credit ratings.
(2) Market risk attributed capital: An estimate of the amount of equity capital required to underpin trading market risk and interest rate risk.
(3) Other – RBC: Includes (a) an estimate of the amount of equity capital required to underpin risks associated with business, fixed assets and insurance risks; (b) a regulatory capital adjustment since attributed capital is determined at the higher of regulatory or economic capital; and (c) unattributed capital reported representing common equity in excess of common equity attributed to our business segments which is reported in the Corporate Support segment only.
(4) RWA amount represents RWA for CET1.
(5) RWA regulatory floor adjustment is not attributed to business segments.
(6) Other – Business segments: Includes (a) an estimate of the amount of equity capital required to underpin risks associated with business, fixed assets and insurance risks; and (b) a regulatory capital adjustment since attributed capital is determined at the business segment level as the greater of regulatory or economic capital.
(7) Insurance RWA amount above represents our investments in the insurance subsidiaries capitalized at the regulatory prescribed rate as required under Basel CAR filing.

Subsidiary capital

Our capital management framework includes the management of subsidiaries' capital. We invest capital across the enterprise to meet local regulators' capital adequacy requirements and maximize returns to our shareholders. We set guidelines for defining capital investments in our subsidiaries and manage the relationship between capital invested in subsidiaries and our consolidated capital base to ensure that we can access capital recognized in our consolidated regulatory capital measurements.

Each of our subsidiaries has responsibility for maintaining compliance with local regulatory capital adequacy requirements, which may include restrictions on the transfer of assets in the form of cash, dividends, loans or advances. Concurrently, Corporate Treasury provides centralized oversight of capital adequacy across all subsidiary entities.

Other considerations affecting capital

Capital treatment for equity investments in other entities is determined by a combination of accounting and regulatory guidelines based on the size or nature of the investment. Three broad approaches apply as follows:

- Consolidation: entities which we control are consolidated on our Consolidated Balance Sheets.
- Deduction: certain holdings are deducted from our regulatory capital. These include all unconsolidated "substantial investments," as defined by *the Bank Act* (Canada) in the capital of financial institutions, as well as all investments in insurance subsidiaries.
- Risk weighting: equity investments that are not deducted from capital are risk weighted at a prescribed rate for determination of capital charges.

Regulatory capital approach for securitization exposures

For our securitization exposures, we use an internal assessment approach (IAA) for exposures related to our ABCP business, and for other securitization exposures we use a combination of approaches including a ratings-based approach and the standardized approach.

While our IAA rating methodologies are based in large part on criteria that are published by External Credit Assessment Institutions (ECAIs) such as S&P and therefore are similar to the methodologies used by these institutions, they are not identical. Our ratings process includes a comparison of the available credit enhancement in a securitization structure to a stressed level of projected losses. The stress level used is determined by the desired risk profile of the transaction. As a result, we stress the cash flows of a given transaction at a higher level in order to achieve a higher rating. Conversely, transactions that only pass lower stress levels achieve lower ratings.

Most of the other securitization exposures (non-ABCP) carry external ratings and we use the lower of our own rating or the lowest external rating for determining the proper capital allocation for these positions. We periodically compare our own ratings to ECAIs ratings to ensure that the ratings provided by ECAIs are reasonable.

GRM is responsible for providing risk assessments for capital purposes in respect of all our banking book exposures. GRM is independent of the business originating the securitization exposures and performs its own analysis, sometimes in conjunction with but always independent of the applicable business. GRM has developed asset class specific criteria guidelines which provide the rating methodologies for each asset class. The guidelines are reviewed periodically and are subject to the ratings replication process mandated by Pillar I of the Basel rules.

Accounting and control matters

Critical accounting policies and estimates

Application of critical accounting policies, judgments, estimates and assumptions

Our significant accounting policies are described in Note 2 to our 2017 Annual Consolidated Financial Statements. Certain of these policies and related estimates are recognized as critical because they require us to make particularly subjective or complex judgments about matters that are inherently uncertain and significantly different amounts could be reported under different conditions or using different assumptions. Our critical accounting judgments, estimates and assumptions relate to the fair value of financial instrument and securities impairment, allowance for credit losses, goodwill and other intangible assets, employee benefits, consolidation, derecognition of financial assets, application of the effective interest method, provisions, insurance claims and policy benefit liabilities, income taxes, and deferred revenue on our customer loyalty program. Our critical accounting policies and estimates have been reviewed and approved by our Audit Committee, in consultation with management, as part of their review and approval of our significant accounting policies, judgments, estimates and assumptions.

Fair value of financial instruments and securities impairment

The fair value of a financial instrument is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. We determine fair value by incorporating factors that market participants would consider in setting a price, including commonly accepted valuation approaches.

We give priority to third-party pricing services and valuation techniques with the highest and most consistent accuracy. The level of accuracy is determined over time by comparing third-party price values to traders' or system values, other pricing service values and, when available, actual trade data. Other valuation techniques are used when a price or quote is not available. Some valuation processes use models to determine fair value. We have a systematic and consistent approach to control model use.

In determining fair value, a hierarchy is used which prioritizes the inputs to valuation techniques. The fair value hierarchy gives the highest priority to unadjusted quoted prices in active markets and the lowest priority to unobservable inputs. Fair values established based on this hierarchy require the use of observable market data whenever available. Level 1 inputs are unadjusted quoted prices in active markets for identical assets or liabilities that we have the ability to access at the measurement date. Level 2 inputs include quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active, and model inputs that are either observable, or can be corroborated by observable market data for substantially the full term of the assets or liabilities. Level 3 inputs are one or more inputs that are unobservable and significant to the fair value of the asset or liability. Unobservable inputs are used to measure fair value to the extent that observable inputs are not available at the measurement date. The availability of inputs for valuation may affect the selection of valuation techniques. The classification of a financial instrument in the fair value hierarchy for disclosure purposes is based upon the lowest level of input that is significant to the measurement of fair value.

Where observable prices or inputs are not available, management judgment is required to determine fair values by assessing other relevant sources of information such as historical data, proxy information from similar transactions, and through extrapolation and interpolation techniques. For more complex or illiquid instruments, significant judgment is required to determine the model used, select the model inputs, and in some cases, apply valuation adjustments to the model value or quoted price for inactively traded financial instruments. The selection of model inputs may be subjective and the inputs may be unobservable. Unobservable inputs are inherently uncertain as there is little or no market data available from which to determine the level at which the transaction would occur under normal business circumstances. Appropriate parameter uncertainty and market risk valuation adjustments for such inputs and other model risk valuation adjustments are assessed in all such instances.

Valuation adjustments may be subjective as they require significant judgment in the input selection, such as the probability of default and recovery rate, and are intended to arrive at a fair value that is determined based on assumptions that market participants would use in pricing the financial instrument. The realized price for a transaction may be different from its recorded value that was previously estimated using management judgment, and may therefore impact unrealized gains and losses recognized in Non-interest income – Trading revenue or Other.

At each reporting date or more frequently when conditions warrant, we evaluate our AFS securities to determine whether there is any objective evidence of impairment, such as a significant or prolonged decline in the fair value of the security below its cost or when an adverse effect on future cash flows from the security can be reliably estimated. Evidence of impairment includes, but is not limited to, delinquency or default, bankruptcy, restructuring or other events that may question the issuer's creditworthiness. When assessing impairment for debt instruments we primarily consider counterparty ratings and security-specific factors, including collateral, external ratings, subordination and other market factors. For complex debt instruments including U.S. non-agency MBS, ABS and other structured products, we also use cash flow projection models which incorporate actual and projected cash flows for each security using a number of assumptions and inputs that are based on security specific factors. The inputs and assumptions used, such as default, prepayment and recovery rates, are based on updated market data. In addition, we consider the transaction structure and credit enhancement for structured securities. If results indicate that we will not be able to recover the entire principal and interest amount, we do a further review of the security in order to assess whether a loss would ultimately be realized. As equity securities do not have contractual cash flows, they are assessed differently than debt securities. When assessing equity securities for impairment, we consider factors that include the length of time and extent the fair value has been below cost and the financial condition and near term prospects of the issuer. We also consider the estimated recoverable value and the period of recovery. Refer to Note 4 to our 2017 Annual Consolidated Financial Statements for more information.

Allowance for credit losses

We maintain an allowance for credit losses relating to on-balance sheet exposures, such as loans and acceptances, and off-balance sheet items such as letters of credit, guarantees and unfunded commitments, at levels that we consider appropriate to cover credit-related losses incurred as at the balance sheet date.

Loans which are individually significant are assessed individually for objective indicators of impairment. A loan is considered impaired when we determine that we will not be able to collect all amounts due according to the original contractual terms. Credit exposures of individually significant loans are evaluated based on factors including the borrower's overall financial condition, resources and payment record, and where applicable, the realizable value of any collateral. If there is evidence of impairment leading to an impairment loss, then the amount of the loss is determined as the difference between the carrying value of the loan, including accrued interest, and the estimated recoverable amount. The estimated recoverable amount is measured as the present value of expected future cash flows discounted at the loan's original effective interest rate, including cash flows that may result from the realization of collateral less costs to sell.

Loans which are not individually significant, or which are individually assessed and not determined to be impaired, are collectively assessed for impairment. For the purposes of a collective evaluation of impairment, loans are grouped on the basis of similar credit risk characteristics, taking into account loan type, industry, geographic location, collateral type, past due status and other relevant factors. The collective impairment allowance is determined by reviewing factors including: (i) historical loss experience, which takes into consideration historical probabilities of default, loss given default and exposure at default, and (ii) management's judgment on the level of impairment losses based on historical experience relative to the actual level as reported at the balance sheet date, taking into consideration the current portfolio credit quality trends; business, economic and credit conditions; the impact of policy and process changes; and other supporting factors. Future cash flows for a group of loans are collectively evaluated for impairment on the basis of contractual cash flows and historical loss experience for loans with credit risk characteristics similar to those in the group. We use historical loss experience and normalize observable inputs for current and past conditions that are not relevant to the assessment performed for the current reporting period. The methodology and assumptions used for estimating future cash flows are reviewed regularly to reduce any differences between loss estimates and actual loss experience.

Loans and the related impairment allowance for credit losses are written off, either partially or in full, when there is no realistic prospect of recovery. Where loans are secured, they are generally written off after receipt of any proceeds from the realization of the collateral. In circumstances where the net realizable value of any collateral has been determined and there is no reasonable expectation of further recovery, write off may be earlier.

For further information on allowance for credit losses, refer to Note 5 to our 2017 Annual Consolidated Financial Statements.

Goodwill and other intangible assets

We allocate goodwill to groups of cash-generating units (CGU). Goodwill is not amortized and is tested for impairment on an annual basis, or more frequently if there are objective indications of impairment. We test for impairment by comparing the recoverable amount of a CGU with its carrying amount.

We estimate the value in use and fair value less costs of disposal of our CGUs primarily using a discounted cash flow method which incorporates each CGU's internal forecasts of revenues and expenses. Significant management judgment is applied in the determination of expected future cash flows (uncertainty in timing and amount), discount rates (based on CGU-specific risks) and terminal growth rates. CGU-specific risks include country risk, business/operational risk, geographic risk (including political risk, devaluation risk and government regulation), currency risk and price risk (including product pricing risk and inflation). If the forecast earnings and other assumptions in future periods deviate significantly from the current amounts used in our impairment testing, the value of our goodwill could become impaired.

We assess for indicators of impairment of our other intangible assets at each reporting period. If there is an indication that an asset may be impaired, an impairment test is performed by comparing the carrying amount of the intangible asset to its recoverable amount. Where it is not possible to estimate the recoverable amount of an individual asset, we estimate the recoverable amount of the CGU to which the asset belongs. Significant judgment is applied in estimating the useful lives and recoverable amounts of our intangible assets and assessing whether certain events or circumstances constitute objective evidence of impairment. We do not have any other intangible assets with indefinite lives.

For further details, refer to Notes 2 and 10 to our 2017 Annual Consolidated Financial Statements.

Employee benefits

We sponsor a number of benefit programs for eligible employees, including registered pension plans, supplemental pension plans, health, dental, disability and life insurance plans.

The calculation of defined benefit expenses and obligations depends on various assumptions such as discount rates, healthcare cost trend rates, projected salary increases, retirement age, and mortality and termination rates. Discount rates are determined using a yield curve based on spot rates from high quality corporate bonds. All other assumptions are determined by us and are reviewed by the actuaries. Actual experience that differs from the actuarial assumptions will affect the amounts of benefit obligations and remeasurements that we recognize. The weighted average assumptions used and the sensitivity of key assumptions are presented in Note 17 to our 2017 Annual Consolidated Financial Statements.

Consolidation of structured entities

Subsidiaries are those entities, including structured entities, over which we have control. We control an entity when we are exposed, or have rights, to variable returns from our involvement with the entity and have the ability to affect those returns through our power over the investee. We have power over an entity when we have existing rights that give us the current ability to direct the activities that most significantly affect the entity's returns (relevant activities). Power may be determined on the basis of voting rights or, in the case of structured entities, other contractual arrangements.

We are not deemed to control an entity when we exercise power over an entity as the agent of a third party or parties. In determining whether we are acting as an agent, we consider the overall relationship between us, the investee and other parties to the arrangement with respect to the following factors: (i) the scope of our decision making power; (ii) the rights held by other parties; (iii) the remuneration to which we are entitled; and (iv) our exposure to variability of returns.

The determination of control is based on the current facts and circumstances and is continuously assessed. In some circumstances, different factors and conditions may indicate that various parties control an entity depending on whether those factors and conditions are assessed in isolation or in totality. Significant judgment is applied in determining whether we control an entity, specifically, assessing whether we have substantive decision making rights over the relevant activities and whether we are exercising our power as a principal or an agent.

We consolidate all subsidiaries from the date control is transferred to us, and cease consolidation when an entity is no longer controlled by us. Our consolidation conclusions affect the classification and amount of assets, liabilities, revenues and expenses reported in our Consolidated Financial Statements.

For further details, refer to the Note 7 to our 2017 Annual Consolidated Financial Statements.

Derecognition of financial assets
We periodically enter into transactions in which we transfer financial assets such as loans or mortgage-backed securities to structured entities or trusts that issue securities to investors. We derecognize the assets when our contractual rights to the cash flows from the assets have expired; when we retain the rights to receive the cash flows but assume an obligation to pay those cash flows to a third party subject to certain pass-through requirements; or when we transfer our contractual rights to receive the cash flows and substantially all of the risks and rewards of the assets have been transferred. When we retain substantially all of the risks and rewards of the transferred assets, the transferred assets are not derecognized from our Consolidated Balance Sheets and are accounted for as secured financing transactions. When we neither retain nor transfer substantially all risks and rewards of ownership of the assets, we derecognize the assets if control over the assets is relinquished. If we retain control over the transferred assets, we continue to recognize the transferred assets to the extent of our continuing involvement. Management's judgment is applied in determining whether we have transferred or retained substantially all risk and rewards of ownership of the transferred financial asset.

The majority of assets transferred under repurchase agreements, securities lending agreements, and in our Canadian residential mortgage securitization transactions do not qualify for derecognition. As a result, we continue to record the associated transferred assets on our Consolidated Balance Sheets and no gains or losses are recognized for those securitization activities. Otherwise, a gain or loss is recognized on securitization by comparing the carrying amount of the transferred asset with its fair value at the date of the transfer. For further information on derecognition of financial assets, refer to Note 6 to our 2017 Annual Consolidated Financial Statements.

Application of the effective interest method
Interest is recognized in Interest income and Interest expense in the Consolidated Statements of Income for all interest bearing financial instruments using the effective interest method. The effective interest rate is the rate that discounts estimated future cash flows over the expected life of the financial asset or liability to the net carrying amount upon initial recognition. Significant judgment is applied in determining the effective interest rate due to uncertainty in the timing and amounts of future cash flows.

Provisions
Provisions are liabilities of uncertain timing or amount and are recognized when we have a present legal or constructive obligation as a result of a past event, it is probable that an outflow of resources will be required to settle the obligation, and a reliable estimate can be made of the amount of the obligation. We record provisions related to litigation, asset retirement obligations, and the allowance for off-balance sheet and other items. Provisions are recorded under Other liabilities on our Consolidated Balance Sheets.

Provisions are measured as the best estimate of the consideration required to settle the present obligation at the reporting date. Significant judgment is required in determining whether a present obligation exists and in estimating the probability, timing and amount of any outflows. The forward-looking nature of these estimates requires us to use a significant amount of judgment in projecting the timing and amount of future cash flows. We record our provisions on the basis of all available information at the end of the reporting period and make adjustments on a quarterly basis to reflect current expectations. Should actual results differ from our expectations, we may incur expenses in excess of the provisions recognized.

When some or all of the economic benefits required to settle a provision are expected to be recovered from a third party, such as an insurer, a separate asset is recognized if it is virtually certain that reimbursement will be received.

Insurance claims and policy benefit liabilities
Insurance claims and policy benefit liabilities represent current claims and estimates for future insurance policy benefits. Liabilities for life insurance contracts are determined using the Canadian Asset Liability Method, which incorporates assumptions for mortality, morbidity, policy lapses and surrenders, investment yields, policy dividends, operating and policy maintenance expenses, and provisions for adverse deviation. These assumptions are reviewed at least annually and updated in response to actual experience and market conditions. Liabilities for property and casualty insurance represent estimated provisions for reported and unreported claims. Liabilities for life and property and casualty insurance are included in Insurance claims and policy benefit liabilities. Changes in Insurance claims and policy benefit liabilities are included in the Insurance policyholder benefits, claims and acquisition expense in our Consolidated Statements of Income in the period in which the estimates change. Refer to Note 15 to our 2017 Annual Consolidated Financial Statements for further information.

Income taxes
We are subject to income tax laws in various jurisdictions where we operate, and the complex tax laws are potentially subject to different interpretations by us and the relevant taxation authority. Management's judgment is applied in interpreting the relevant tax laws and estimating the expected timing and amount of the provision for current and deferred income taxes. A deferred tax asset or liability is determined for each temporary difference based on the tax rates that are expected to be in effect in the period that the asset is realized or the liability is settled. Where the temporary differences will not reverse in the foreseeable future, no deferred tax amount is recognized.

On a quarterly basis, we review whether it is probable that the benefits associated with our deferred tax assets will be realized, using both positive and negative evidence. Refer to Note 23 to our 2017 Annual Consolidated Financial Statements for further information.

Future changes in accounting policy and disclosure

IFRS 9 *Financial Instruments* (IFRS 9)
In July 2014, the IASB issued the complete version of IFRS 9, which brings together the classification and measurement, impairment and hedge accounting phases of the IASB's project to replace IAS 39 *Financial Instruments: Recognition and Measurement* (IAS 39).

In January 2015, OSFI issued an advisory with respect to the early adoption of IFRS 9 for D-SIBs, requiring D-SIBs to adopt IFRS 9 for the annual period beginning on November 1, 2017. As a result, we are required to adopt IFRS 9 on November 1, 2017, with the exception of the own credit provisions of IFRS 9, which we adopted in the second quarter of 2014.

In June 2016, OSFI issued its final guideline on *IFRS 9 Financial Instruments and Disclosures*. The guideline provides guidance to Federally Regulated Entities on the application of IFRS 9, including the implementation of the expected credit loss framework under IFRS 9. The OSFI guideline is effective for us on November 1, 2017, consistent with the adoption of IFRS 9.

The new classification and measurement and impairment requirements will be applied by adjusting our Consolidated Balance Sheet on November 1, 2017, the date of initial application, with no restatement of comparative period financial information. Based on current estimates, the adoption of IFRS 9 is expected to result in a reduction to retained earnings as at November 1, 2017 of approximately $600 million, net of taxes. The impact is primarily attributable to increases in the allowance for credit losses under the new impairment requirements. We do not expect the adoption of IFRS 9 to have a significant impact on our CET1 capital. We continue to monitor and refine certain elements of our impairment process in advance of Q1 2018 reporting.

Classification and measurement
IFRS 9 introduces a principles-based approach to the classification of financial assets. Debt instruments, including hybrid contracts, are measured at fair value through profit or loss (FVTPL), FVOCI or amortized cost based on the nature of the cash flows of the assets and an entity's business model. These categories replace the existing IAS 39 classifications of FVTPL, AFS, loans and receivables, and held-to-maturity. Equity instruments are measured at FVTPL, unless they are not held for trading purposes, in which case an irrevocable election can be made on initial recognition to measure them at FVOCI with no subsequent reclassification to profit or loss.

For financial liabilities, most of the pre-existing requirements for classification and measurement previously included in IAS 39 were carried forward unchanged into IFRS 9. The requirements related to the fair value option for financial liabilities, which were adopted in 2014, were changed to address the treatment of own credit risk.

The combined application of the contractual cash flow characteristics and business model tests as at November 1, 2017 is expected to result in certain differences in the classification of financial assets when compared to our classification under IAS 39. The most significant changes include the following:

- Approximately $25 billion of debt securities previously classified as AFS are expected to be classified as amortized cost based on a held-to-collect business model.
- Approximately $2.5 billion of securities previously classified as AFS are expected to be classified as FVTPL, primarily representing equities and debt securities whose cash flows do not represent solely payments of principal and interest.

Impairment
IFRS 9 introduces an expected credit loss impairment model that differs significantly from the incurred loss model under IAS 39 and is expected to result in earlier recognition of credit losses. Additional details on the key elements of the new expected credit loss model are described below.

Scope
Under IFRS 9, the same impairment model is applied to all financial assets, except for financial assets classified or designated as at FVTPL and equity securities designated as at FVOCI, which are not subject to impairment assessment. The scope of the IFRS 9 expected credit loss impairment model includes amortized cost financial assets, debt securities classified as at FVOCI, and off balance sheet loan commitments and financial guarantees which were previously provided for under IAS 37 *Provisions, Contingent Liabilities and Contingent Assets* (IAS 37). The above-mentioned reclassifications into or out of these categories under IFRS 9 and items that previously fell under the IAS 37 framework were considered in determining the scope of our application of the new expected credit loss impairment model.

Expected credit loss impairment model
Under IFRS 9, credit loss allowances will be measured on each reporting date according to a three-stage expected credit loss impairment model:

- Stage 1 – From initial recognition of a financial asset to the date on which the asset has experienced a significant increase in credit risk relative to its initial recognition, a loss allowance is recognized equal to the credit losses expected to result from defaults occurring over the next 12 months.
- Stage 2 – Following a significant increase in credit risk relative to the initial recognition of the financial asset, a loss allowance is recognized equal to the credit losses expected over the remaining lifetime of the asset.
- Stage 3 – When a financial asset is considered to be credit-impaired, a loss allowance equal to full lifetime expected credit losses will be recognized. Interest revenue is calculated based on the carrying amount of the asset, net of the loss allowance, rather than on its gross carrying amount.

Stage 1 and Stage 2 credit loss allowances effectively replace the collectively-assessed allowance for loans not yet identified as impaired recorded under IAS 39, while Stage 3 credit loss allowances effectively replace the individually and collectively assessed allowances for impaired loans. Under IFRS 9, the population of financial assets and corresponding allowances disclosed as Stage 3 will not necessarily correspond to the amounts of financial assets currently disclosed as impaired in accordance with IAS 39. Consistent with IAS 39, loans are written off when there is no realistic probability of recovery. Accordingly, our policy on when financial assets are written-off will not significantly change on adoption of IFRS 9.

Because all financial assets within the scope of the IFRS 9 impairment model will be assessed for at least 12-months of expected credit losses, and the population of financial assets to which full lifetime expected credit losses applies is larger than the population of impaired loans for which there is objective evidence of impairment in accordance with IAS 39, loss allowances are generally expected to be higher under IFRS 9 relative to IAS 39.

Changes in the required credit loss allowance, including the impact of movements between Stage 1 (12 month expected credit losses) and Stage 2 (lifetime expected credit losses), will be recorded in profit or loss. Because of the impact of moving between 12 month and lifetime expected credit losses and the application of forward looking information, provisions are expected to be more volatile under IFRS 9 than IAS 39.

Measurement
The measurement of expected credit losses will primarily be based on the product of the instrument's probability of default (PD), loss given default (LGD), and exposure at default (EAD), discounted to the reporting date. The main difference between Stage 1 and Stage 2 expected credit losses is the respective PD horizon. Stage 1 estimates will use a maximum of a 12-month PD while Stage 2 estimates will use a lifetime PD. Stage 3 estimates will continue to leverage existing processes for estimating losses on impaired loans, however, these processes will be updated to reflect the requirements of IFRS 9, including the requirement to consider multiple forward-looking scenarios.

An expected credit loss estimate will be produced for each individual exposure, including amounts which are subject to a more simplified model for estimating expected credit losses; however the relevant parameters will be modeled on a collective basis using largely the same underlying data pool supporting our stress testing and regulatory capital expected loss processes. Models have been developed, primarily leveraging our existing models for enterprise-wide stress testing.

For the small percentage of our portfolios that lack detailed historical information and/or loss experience, we will apply simplified measurement approaches that may differ from what is described above. These approaches have been designed to maximize the available information that is reliable and supportable for each portfolio and may be collective in nature.

Expected credit losses must be discounted to the reporting period using the effective interest rate, or an approximation thereof.

Movement between stages
Movements between Stage 1 and Stage 2 are based on whether an instrument's credit risk as at the reporting date has increased significantly relative to the date it was initially recognized. For the purposes of this assessment, credit risk is based on an instrument's lifetime PD, not the

losses we expect to incur. The assessment of significant increases in credit risk is a new concept under IFRS 9 and will require significant judgment.

Our assessment of significant increases in credit risk will be performed at least quarterly for each individual exposure based on three factors. If any of the following factors indicates that a significant increase in credit risk has occurred, the instrument will be moved from Stage 1 to Stage 2:

(1) We have established thresholds for significant increases in credit risk based on both a percentage and absolute change in lifetime PD relative to initial recognition. The exact thresholds applied will differ by product and/or business.
(2) Additional qualitative reviews will be performed to assess the staging results and make adjustments, as necessary, to better reflect the positions which have significantly increased in risk.
(3) IFRS 9 contains a rebuttable presumption that instruments which are 30 days past due have experienced a significant increase in credit risk. We do not intend to rebut this presumption.

Movements between Stage 2 and Stage 3 are based on whether financial assets are credit-impaired as at the reporting date. The determination of credit-impairment under IFRS 9 will be similar to the individual assessment of financial assets for objective evidence of impairment under IAS 39.

The assessments for significant increases in credit risk since initial recognition and credit-impairment are performed independently as at each reporting period. Assets can move in both directions through the stages of the impairment model. After a financial asset has migrated to Stage 2, if it is no longer considered that credit risk has significantly increased relative to initial recognition in a subsequent reporting period, it will move back to Stage 1. Similarly, an asset that is in Stage 3 will move back to Stage 2 if it is no longer considered to be credit-impaired.

Forward-looking information

The measurement of expected credit losses for each stage and the assessment of significant increases in credit risk must consider information about past events and current conditions as well as reasonable and supportable forecasts of future events and economic conditions. The estimation and application of forward-looking information will require significant judgment.

PD, LGD and EAD inputs used to estimate Stage 1 and Stage 2 credit loss allowances are modelled based on the macroeconomic variables (or changes in macroeconomic variables) that are most closely correlated with credit losses in the relevant portfolio. Each macroeconomic scenario used in our expected credit loss calculation will have forecasts of the relevant macroeconomic variables – including, but not limited to, unemployment rates, gross domestic product, bond yields, credit spreads, equity indices, stock market volatility, residential and commercial real estate prices, and commodity prices – for a five year period, subsequently reverting to long-run averages.

Our estimation of expected credit losses in Stage 1 and Stage 2 will be a discounted probability-weighted estimate that considers a minimum of three future macroeconomic scenarios. Our base case scenario will be based on macroeconomic forecasts published by our internal economics group. Upside and downside scenarios will be set relative to our base case scenario based on reasonably possible alternative macroeconomic conditions. Scenario design, including the identification of additional downside scenarios will occur on at least an annual basis and more frequently if conditions warrant.

Scenarios will be probability-weighted according to our best estimate of their relative likelihood based on historical frequency and current trends and conditions. Probability weights will be updated on a quarterly basis. All scenarios considered will be applied to all portfolios subject to expected credit losses with the same probabilities.

Loss rates used in collectively-assessed Stage 3 allowances will be adjusted based on the forward-looking macroeconomic scenarios used in the Stage 1 and Stage 2 estimates. Individually-assessed allowances will be established on consideration of a range of possible outcomes, which may include macroeconomic or non-macroeconomic scenarios, as appropriate.

Our assessment of significant increases in credit risk will be based on changes in probability-weighted forward-looking lifetime PD, using the same macroeconomic scenarios as the calculation of expected credit losses.

Expected life

For instruments in Stage 2 or Stage 3, loss allowances will cover expected credit losses over the expected remaining lifetime of the instrument. For most instruments, the expected life is limited to the remaining contractual life, adjusted as applicable for expected prepayments. However, an exemption from this limit is granted for instruments that include both a loan and undrawn commitment component and where our contractual ability to demand repayment and cancel the undrawn commitment does not limit our exposure to credit losses to the contractual notice period. For products in scope of this exemption, the expected life is the period over which our exposure to credit losses is not mitigated by our normal credit risk management actions. Determining the instruments in scope for this exemption and estimating the appropriate remaining life will require significant judgment.

Products identified as in scope of the lifetime exemption include credit cards, overdraft balances and certain revolving lines of credit. The expected life for these products will be determined using a behavioral life simulation, based on our historical experience.

Definition of default

The definition of default used in the measurement of expected credit losses and the assessment to determine movement between stages will be consistent with the definition of default used for internal credit risk management purposes. IFRS 9 does not define default, but contains a rebuttable presumption that default has occurred when an exposure is greater than 90 days past due. We will rebut this presumption for our Canadian and U.S. credit card assets, which use a definition of default of 180 days for both accounting and regulatory capital purposes, based on an analysis of write-off and cure rates which indicates that a more lagging criterion is appropriate.

Governance

As part of the implementation of IFRS 9, we have designed and implemented new controls and governance procedures in several areas that contribute to the calculation of expected credit losses. These include controls over credit risk data and systems, expected credit loss models and calculation engine, forecasts of future macroeconomic variables, design and probability-weighting of future macroeconomic scenarios, and the determination of significant increases in credit risk.

In addition to the existing risk management framework, we have established an Allowance Committee to provide oversight to the IFRS 9 impairment process. The Allowance Committee is comprised of senior representatives from Finance, Risk Management and Economics and will be responsible for reviewing and approving key inputs and assumptions used in our expected credit loss estimates. It also assesses the appropriateness of the overall allowance results to be included in our financial statements. We have also established the Business Advisory Working Group, comprised of senior representatives from the Business and Risk Management, which provides advice to the Allowance Committee on certain measurement methodology and assumptions. The new committee structure, with underlying key controls, went into operation in 2017.

Regulatory capital
Under the Basel III regulatory capital framework, any shortfall of accounting allowances to expected losses calculated according to the Basel rules for IRB portfolios is a deduction from CET1 capital. If accounting allowances exceed Basel expected losses, the excess is included as Tier 2 capital.

After the adoption of IFRS 9, expected loss models will be used for both regulatory capital and accounting purposes. Under both models, expected losses are calculated as the product of PD, LGD and EAD. However, there are several key differences under current Basel rules which could lead to significantly different expected loss estimates:

- Basel PDs are based on long-run averages over an entire economic cycle. IFRS 9 PDs are based on current conditions, adjusted for estimates of future conditions that will impact PD under several probability-weighted macroeconomic scenarios.
- Basel PDs consider the probability of default over the next 12 months. IFRS 9 PDs consider the probability of default over the next 12 months only for instruments in Stage 1. Expected credit losses for instruments in Stage 2 are calculated using lifetime PDs.
- Basel LGDs are based on severe but plausible downturn economic conditions. IFRS 9 LGDs are based on current conditions, adjusted for estimates of future conditions that will impact LGD under several probability-weighted macroeconomic scenarios.

As at October 31, 2017, our shortfall of accounting allowances under IAS 39 to Basel expected losses was $1.2 billion. We expect the impact of the impairment requirements of IFRS 9 to reduce but not eliminate the shortfall of accounting allowances to Basel expected losses as at November 1, 2017. Going forward, the regulatory capital impact of further increases in our accounting allowances under IFRS 9 will be mitigated to the extent of the remaining deduction from CET1 capital.

Hedge accounting
The new hedge accounting model under IFRS 9 aims to simplify hedge accounting, align the accounting for hedge relationships more closely with an entity's risk management activities and permit hedge accounting to be applied more broadly to a greater variety of hedging instruments and risks eligible for hedge accounting.

The new standard does not explicitly address the accounting for macro hedging activities, which is being addressed by the IASB through a separate project. As a result, IFRS 9 includes an accounting policy choice to retain IAS 39 for hedge accounting requirements until the amended standard resulting from the IASB's project on macro hedge accounting is effective. We will elect the accounting policy choice to continue applying hedge accounting under the IAS 39 framework. The new hedge accounting disclosures required by the related amendments to IFRS 7 *Financial Instruments: Disclosures*, however, are required for the annual period beginning November 1, 2017.

Transition
To manage our transition to IFRS 9, we implemented a comprehensive enterprise-wide program led jointly by Finance and Risk Management that focuses on key areas of impact, including financial reporting, data, systems and processes, as well as communications and training. Throughout the project, we have provided regular updates to the Audit Committee, Risk Committee and senior management to ensure escalation of key issues and risks.

During fiscal 2015 and 2016, we completed initial assessments of the scope of IFRS 9, differences from IAS 39, classification of financial assets, financial and economic impacts, system and resource requirements, and key accounting interpretations. We also designed and began building the systems, models, controls and processes required to implement IFRS 9.

During fiscal 2017, we completed the following steps:

- Completed a parallel run of the full end to end process during the fourth quarter of 2017, the results of which were used to test our models and methodologies against our key performance indicators;
- Validated significant new impairment models;
- Completed documentation of updated bank-wide accounting and risk policies;
- Finalized governance and control frameworks over new processes and testing of internal controls;
- Documented the roll-out and implementation of the IFRS 9 project and governance structure including key controls;
- Continued to provide training and educational seminars to impacted internal stakeholders; and
- Prepared external disclosures to be provided on transition to IFRS 9 and going forward on a quarterly or annual basis.

IFRS 15 *Revenue from Contracts with Customers* (IFRS 15)
In May 2014, the IASB issued IFRS 15, which establishes the principles for reporting about the nature, amount, timing and uncertainty of revenue and cash flows arising from an entity's contracts with customers. The standard provides a single, principles based five-step model for revenue recognition to be applied to contracts with customers except for revenue arising from items such as financial instruments, insurance contracts and leases. The majority of our revenue, including net interest income, is not expected to be impacted. In April 2016, the IASB issued amendments to IFRS 15, which clarify the underlying principles of IFRS 15 and provide additional transitional relief on initial application. IFRS 15 and its amendments will be effective for us on November 1, 2018.

We plan to adopt IFRS 15 by adjusting our Consolidated Balance Sheet at November 1, 2018, the date of initial application, with no restatement of comparative periods.

To manage our transition to IFRS 15, we implemented a comprehensive enterprise-wide program and governance structure led by Finance that focuses on key areas of impact, including financial reporting, systems and processes, training, as well as communications.

During fiscal 2017, we have continued to manage the IFRS 15 program through detailed assessment of our higher-risk revenue contracts and accounting policies. In the upcoming year, we will continue our assessment of the remaining revenue contracts and finalize the changes required to our applicable transition, interim and annual disclosures. While our implementation efforts are not complete, aside from the limited changes necessary to comply with the enhanced presentation and disclosure requirements, we do not expect any material impacts of IFRS 15 on our Consolidated Financial Statements.

As we prepare for our transition to IFRS 15, we will continue to monitor industry interpretations of the new standard and expect to adjust our implementation accordingly.

IFRS 16 *Leases* (IFRS 16)
In January 2016, the IASB issued IFRS 16, which sets out the principles for the recognition, measurement, presentation and disclosure of leases. The standard removes the current requirement for lessees to classify leases as finance leases or operating leases by introducing a single lessee accounting model that requires the recognition of lease assets and lease liabilities on the balance sheet for most leases. Lessees will also recognize depreciation expense on the lease asset and interest expense on the lease liability in the statement of income. There are no significant changes to lessor accounting aside from enhanced disclosure requirements. IFRS 16 will be effective for us on November 1, 2019.

IAS 7 *Statement of Cash Flows* (IAS 7)
In January 2016, the IASB issued amendments to IAS 7, which will require specific disclosures for movements in certain liabilities on the statement of cash flows. These amendments will be effective for us on November 1, 2017 and will adopt these disclosures in our 2018 Consolidated Financial Statements. The adoption of these amendments is not expected to have a material impact on our consolidated financial statements.

IFRS 17 *Insurance Contracts* (IFRS 17)
In May 2017, the IASB issued IFRS 17 to establish a comprehensive global insurance standard which provides guidance on the recognition, measurement, presentation and disclosures of insurance contracts. This new standard will be effective for us on November 1, 2021. We are currently assessing the impact of adopting this standard on our Consolidated Financial Statements.

Regulatory developments

Global systemically important bank (G-SIB) designation
On November 21, 2017, Royal Bank of Canada was designated as a G-SIB by the FSB. We remain in consultation with OSFI and other relevant regulatory bodies to discuss and understand the impacts resulting from the G-SIB designation; however we do not expect any significant impacts resulting from the designation. In accordance with BCBS requirements, we will begin disclosing the detailed template used in the calculation of each of the 12 G-SIB indicators beginning in Q1 2018. The proposed 2018 CAR Guideline also clarifies that if, and when, a Canadian bank is designated a G-SIB, the higher of the D-SIB and G-SIB surcharges will apply.

BCBS Pillar 3 disclosure requirements
In April 2017, OSFI issued final guidelines for the first phase of the Pillar 3 disclosure requirements, indicating that all D-SIBs are expected to implement the "Revised Pillar 3 Disclosure Requirements", issued by the BCBS in January 2015 for the reporting period ending October 31, 2018 (and referenced by BCBS as phase one). These guidelines replace existing disclosure requirements in the areas of credit risk, counterparty credit risk and securitization activities. We are making progress and expect to meet OSFI's stated timeline.

In March 2017, the BCBS issued its second phase of the Pillar 3 disclosure requirements entitled, "*Pillar 3 disclosure requirements – consolidated and enhanced framework*". The enhancements include the addition of a dashboard of key metrics and incorporates disclosure requirements related to ongoing reforms to the regulatory environment, such as the TLAC regime for G-SIBs, the proposed operational risk requirements, and the final standard for market risk. The disclosure standard also consolidates all existing Pillar 3 disclosure requirements of the Basel III framework, including the leverage and liquidity ratios disclosure templates. This phase two requirement, together with the phase one *Revised Pillar 3 disclosure requirements*, issued in January 2015, comprise the single Pillar 3 framework. OSFI has not yet released the implementation date for the BCBS phase two disclosure requirements.

The BCBS has commenced its work on the final phase of the Pillar 3 disclosure requirements, which includes the standardized approach RWA to benchmark internally modelled capital requirements, asset encumbrance, operational risk, and ongoing policy reform.

Capital treatment proposed or issued in connection with accounting changes
On March 29, 2017, the BCBS issued a standard with details on the interim regulatory treatment of accounting provisions under the Basel III regulatory capital framework. The standard addresses the impact of new expected credit loss accounting requirements under IFRS 9 *Financial Instruments* (IFRS 9) that will replace the current incurred loss models used for accounting purposes. IFRS 9 will be effective for us on November 1, 2017. For further details on the adoption of IFRS 9, including applicable regulatory guidance, refer to the Critical accounting policies and estimates section.

The standard retains the current regulatory treatment of accounting provisions under the standardized and the internal ratings-based approaches until a longer-term solution is developed. It also sets out transitional arrangements which allow for a phase-in of the impact of the new expected credit loss accounting standard on regulatory capital for up to five years, should individual jurisdictions choose to provide capital relief. OSFI has not adopted any of these transitional arrangements.

On August 21, 2017, OSFI announced its intention to delay the domestic implementation of the BCBS frameworks related to the Standardized Approach to Counterparty Credit Risk (SA-CCR) and the revisions to the capital requirements for bank exposures to Central counterparties until Q1 2019. In addition, in its communication, OSFI announced its intention to delay the implementation of the BCBS Revised Securitization Framework until Q1 2019.

Controls and procedures

Disclosure controls and procedures
Our disclosure controls and procedures are designed to provide reasonable assurance that information required to be disclosed by us in reports filed or submitted under Canadian and U.S. securities laws is recorded, processed, summarized and reported within the time periods specified under those laws and include controls and procedures that are designed to ensure that information is accumulated and communicated to management, including the President and Chief Executive Officer, and the Chief Financial Officer, to allow timely decisions regarding required disclosure.

As of October 31, 2017, management evaluated, under the supervision of and with the participation of the President and Chief Executive Officer and the Chief Financial Officer, the effectiveness of our disclosure controls and procedures as defined under rules adopted by the United States Securities and Exchange Commission (U.S. SEC). Based on that evaluation, the President and Chief Executive Officer and the Chief Financial Officer concluded that our disclosure controls and procedures were effective as of October 31, 2017.

Internal control over financial reporting
Management is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with IFRS. However, because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements on a timely basis. See Management's Report on Internal Control over Financial Reporting and the Report of Independent Registered Public Accounting Firm.

No changes were made in our internal control over financial reporting during the year ended October 31, 2017 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Related party transactions

In the ordinary course of business, we provide normal banking services and operational services, and enter into other transactions with associated and other related corporations, including our joint venture entities, on terms similar to those offered to non-related parties. We grant loans to directors, officers and other employees at rates normally accorded to preferred clients. In addition, we offer deferred share and other plans to non-employee directors, executives and certain other key employees. For further information, refer to Notes 12 and 28 of our audited 2017 Annual Consolidated Financial Statements.

Supplementary information

Selected annual information — Table 77

(Millions of Canadian dollars, except as otherwise noted)	2017	2016	2015
Total revenue (1)	**$ 40,669**	$ 38,795	$ 35,703
Net income attributable to:			
Shareholders	**11,428**	10,405	9,925
Non-controlling interest	**41**	53	101
	$ 11,469	$ 10,458	$ 10,026
Basic earnings per share (in dollars)	**7.59**	6.80	6.75
Diluted earnings per share (in dollars)	**7.56**	6.78	6.73
Dividends declared per common shares (in dollars)	**3.48**	3.24	3.08
Total assets	**1,212,853**	1,180,258	1,074,208
Deposits	**789,635**	757,589	697,227

(1) Effective Q4 2017, certain commissions and fees paid and related revenue are presented on a gross basis in non-interest expense and non-interest income, respectively. Prior period amounts have been reclassified to conform with this presentation.

Net interest income on average assets and liabilities — Table 78

(Millions of Canadian dollars, except for percentage amounts)	Average balances 2017	Average balances 2016	Interest 2017	Interest 2016	Average rate 2017	Average rate 2016
Assets						
Deposits with other banks						
Canada	$ 11,380	$ 11,679	$ 146	$ 114	1.28%	0.98%
U.S.	21,508	16,842	192	71	0.89	0.42
Other International	17,215	15,415	(31)	(18)	(0.18)	(0.12)
	50,103	43,936	307	167	0.61%	0.38%
Securities						
Trading	130,816	153,114	3,520	3,366	2.69	2.20
Available-for-sale	83,787	72,440	1,379	1,227	1.65	1.69
	214,603	225,554	4,899	4,593	2.28	2.04
Asset purchased under reverse repurchase agreements and securities borrowed	205,993	191,243	3,021	1,816	1.47	0.95
Loans (1)						
Canada						
Retail	350,155	338,270	11,672	11,141	3.33	3.29
Wholesale	74,955	69,028	3,534	3,249	4.71	4.71
	425,110	407,298	15,206	14,390	3.58	3.53
U.S.	75,967	75,734	2,391	2,038	3.15	2.69
Other International	27,201	29,409	1,080	1,448	3.97	4.92
	528,278	512,441	18,677	17,876	3.54	3.49
Total interest-earning assets	998,977	973,174	26,904	24,452	2.69	2.51
Non-interest-bearing deposits with other banks	23,953	17,586	–	–	–	–
Customers' liability under acceptances	14,550	13,247	–	–	–	–
Other assets	149,114	172,393	–	–	–	–
Total assets	$ 1,186,600	$ 1,176,400	$ 26,904	$ 24,452	2.27%	2.08%
Liabilities and shareholders' equity						
Deposits (2)						
Canada	$ 498,134	$ 487,194	$ 5,560	$ 4,714	1.12%	0.97%
U.S.	79,354	83,001	640	413	0.81	0.50
Other International	70,028	67,365	364	340	0.52	0.50
	647,516	637,560	6,564	5,467	1.01	0.86
Obligations related to securities sold short	37,205	50,262	1,515	1,579	4.07	3.14
Obligations related to assets sold under repurchase agreements and securities loaned	128,831	110,231	1,396	629	1.08	0.57
Subordinated debentures	9,460	8,931	270	227	2.85	2.54
Other interest-bearing liabilities	14,839	15,437	19	19	0.13	0.12
Total interest-bearing liabilities	837,851	822,421	9,764	7,921	1.17	0.96
Non-interest-bearing deposits	122,800	112,071	–	–	–	–
Acceptances	14,549	13,248	–	–	–	–
Other liabilities	138,797	159,215	–	–	–	–
Total liabilities	$ 1,113,997	$ 1,106,955	$ 9,764	$ 7,921	0.88%	0.72%
Equity	72,607	69,445	n.a.	n.a.	n.a.	n.a.
Total liabilities and shareholders' equity	$ 1,186,600	$ 1,176,400	$ 9,764	$ 7,921	0.82%	0.67%
Net interest income and margin	$ 1,186,600	$ 1,176,400	$ 17,140	$ 16,531	1.44%	1.41%
Net interest income and margin (average earning assets)						
Canada	$ 595,790	$ 572,671	$ 12,104	$ 11,694	2.03%	2.04%
U.S.	243,276	246,065	3,469	3,241	1.43	1.32
Other International	159,912	154,438	1,567	1,596	0.98	1.03
Total	$ 998,978	$ 973,174	$ 17,140	$ 16,531	1.72%	1.70%

(1) Interest income includes loan fees of $561 million (2016 – $573 million).

(2) Deposits include personal savings deposits with average balances of $178 billion (2016 – $166 billion), interest expense of $.5 billion (2016 – $.4 billion) and average rates of .3% (2016 – .3%). Deposits also include term deposits with average balances of $353 billion (2016 – $362 billion), interest expense of $5.0 billion (2016 – $4.3 billion) and average rates of 1.42% (2016 – 1.20%).

Change in net interest income — Table 79

(Millions of Canadian dollars)	2017 (1) vs. 2016 Increase (decrease) due to changes in Average volume (2)	Average rate (2)	Net change
Assets			
Deposits with other banks			
Canada (3)	$ (3)	$ 35	$ 32
U.S. (3)	20	101	121
Other international (3)	(2)	(11)	(13)
Securities			
Trading	(490)	644	154
Available-for-sale	192	(40)	152
Asset purchased under reverse repurchase agreements and securities borrowed	140	1,065	1,205
Loans			
Canada			
Retail	391	140	531
Wholesale	279	6	285
U.S.	6	347	353
Other international	(109)	(259)	(368)
Total interest income	$ 424	$ 2,028	$ 2,452
Liabilities			
Deposits			
Canada	106	740	846
U.S.	(18)	245	227
Other international	13	11	24
Obligations related to securities sold short	(410)	346	(64)
Obligations related to assets sold under repurchase agreements and securities loaned	106	661	767
Subordinated debentures	13	30	43
Other interest-bearing liabilities	(1)	1	–
Total interest expense	$ (191)	$ 2,034	$ 1,843
Net interest income	$ 615	$ (6)	$ 609

(1) Insurance segment assets and liabilities are included in Other assets and Other liabilities, respectively.
(2) Volume/rate variance is allocated on the percentage relationships of changes in balances and changes in rates to the total net change in net interest income.
(3) Geographic classification for selected assets and liabilities is based on the domicile of the booking point of the subject assets and liabilities.

Loans and acceptances by geography — Table 80

As at October 31 (Millions of Canadian dollars)	2017	2016	2015	2014	2013
Canada					
Residential mortgages	$ 255,799	$ 241,800	$ 229,987	$ 215,624	$ 206,134
Personal	82,022	82,205	84,637	86,984	86,102
Credit cards	17,491	16,601	15,516	14,650	13,902
Small business	4,493	3,878	4,003	4,067	4,026
Retail	359,805	344,484	334,143	321,325	310,164
Business	88,453	76,266	71,246	64,643	58,920
Sovereign (1)	9,379	8,586	8,508	3,840	3,807
Bank	1,326	1,278	530	413	823
Wholesale	$ 99,158	$ 86,130	$ 80,284	$ 68,896	$ 63,550
	$ 458,963	$ 430,614	$ 414,427	$ 390,221	$ 373,714
U.S.					
Retail	18,100	17,134	5,484	4,686	3,734
Wholesale	55,037	59,349	34,702	23,639	19,443
	73,137	76,483	40,186	28,325	23,177
Other International					
Retail	7,265	7,852	8,556	8,258	6,768
Wholesale	21,870	21,733	24,536	21,881	17,103
	29,135	29,585	33,092	30,139	23,871
Total loans and acceptances	$ 561,235	$ 536,682	$ 487,705	$ 448,685	$ 420,762
Total allowance for loan losses	(2,159)	(2,235)	(2,029)	(1,994)	(1,959)
Total loans and acceptances, net of allowance for loan losses	$ 559,076	$ 534,447	$ 485,676	$ 446,691	$ 418,803

(1) In 2015, we reclassified $4 billion from AFS securities to Loans.

Loans and acceptances by portfolio and sector — Table 81

As at October 31 (Millions of Canadian dollars)	2017	2016	2015	2014	2013
Residential mortgages	$ 270,348	$ 254,998	$ 233,975	$ 219,257	$ 209,238
Personal	92,294	93,466	94,346	96,021	93,260
Credit cards	18,035	17,128	15,859	14,924	14,142
Small business	4,493	3,878	4,003	4,067	4,026
Retail	$ 385,170	$ 369,470	$ 348,183	$ 334,269	$ 320,666
Business					
Agriculture	7,380	6,515	6,057	5,694	5,441
Automotive	8,248	7,279	6,614	6,209	6,167
Consumer goods	11,387	10,052	7,146	7,172	6,230
Energy					
Oil & gas	6,743	6,259	7,691	5,849	5,046
Utilities	5,614	7,680	5,162	3,766	3,860
Financing products	6,556	8,840	10,093	3,670	3,162
Forest products	911	1,099	1,169	979	893
Health services	6,998	7,763	6,023	4,052	3,786
Holding and investments	8,803	7,195	6,935	6,865	4,973
Industrial products	5,581	5,508	4,725	4,665	4,038
Mining & metals	1,113	1,455	1,402	1,320	1,074
Non-bank financial services	10,744	8,408	6,428	5,688	4,903
Other services	14,757	11,582	8,834	8,322	8,090
Real estate & related	46,197	40,419	33,802	30,387	24,413
Technology & media	8,890	11,019	6,599	4,822	4,006
Transportation & environment	5,950	6,060	5,907	5,432	5,593
Other	4,570	7,568	3,248	3,695	2,705
Sovereign	11,362	10,581	9,887	4,628	4,396
Bank	4,261	1,930	1,800	1,201	1,320
Wholesale	$ 176,065	$ 167,212	$ 139,522	$ 114,416	$ 100,096
Total loans and acceptances	$ 561,235	$ 536,682	$ 487,705	$ 448,685	$ 420,762
Total allowance for loan losses	(2,159)	(2,235)	(2,029)	(1,994)	(1,959)
Total loans and acceptances, net of allowance for loan losses	$ 559,076	$ 534,447	$ 485,676	$ 446,691	$ 418,803

Impaired loans by portfolio and geography — Table 82

As at October 31 (Millions of Canadian dollars, except for percentage amounts)	2017	2016	2015	2014	2013
Residential mortgages	$ 634	$ 709	$ 646	$ 678	$ 691
Personal	276	304	299	300	363
Small business	38	46	45	47	37
Retail	948	1,059	990	1,025	1,091
Business					
Agriculture	$ 28	$ 43	$ 41	$ 40	$ 43
Automotive	29	43	11	12	12
Consumer goods	105	165	130	108	101
Energy					
Oil and gas	315	1,264	156	6	14
Utilities	10	78	57	–	–
Financing products	107	111	109	–	39
Forest products	7	21	28	25	26
Health services	21	21	17	18	25
Holding and investments	27	72	185	132	40
Industrial products	34	43	45	48	54
Mining & metals	3	15	17	9	2
Non-bank financial services	32	3	1	3	1
Other services	157	109	69	99	101
Real estate & related	345	241	297	314	367
Technology & media	82	93	34	38	117
Transportation & environment	23	45	53	32	98
Other	47	57	43	66	67
Sovereign	–	–	–	–	–
Bank	–	2	2	2	3
Wholesale	1,372	2,426	1,295	952	1,110
Acquired credit-impaired loans	256	418	–	–	–
Total impaired loans (1)	$ 2,576	$ 3,903	$ 2,285	$ 1,977	$ 2,201
Canada					
Residential mortgages	$ 323	$ 368	$ 356	$ 388	$ 464
Personal	198	228	223	224	229
Small business	38	46	45	47	36
Retail	559	642	624	659	729
Business					
Agriculture	22	34	39	36	38
Automotive	4	9	8	11	9
Consumer goods	45	91	65	70	58
Energy					
Oil & gas	13	57	39	4	14
Utilities	–	15	20	–	–
Financing products	–	–	–	–	–
Forest products	7	21	5	6	8
Health services	5	18	17	19	15
Holding and investments	3	5	3	3	3
Industrial products	25	39	39	41	40
Mining & metals	3	12	7	9	2
Non-bank financial services	29	–	–	1	1
Other services	48	49	51	67	59
Real estate & related	187	121	161	171	169
Technology & media	12	27	34	37	86
Transportation & environment	23	24	29	11	21
Other	–	–	(5)	1	3
Sovereign	–	–	–	–	–
Bank	–	–	–	–	–
Wholesale	426	522	512	487	526
Total	$ 985	$ 1,164	$ 1,136	$ 1,146	$ 1,255
U.S.					
Retail	$ 59	$ 56	$ 10	$ 13	$ 14
Wholesale	736	1,736	204	18	98
Total	$ 795	$ 1,792	$ 214	$ 31	$ 112
Other International					
Retail	$ 345	$ 380	$ 356	$ 353	$ 348
Wholesale	451	567	579	447	486
Total	$ 796	$ 947	$ 935	$ 800	$ 834
Total impaired loans	$ 2,576	$ 3,903	$ 2,285	$ 1,977	$ 2,201
Allowance for impaired loans	(737)	(809)	(654)	(632)	(599)
Net impaired loans	$ 1,839	$ 3,094	$ 1,631	$ 1,345	$ 1,602
Gross impaired loans as a % of loans and acceptances					
Residential mortgages	0.23%	0.28%	0.28%	0.31%	0.33%
Personal	0.30%	0.33%	0.32%	0.31%	0.39%
Small business	0.85%	1.19%	1.13%	1.16%	0.83%
Retail	0.25%	0.29%	0.28%	0.31%	0.34%
Wholesale	0.92%	1.69%	0.93%	0.84%	1.11%
Total	0.46%	0.73%	0.47%	0.44%	0.52%
Allowance for impaired loans as a % of gross impaired loans	28.61%	20.72%	28.64%	31.98%	27.22%

(1) Past due loans greater than 90 days not included in impaired loans were $307 million in 2017 (2016 – $337 million; 2015 – $314 million; 2014 – $316 million; 2013 – $346 million). For further details, refer to Note 5 of our 2017 Annual Consolidated Financial Statements.

Provision for credit losses by portfolio and geography — Table 83

(Millions of Canadian dollars, except for percentage amounts)	2017	2016	2015	2014	2013
Residential mortgages	$ 56	$ 77	$ 47	$ 94	$ 41
Personal	409	458	388	441	458
Credit cards	435	442	378	353	354
Small business	32	34	32	44	32
Retail	**$ 932**	**$ 1,011**	**$ 845**	**$ 932**	**$ 885**
Business					
Agriculture	$ 2	$ 10	$ 9	$ 3	$ 4
Automotive	14	13	3	2	3
Consumer goods	11	20	33	27	17
Energy					
Oil and gas	(27)	320	47	(5)	(6)
Utilities	5	16	9	32	–
Financing products	(19)	1	39	3	1
Forest products	4	4	6	7	4
Health services	10	4	–	–	–
Holding and investments	1	–	18	29	(6)
Industrial products	16	12	4	14	21
Mining & metals	(4)	7	8	2	1
Non-bank financial services	2	–	7	–	10
Other services	20	(5)	4	18	14
Real estate & related	115	36	29	58	62
Technology & media	13	8	5	14	157
Transportation & environment	–	(4)	8	2	35
Other	53	36	24	26	35
Sovereign	–	–	–	–	–
Bank	–	(3)	(1)	–	–
Wholesale	**$ 216**	**$ 475**	**$ 252**	**$ 232**	**$ 352**
Acquired credit-impaired loans	2	10	–	–	–
Total provision for credit losses on impaired loans	**$ 1,150**	**$ 1,496**	**$ 1,097**	**$ 1,164**	**$ 1,237**
Canada					
Residential mortgages	$ 33	$ 42	$ 27	$ 27	$ 27
Personal	413	459	393	393	391
Credit cards	426	435	371	345	346
Small business	32	34	32	44	32
Retail	$ 904	$ 970	$ 823	$ 809	$ 796
Business					
Agriculture	–	10	9	4	4
Automotive	1	3	3	3	3
Consumer goods	11	19	21	25	16
Energy					
Oil & gas	(15)	99	22	(5)	(6)
Utilities	1	–	1	–	–
Financial products	–	–	–	–	–
Forest products	4	5	1	1	3
Health services	7	4	–	–	–
Holding and investments	–	–	–	–	(8)
Industrial products	13	10	7	14	14
Mining & metals	1	7	3	2	1
Non-bank financial services	2	–	–	–	–
Other services	21	14	–	6	3
Real estate & related	38	26	13	34	37
Technology & media	10	2	6	14	50
Transportation & environment	2	8	7	3	2
Other	(1)	6	23	22	30
Sovereign	–	–	–	–	–
Bank	–	–	–	–	–
Wholesale	$ 95	$ 213	$ 116	$ 123	$ 149
Total	$ 999	$ 1,183	$ 939	$ 932	$ 945
U.S.					
Retail	3	1	1	2	3
Wholesale	117	227	40	40	32
	$ 120	$ 228	$ 41	$ 42	$ 35
Other International					
Retail	25	41	21	121	86
Wholesale	6	44	96	69	171
	$ 31	$ 85	$ 117	$ 190	$ 257
Total provision for credit losses on impaired loans	**$ 1,150**	$ 1,496	$ 1,097	$ 1,164	$ 1,237
Total provision for credit losses on non-impaired loans	–	50	–	–	–
Total provision for credit losses	**$ 1,150**	$ 1,546	$ 1,097	$ 1,164	$ 1,237
Total PCL as a % of average net loans and acceptances	**0.21%**	0.29%	0.24%	0.27%	0.31%
PCL on impaired loans as a % of average net loans and acceptances	**0.21%**	0.28%	0.24%	0.27%	0.31%

Allowance for credit losses by portfolio and geography — Table 84

(Millions of Canadian dollars, except percentage amounts)	2017	2016	2015	2014	2013
Allowance at beginning of year	$ 2,326	$ 2,120	$ 2,085	$ 2,050	$ 2,087
Provision for credit losses	1,150	1,546	1,097	1,164	1,237
Write-offs by portfolio					
Residential mortgages	(53)	(42)	(64)	(30)	(24)
Personal	(543)	(556)	(494)	(565)	(498)
Credit cards	(565)	(564)	(497)	(466)	(466)
Small business	(38)	(40)	(40)	(47)	(35)
Retail	$ (1,199)	$ (1,202)	$ (1,095)	$ (1,108)	$ (1,023)
Business	$ (226)	$ (321)	$ (243)	$ (221)	$ (448)
Sovereign	–	–	–	–	–
Bank	–	–	–	–	–
Wholesale	$ (226)	$ (321)	$ (243)	$ (221)	$ (448)
Total write-offs by portfolio	$ (1,425)	$ (1,523)	$ (1,338)	$ (1,329)	$ (1,471)
Recoveries by portfolio					
Residential mortgages	$ 8	$ 5	$ 7	$ 2	$ 2
Personal	116	111	105	106	96
Credit cards	131	122	119	114	112
Small business	9	10	10	9	9
Retail	$ 264	$ 248	$ 241	$ 231	$ 219
Business	$ 66	$ 38	$ 33	$ 32	$ 51
Sovereign	–	–	–	–	–
Bank	–	–	1	–	–
Wholesale	$ 66	$ 38	$ 34	$ 32	$ 51
Total recoveries by portfolio	$ 330	$ 286	$ 275	$ 263	$ 270
Net write-offs	$ (1,095)	$ (1,237)	$ (1,063)	$ (1,066)	$ (1,201)
Adjustments (1)	(131)	(103)	1	(63)	(73)
Total allowance for credit losses at end of year	$ 2,250	$ 2,326	$ 2,120	$ 2,085	$ 2,050
Allowance against impaired loans					
Canada					
Residential mortgages	$ 31	$ 35	$ 27	$ 31	$ 36
Personal	91	105	96	93	97
Small business	19	20	19	19	16
Retail	$ 141	$ 160	$ 142	$ 143	$ 149
Business					
Agriculture	$ 3	$ 6	$ 5	$ 6	$ 6
Automotive	4	4	4	4	4
Consumer goods	11	14	12	22	15
Energy					
Oil & gas	3	6	–	–	1
Utilities	–	–	1	–	–
Financing products	–	–	–	–	–
Forest products	3	5	3	3	4
Health services	6	6	6	6	6
Holding and investments	1	1	1	1	2
Industrial products	13	11	13	18	15
Mining and metals	4	4	1	1	1
Non-bank financial services	1	–	–	–	–
Other services	19	18	19	28	23
Real estate & related	36	23	28	48	42
Technology & media	11	10	12	17	46
Transportation & environment	8	11	7	5	6
Other	1	–	(1)	1	(1)
Sovereign	–	–	–	–	–
Bank	–	–	–	–	–
Wholesale	$ 124	$ 119	$ 111	$ 160	$ 170
	$ 265	$ 279	$ 253	$ 303	$ 319
U.S.					
Retail	$ 1	$ 2	$ 1	$ 1	$ 2
Wholesale	150	177	47	16	19
	$ 151	$ 179	$ 48	$ 17	$ 21
Other International					
Retail	$ 168	$ 180	$ 169	$ 172	$ 146
Wholesale	153	171	184	140	113
	$ 321	$ 351	$ 353	$ 312	$ 259
Total allowance against impaired loans	$ 737	$ 809	$ 654	$ 632	$ 599
Allowance against non-impaired loans					
Residential mortgages	$ 128	$ 96	$ 83	$ 78	$ 48
Personal	391	385	396	400	405
Credit cards	379	386	386	385	385
Small business	37	45	45	45	45
Retail	$ 935	$ 912	$ 910	$ 908	$ 883
Wholesale	$ 487	$ 514	$ 465	$ 454	$ 477
Off-balance sheet and other items	$ 91	$ 91	$ 91	$ 91	$ 91
Total allowance against non-impaired loans	$ 1,513	$ 1,517	$ 1,466	$ 1,453	$ 1,451
Total allowance for credit losses	$ 2,250	$ 2,326	$ 2,120	$ 2,085	$ 2,050
Key ratios					
Allowance for credit losses as a % of loans and acceptances	0.40%	0.43%	0.43%	0.46%	0.49%
Net write-offs as a % of average net loans and acceptances	0.20%	0.23%	0.23%	0.25%	0.30%

(1) Under IFRS, other adjustments include $104 million of unwind of discount and $27 million of changes in exchange rate (2016 – $100 million and $3 million; 2015 – $80 million and $(81) million; 2014 – $87 million and $(24) million). For further details, refer to Note 5 of our 2017 Annual Consolidated Financial Statements.

Credit quality information by Canadian province — Table 85

(Millions of Canadian dollars)	2017	2016	2015	2014	2013
Loans and acceptances					
Atlantic provinces (1)	$ 24,471	$ 23,947	$ 23,040	$ 22,130	$ 21,263
Quebec	56,749	53,518	51,197	50,748	48,060
Ontario	202,272	185,434	175,315	159,817	152,258
Alberta	68,051	66,277	64,902	61,197	58,318
Other Prairie provinces (2)	31,318	30,143	29,490	27,341	25,697
B.C. and territories (3)	76,102	71,295	70,483	68,988	68,118
Total loans and acceptances in Canada	$ 458,963	$ 430,614	$ 414,427	$ 390,221	$ 373,714
Gross impaired loans					
Atlantic provinces (1)	$ 77	$ 101	$ 93	$ 81	$ 83
Quebec	176	207	213	205	177
Ontario	213	336	341	391	424
Alberta	284	313	224	185	233
Other Prairie provinces (2)	125	93	115	73	97
B.C. and territories (3)	110	114	150	211	241
Total gross impaired loans in Canada	$ 985	$ 1,164	$ 1,136	$ 1,146	$ 1,255
Provision for credit losses on impaired loans					
Atlantic provinces (1)	$ 66	$ 67	$ 57	$ 51	$ 50
Quebec	85	92	96	92	78
Ontario	617	654	590	588	605
Alberta	112	226	77	71	74
Other Prairie provinces (2)	64	64	52	40	39
B.C. and territories (3)	55	80	67	90	99
Total provision for credit losses on impaired loans in Canada	$ 999	$ 1,183	$ 939	$ 932	$ 945

(1) Comprises Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick.
(2) Comprises Manitoba and Saskatchewan.
(3) Comprises British Columbia, Nunavut, Northwest Territories and Yukon.

EDTF recommendations index

We aim to present transparent, high-quality risk disclosures by providing disclosures in our 2017 Annual Report and Supplementary Financial Information package (SFI), in accordance with recommendations from the Financial Stability Board's (FSB) Enhanced Disclosure Task Force (EDTF).

The following index summarizes our disclosure by EDTF recommendation:

			Location of disclosure	
Type of Risk	Recommendation	Disclosure	Annual Report page	SFI page
General	1	Table of contents for EDTF risk disclosure	116	1
	2	Define risk terminology and measures	52, 54-57 206-207	–
	3	Top and emerging risks	53	–
	4	New regulatory ratios	92-95	–
Risk governance, risk management and business model	5	Risk management organization	52, 54-57	–
	6	Risk culture	54-57	–
	7	Risk in the context of our business activities	100	–
	8	Stress testing	56-57, 69	–
Capital adequacy and risk-weighted assets (RWA)	9	Minimum Basel III capital ratios and Domestic systemically important bank surcharge	92-95	–
	10	Composition of capital and reconciliation of the accounting balance sheet to the regulatory balance sheet	–	21-24
	11	Flow statement of the movements in regulatory capital	–	25
	12	Capital strategic planning	92-95	–
	13	RWA by business segments	–	28
	14	Analysis of capital requirement, and related measurement model information	58-60	26-27
	15	RWA credit risk and related risk measurements	–	42-44
	16	Movement of risk-weighted assets by risk type	–	28
	17	Basel back-testing	55, 58	42
Liquidity	18	Quantitative and qualitative analysis of our liquidity reserve	75-77, 81-82	–
Funding	19	Encumbered and unencumbered assets by balance sheet category, and contractual obligations for rating downgrades	77, 80	–
	20	Maturity analysis of consolidated total assets, liabilities and off-balance sheet commitments analyzed by remaining contractual maturity at the balance sheet date	82-83	–
	21	Sources of funding and funding strategy	77-79	–
Market risk	22	Relationship between the market risk measures for trading and non-trading portfolios and the balance sheet	73-74	–
	23	Decomposition of market risk factors	68-72	–
	24	Market risk validation and back-testing	69	–
	25	Primary risk management techniques beyond reported risk measures and parameters	68-72	–
Credit risk	26	Bank's credit risk profile	58-68, 154-156	31-44
		Quantitative summary of aggregate credit risk exposures that reconciles to the balance sheet	111-115	40
	27	Policies for identifying impaired loans	59-60, 101-102, 130	–
	28	Reconciliation of the opening and closing balances of impaired loans and impairment allowances during the year	–	33,37
	29	Quantification of gross notional exposure for OTC derivatives or exchange-traded derivatives	61-62	46
	30	Credit risk mitigation, including collateral held for all sources of credit risk	60	41
Other	31	Other risk types	84-91	–
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Management's Responsibility for Financial Reporting

The accompanying consolidated financial statements of Royal Bank of Canada were prepared by management, which is responsible for the integrity and fairness of the information presented, including the many amounts that must of necessity be based on estimates and judgments. These consolidated financial statements were prepared in accordance with the *Bank Act* (Canada) and International Financial Reporting Standards as issued by the International Accounting Standards Board. Financial information appearing throughout our Management's Discussion and Analysis is consistent with these consolidated financial statements.

Our internal controls are designed to provide reasonable assurance that transactions are authorized, assets are safeguarded and proper records are maintained. These controls include quality standards in hiring and training of employees, policies and procedures manuals, a corporate code of conduct and accountability for performance within appropriate and well-defined areas of responsibility.

The system of internal controls is further supported by a compliance function, which is designed to ensure that we and our employees comply with securities legislation and conflict of interest rules, and by an internal audit staff, which conducts periodic audits of all aspects of our operations.

The Board of Directors oversees management's responsibilities for financial reporting through an Audit Committee, which is composed entirely of independent directors. This Committee reviews our consolidated financial statements and recommends them to the Board for approval. Other key responsibilities of the Audit Committee include reviewing our existing internal control procedures and planned revisions to those procedures, and advising the directors on auditing matters and financial reporting issues. Our Chief Compliance Officer and Chief Internal Auditor have full and unrestricted access to the Audit Committee.

The Office of the Superintendent of Financial Institutions Canada (OSFI) examines and inquires into our business and affairs as deemed necessary to determine whether the provisions of the *Bank Act* are being complied with, and that we are in sound financial condition. In carrying out its mandate, OSFI strives to protect the rights and interests of our depositors and creditors.

PricewaterhouseCoopers LLP, Independent Registered Public Accounting Firm appointed by our shareholders upon the recommendation of the Audit Committee and Board, has performed an independent audit of the consolidated financial statements and their report follows. The auditors have full and unrestricted access to the Audit Committee to discuss their audit and related findings.

David I. McKay
President and Chief Executive Officer

Rod Bolger
Chief Financial Officer

Toronto, November 28, 2017

Management's Report on Internal Control over Financial Reporting

Management of Royal Bank of Canada is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is a process designed by, or under the supervision of, the President and Chief Executive Officer and Chief Financial Officer and effected by the Board of Directors, management and other personnel to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with International Financial Reporting Standards as issued by the International Accounting Standards Board. It includes those policies and procedures that:

- Pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions related to and dispositions of our assets;
- Provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and our receipts and expenditures are made only in accordance with authorizations of our management and directors; and
- Provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of our assets that could have a material effect on our financial statements.

Due to its inherent limitations, internal control over financial reporting may not prevent or detect misstatements on a timely basis. Also, projections of any evaluation of the effectiveness of internal control over financial reporting to future periods are subject to the risk that the controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Management evaluated, under the supervision of and with the participation of the President and Chief Executive Officer and Chief Financial Officer, the effectiveness of our internal control over financial reporting as of October 31, 2017, based on the criteria set forth in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on that evaluation, management concluded that, as of October 31, 2017, internal control over financial reporting was effective based on the criteria established in the *Internal Control – Integrated Framework (2013)*. Also, based on the results of our evaluation, management concluded that there were no material weaknesses that have been identified in internal control over financial reporting as of October 31, 2017.

The effectiveness of our internal control over financial reporting as of October 31, 2017, has been audited by PricewaterhouseCoopers LLP, Independent Registered Public Accounting Firm, as stated in their report, which expressed an unqualified opinion on our internal control over financial reporting and appears herein.

David I. McKay
President and Chief Executive Officer

Rod Bolger
Chief Financial Officer

Toronto, November 28, 2017

Report of Independent Registered Public Accounting Firm

Independent Auditor's Report

To the Shareholders of Royal Bank of Canada

We have completed integrated audits of Royal Bank of Canada's (the Bank) 2017 and 2016 consolidated financial statements and its internal control over financial reporting as at October 31, 2017. Our opinions, based on our audits are presented below.

Report on the consolidated financial statements
We have audited the accompanying consolidated financial statements of Royal Bank of Canada, which comprise the consolidated balance sheets as at October 31, 2017 and October 31, 2016 and the consolidated statements of income, comprehensive income, changes in equity and cash flows for the years then ended, and the related notes, which comprise a summary of significant accounting policies and other explanatory information.

Management's responsibility for the consolidated financial statements
Management is responsible for the preparation and fair presentation of these consolidated financial statements in accordance with International Financial Reporting Standards as issued by the International Accounting Standards Board and for such internal control as management determines is necessary to enable the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's responsibility
Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We conducted our audits in accordance with Canadian generally accepted auditing standards and the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free from material misstatement. Canadian generally accepted auditing standards also require that we comply with ethical requirements.

An audit involves performing procedures to obtain audit evidence, on a test basis, about the amounts and disclosures in the consolidated financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the consolidated financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Bank's preparation and fair presentation of the consolidated financial statements in order to design audit procedures that are appropriate in the circumstances. An audit also includes evaluating the appropriateness of accounting principles and policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements.

We believe that the audit evidence we have obtained in our audits is sufficient and appropriate to provide a basis for our audit opinion on the consolidated financial statements.

Opinion
In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of Royal Bank of Canada as at October 31, 2017 and October 31, 2016 and its financial performance and its cash flows for the years then ended in accordance with International Financial Reporting Standards as issued by the International Accounting Standards Board.

Report on internal control over financial reporting
We have also audited Royal Bank of Canada's internal control over financial reporting as at October 31, 2017, based on criteria established in *Internal Control–Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

Management's responsibility for internal control over financial reporting
Management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management's Report on Internal Control over Financial Reporting.

Auditor's responsibility
Our responsibility is to express an opinion on the Bank's internal control over financial reporting based on our audit. We conducted our audit of internal control over financial reporting in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects.

An audit of internal control over financial reporting includes obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control, based on the assessed risk, and performing such other procedures as we consider necessary in the circumstances.

We believe that our audit provides a reasonable basis for our audit opinion on the Bank's internal control over financial reporting.

Definition of internal control over financial reporting
A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that: (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Inherent limitations
Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions or that the degree of compliance with the policies or procedures may deteriorate.

Opinion
In our opinion, Royal Bank of Canada maintained, in all material respects, effective internal control over financial reporting as at October 31, 2017, based on criteria established in *Internal Control–Integrated Framework (2013)* issued by COSO.

PricewaterhouseCoopers LLP

Chartered Professional Accountants
Licensed Public Accountants
Toronto, Canada
November 28, 2017

Consolidated Balance Sheets

(Millions of Canadian dollars)	As at October 31 2017	As at October 31 2016
Assets		
Cash and due from banks	$ 28,407	$ 14,929
Interest-bearing deposits with banks	32,662	27,851
Securities (Note 4)		
Trading	127,657	151,292
Available-for-sale	90,722	84,801
	218,379	236,093
Assets purchased under reverse repurchase agreements and securities borrowed	220,977	186,302
Loans (Note 5)		
Retail	385,170	369,470
Wholesale	159,606	154,369
	544,776	523,839
Allowance for loan losses (Note 5)	(2,159)	(2,235)
	542,617	521,604
Segregated fund net assets (Note 16)	1,216	981
Other		
Customers' liability under acceptances	16,459	12,843
Derivatives (Note 8)	95,023	118,944
Premises and equipment, net (Note 9)	2,670	2,836
Goodwill (Note 10)	10,977	11,156
Other intangibles (Note 10)	4,507	4,648
Other assets (Note 13)	38,959	42,071
	168,595	192,498
Total assets	$ 1,212,853	$ 1,180,258
Liabilities and equity		
Deposits (Note 14)		
Personal	$ 260,213	$ 250,550
Business and government	505,665	488,007
Bank	23,757	19,032
	789,635	757,589
Segregated fund net liabilities (Note 16)	1,216	981
Other		
Acceptances	16,459	12,843
Obligations related to securities sold short	30,008	50,369
Obligations related to assets sold under repurchase agreements and securities loaned	143,084	103,441
Derivatives (Note 8)	92,127	116,550
Insurance claims and policy benefit liabilities (Note 15)	9,676	9,164
Other liabilities (Note 18)	46,955	47,947
	338,309	340,314
Subordinated debentures (Note 19)	9,265	9,762
Total liabilities	1,138,425	1,108,646
Equity attributable to shareholders (Note 21)		
Preferred shares	6,413	6,713
Common shares (shares issued – 1,452,534,303 and 1,484,234,375)	17,703	17,859
Retained earnings	45,359	41,519
Other components of equity	4,354	4,926
	73,829	71,017
Non-controlling interests (Note 21)	599	595
Total equity	74,428	71,612
Total liabilities and equity	$ 1,212,853	$ 1,180,258

The accompanying notes are an integral part of these Consolidated Financial Statements.

David I. McKay
President and Chief Executive Officer

David F. Denison
Director

Consolidated Statements of Income

(Millions of Canadian dollars, except per share amounts)	For the year ended October 31 2017	October 31 2016
Interest income		
Loans	$ 18,677	$ 17,876
Securities	4,899	4,593
Assets purchased under reverse repurchase agreements and securities borrowed	3,021	1,816
Deposits and other	307	167
	26,904	24,452
Interest expense		
Deposits and other	6,564	5,467
Other liabilities	2,930	2,227
Subordinated debentures	270	227
	9,764	7,921
Net interest income	17,140	16,531
Non-interest income		
Insurance premiums, investment and fee income (Note 15)	4,566	4,868
Trading revenue	806	701
Investment management and custodial fees	4,803	4,358
Mutual fund revenue	3,339	3,159
Securities brokerage commissions	1,416	1,429
Service charges	1,770	1,756
Underwriting and other advisory fees	2,093	1,876
Foreign exchange revenue, other than trading	974	964
Card service revenue	933	889
Credit fees	1,433	1,239
Net gains on available-for-sale securities (Note 4)	172	76
Share of profit in joint ventures and associates (Note 12)	335	176
Other	889	773
	23,529	22,264
Total revenue	40,669	38,795
Provision for credit losses (Note 5)	1,150	1,546
Insurance policyholder benefits, claims and acquisition expense (Note 15)	3,053	3,424
Non-interest expense		
Human resources (Note 17 and 22)	13,330	12,377
Equipment	1,434	1,438
Occupancy	1,588	1,568
Communications	1,011	945
Professional fees	1,214	1,078
Amortization of other intangibles (Note 10)	1,015	970
Other	2,202	2,150
	21,794	20,526
Income before income taxes	14,672	13,299
Income taxes (Note 23)	3,203	2,841
Net income	$ 11,469	$ 10,458
Net income attributable to:		
Shareholders	$ 11,428	$ 10,405
Non-controlling interests	41	53
	$ 11,469	$ 10,458
Basic earnings per share (in dollars) (Note 24)	$ 7.59	$ 6.80
Diluted earnings per share (in dollars) (Note 24)	7.56	6.78
Dividends per common share (in dollars)	3.48	3.24

The accompanying notes are an integral part of these Consolidated Financial Statements.

Consolidated Statements of Comprehensive Income

(Millions of Canadian dollars)	For the year ended October 31 2017	October 31 2016
Net income	$ 11,469	$ 10,458
Other comprehensive income (loss), net of taxes (Note 23)		
Items that will be reclassified subsequently to income:		
Net change in unrealized gains (losses) on available-for-sale securities		
Net unrealized gains (losses) on available-for-sale securities	134	73
Reclassification of net losses (gains) on available-for-sale securities to income	(96)	(48)
	38	25
Foreign currency translation adjustments		
Unrealized foreign currency translation gains (losses)	(1,570)	147
Net foreign currency translation gains (losses) from hedging activities	438	113
Reclassification of losses (gains) on foreign currency translation to income	(10)	–
	(1,142)	260
Net change in cash flow hedges		
Net gains (losses) on derivatives designated as cash flow hedges	622	(35)
Reclassification of losses (gains) on derivatives designated as cash flow hedges to income	(92)	52
	530	17
Items that will not be reclassified subsequently to income:		
Remeasurements of employee benefit plans (Note 17)	790	(1,077)
Net fair value change due to credit risk on financial liabilities designated as at fair value through profit or loss	(323)	(322)
	467	(1,399)
Total other comprehensive income (loss), net of taxes	(107)	(1,097)
Total comprehensive income (loss)	$ 11,362	$ 9,361
Total comprehensive income attributable to:		
Shareholders	$ 11,323	$ 9,306
Non-controlling interests	39	55
	$ 11,362	$ 9,361

The accompanying notes are an integral part of these Consolidated Financial Statements.

Consolidated Statements of Changes in Equity

(Millions of Canadian dollars)	Preferred shares	Common shares	Treasury shares – preferred	Treasury shares – common	Retained earnings	Other components of equity: Available-for-sale securities	Other components of equity: Foreign currency translation	Other components of equity: Cash flow hedges	Other components of equity: Total other components of equity	Equity attributable to shareholders	Non-controlling interests	Total equity
Balance at November 1, 2015	$ 5,100	$ 14,573	$ (2)	$ 38	$ 37,811	$ 315	$ 4,427	$ (116)	$ 4,626	$ 62,146	$ 1,798	$ 63,944
Changes in equity												
Issues of share capital	1,855	3,422	–	–	(16)	–	–	–	–	5,261	–	5,261
Common shares purchased for cancellation	–	(56)	–	–	(306)	–	–	–	–	(362)	–	(362)
Preferred shares purchased for cancellation	(242)	–	–	–	(22)	–	–	–	–	(264)	–	(264)
Redemption of trust capital securities	–	–	–	–	–	–	–	–	–	–	(1,200)	(1,200)
Preferred shares redeemed	–	–	–	–	–	–	–	–	–	–	–	–
Sales of treasury shares	–	–	172	4,973	–	–	–	–	–	5,145	–	5,145
Purchases of treasury shares	–	–	(170)	(5,091)	–	–	–	–	–	(5,261)	–	(5,261)
Share-based compensation awards	–	–	–	–	(54)	–	–	–	–	(54)	–	(54)
Dividends on common shares	–	–	–	–	(4,817)	–	–	–	–	(4,817)	–	(4,817)
Dividends on preferred shares and other	–	–	–	–	(294)	–	–	–	–	(294)	(63)	(357)
Other	–	–	–	–	211	–	–	–	–	211	5	216
Net income	–	–	–	–	10,405	–	–	–	–	10,405	53	10,458
Total other comprehensive income (loss), net of taxes	–	–	–	–	(1,399)	25	258	17	300	(1,099)	2	(1,097)
Balance at October 31, 2016	$ 6,713	$ 17,939	$ –	$ (80)	$ 41,519	$ 340	$ 4,685	$ (99)	$ 4,926	$ 71,017	$ 595	$ 71,612
Changes in equity												
Issues of share capital	–	227	–	–	(1)	–	–	–	–	226	–	226
Common shares purchased for cancellation	–	(436)	–	–	(2,674)	–	–	–	–	(3,110)	–	(3,110)
Preferred shares purchased for cancellation	–	–	–	–	–	–	–	–	–	–	–	–
Redemption of trust capital securities	–	–	–	–	–	–	–	–	–	–	–	–
Preferred shares redeemed	(300)	–	–	–	–	–	–	–	–	(300)	–	(300)
Sales of treasury shares	–	–	130	4,414	–	–	–	–	–	4,544	–	4,544
Purchases of treasury shares	–	–	(130)	(4,361)	–	–	–	–	–	(4,491)	–	(4,491)
Share-based compensation awards	–	–	–	–	(40)	–	–	–	–	(40)	–	(40)
Dividends on common shares	–	–	–	–	(5,096)	–	–	–	–	(5,096)	–	(5,096)
Dividends on preferred shares and other	–	–	–	–	(300)	–	–	–	–	(300)	(34)	(334)
Other	–	–	–	–	56	–	–	–	–	56	(1)	55
Net income	–	–	–	–	11,428	–	–	–	–	11,428	41	11,469
Total other comprehensive income (loss), net of taxes	–	–	–	–	467	38	(1,140)	530	(572)	(105)	(2)	(107)
Balance at October 31, 2017	$ 6,413	$ 17,730	$ –	$ (27)	$ 45,359	$ 378	$ 3,545	$ 431	$ 4,354	$ 73,829	$ 599	$ 74,428

The accompanying notes are an integral part of these Consolidated Financial Statements.

Consolidated Statements of Cash Flows

(Millions of Canadian dollars)	For the year ended October 31 2017	October 31 2016
Cash flows from operating activities		
Net income	$ 11,469	$ 10,458
Adjustments for non-cash items and others		
Provision for credit losses	1,150	1,546
Depreciation	600	573
Deferred income taxes	203	(479)
Amortization and impairment of other intangibles	1,017	973
Net changes in investments in joint ventures and associates	(331)	(184)
Losses (Gains) on sale of premises and equipment	(1)	19
Losses (Gains) on available-for-sale securities	(246)	(176)
Losses (Gains) on disposition of business	2	(268)
Impairment of available-for-sale securities	52	90
Adjustments for net changes in operating assets and liabilities		
Insurance claims and policy benefit liabilities	512	1,040
Net change in accrued interest receivable and payable	(90)	(67)
Current income taxes	(1,183)	1,189
Derivative assets	23,921	(13,224)
Derivative liabilities	(24,423)	8,593
Trading securities	23,624	6,827
Loans, net of securitizations	(22,608)	(19,297)
Assets purchased under reverse repurchase agreements and securities borrowed	(34,675)	(11,369)
Deposits, net of securitizations	33,296	18,931
Obligations related to assets sold under repurchase agreements and securities loaned	39,643	20,153
Obligations related to securities sold short	(20,361)	2,711
Brokers and dealers receivable and payable	601	47
Other	5,553	(1,230)
Net cash from (used in) operating activities	37,725	26,856
Cash flows from investing activities		
Change in interest-bearing deposits with banks	(4,811)	(3,109)
Proceeds from sale of available-for-sale securities	11,432	8,056
Proceeds from maturity of available-for-sale securities	39,944	34,005
Purchases of available-for-sale securities	(60,364)	(55,327)
Proceeds from maturity of held-to-maturity securities	900	1,691
Purchases of held-to-maturity securities	(1,195)	(3,155)
Net acquisitions of premises and equipment and other intangibles	(1,364)	(1,257)
Proceeds from dispositions	–	634
Cash used in acquisitions	–	(2,964)
Net cash from (used in) investing activities	(15,458)	(21,426)
Cash flows from financing activities		
Redemption of trust capital securities	–	(1,200)
Issue of subordinated debentures	–	3,606
Repayment of subordinated debentures	(119)	(1,500)
Issue of common shares	199	307
Common shares purchased for cancellation	(3,110)	(362)
Issue of preferred shares	–	1,475
Redemption of preferred shares	(300)	–
Preferred shares purchased for cancellation	–	(264)
Sales of treasury shares	4,544	5,145
Purchases of treasury shares	(4,491)	(5,261)
Dividends paid	(5,309)	(4,997)
Issuance costs	(1)	(16)
Dividends/distributions paid to non-controlling interests	(34)	(63)
Change in short-term borrowings of subsidiaries	(30)	(4)
Net cash from (used in) financing activities	(8,651)	(3,134)
Effect of exchange rate changes on cash and due from banks	(138)	181
Net change in cash and due from banks	13,478	2,477
Cash and due from banks at beginning of period (1)	14,929	12,452
Cash and due from banks at end of period (1)	$ 28,407	$ 14,929
Cash flows from operating activities include:		
Amount of interest paid	$ 8,803	$ 7,097
Amount of interest received	25,602	23,237
Amount of dividend received	1,729	1,680
Amount of income taxes paid	4,708	1,581

(1) We are required to maintain balances with central banks and other regulatory authorities. The total balances were $2.3 billion as at October 31, 2017 (October 31, 2016 – $3.3 billion; November 1, 2015 – $2.6 billion).

The accompanying notes are an integral part of these Consolidated Financial Statements.

Note 1 General information

Royal Bank of Canada and its subsidiaries (the Bank) provide diversified financial services including personal and commercial banking, wealth management, insurance, investor services and capital markets products and services on a global basis. Refer to Note 29 for further details on our business segments.

The parent bank, Royal Bank of Canada, is a Schedule I Bank under the *Bank Act* (Canada) incorporated and domiciled in Canada. Our corporate headquarters are located at Royal Bank Plaza, 200 Bay Street, Toronto, Ontario, Canada and our head office is located at 1 Place Ville-Marie, Montreal, Quebec, Canada. Our common shares are listed on the Toronto Stock Exchange and New York Stock Exchange with the ticker symbol RY.

These Consolidated Financial Statements are prepared in compliance with International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board (IASB). Unless otherwise stated, monetary amounts are stated in Canadian dollars. Tabular information is stated in millions of dollars, except as noted. These Consolidated Financial Statements also comply with Subsection 308 of the *Bank Act* (Canada), which states that, except as otherwise specified by the OSFI, our Consolidated Financial Statements are to be prepared in accordance with IFRS. The accounting policies outlined in Note 2 have been consistently applied to all periods presented.

On November 28, 2017, the Board of Directors authorized the Consolidated Financial Statements for issue.

Note 2 Summary of significant accounting policies, estimates and judgments

The significant accounting policies used in the preparation of these Consolidated Financial Statements, including the accounting requirements prescribed by OSFI, are summarized below. These accounting policies conform, in all material respects, to IFRS as issued by the IASB.

General

Use of estimates and assumptions

In preparing our Consolidated Financial Statements, management is required to make subjective estimates and assumptions that affect the reported amount of assets, liabilities, net income and related disclosures. Estimates made by management are based on historical experience and other assumptions that are believed to be reasonable. Key sources of estimation uncertainty include: securities impairment, determination of fair value of financial instruments, the allowance for credit losses, derecognition of financial assets, insurance claims and policy benefit liabilities, pensions and other post-employment benefits, income taxes, carrying value of goodwill and other intangible assets, litigation provisions, and deferred revenue under the credit card customer loyalty reward program. Accordingly, actual results may differ from these and other estimates thereby impacting our future Consolidated Financial Statements. Refer to the relevant accounting policies in this Note for details on our use of estimates and assumptions.

Significant judgments

In preparation of these Consolidated Financial Statements, management is required to make significant judgments that affect the carrying amounts of certain assets and liabilities, and the reported amounts of revenues and expenses recorded during the period. Significant judgments have been made in the following areas and discussed as noted in the Consolidated Financial Statements:

Consolidation of structured entities	Note 2 – page 125 Note 7 – page 157	Securities impairment	Note 2 – page 126 Note 4 – page 151
Fair value of financial instruments	Note 2 – page 127 Note 3 – page 136	Application of the effective interest method	Note 2 – page 128
Allowance for credit losses	Note 2 – page 130 Note 5 – page 154	Derecognition of financial assets	Note 2 – page 131 Note 6 – page 156
Employee benefits	Note 2 – page 132 Note 17 – page 176	Income taxes	Note 2 – page 132 Note 23 – page 187
Goodwill and other intangibles	Note 2 – page 133 Note 10 – page 168 Note 11 – page 170	Provisions	Note 2 – page 134 Note 25 – page 190 Note 26 – page 193

Basis of consolidation

Our Consolidated Financial Statements include the assets and liabilities and results of operations of the parent company, Royal Bank of Canada, and its subsidiaries including certain structured entities, after elimination of intercompany transactions, balances, revenues and expenses.

Consolidation

Subsidiaries are those entities, including structured entities, over which we have control. We control an entity when we are exposed, or have rights, to variable returns from our involvement with the entity and have the ability to affect those returns through our power over the investee. We have power over an entity when we have existing rights that give us the current ability to direct the activities that most significantly affect the entity's returns (relevant activities). Power may be determined on the basis of voting rights or, in the case of structured entities, other contractual arrangements.

We are not deemed to control an entity when we exercise power over an entity in an agency capacity. In determining whether we are acting as an agent, we consider the overall relationship between us, the investee and other parties to the arrangement with respect to the following factors: (i) the scope of our decision making power; (ii) the rights held by other parties; (iii) the remuneration to which we are entitled; and (iv) our exposure to variability of returns.

The determination of control is based on the current facts and circumstances and is continuously assessed. In some circumstances, different factors and conditions may indicate that different parties control an entity depending on whether those factors and conditions are assessed in isolation or in totality. Significant judgment is applied in assessing the relevant factors and conditions in totality when determining whether we control an entity. Specifically, judgment is applied in assessing whether we have substantive decision making rights over the relevant activities and whether we are exercising our power as a principal or an agent.

We consolidate all subsidiaries from the date we obtain control and cease consolidation when an entity is no longer controlled by us. Our consolidation conclusions affect the classification and amount of assets, liabilities, revenues and expenses reported in our Consolidated Financial Statements.

Non-controlling interests in subsidiaries that we consolidate are shown on our Consolidated Balance Sheets as a separate component of equity which is distinct from our shareholders' equity. The net income attributable to non-controlling interests is separately disclosed in our Consolidated Statements of Income.

Investments in joint ventures and associates

Our investments in associated corporations and limited partnerships over which we have significant influence are accounted for using the equity method. The equity method is also applied to our interests in joint ventures over which we have joint control. Under the equity method of accounting, investments are initially recorded at cost, and the carrying amount is increased or decreased to recognize our share of the investee's net profit or loss, including our proportionate share of the investee's other comprehensive income (OCI), subsequent to the date of acquisition.

Non-current assets held for sale and discontinued operations

Non-current assets (and disposal groups) are classified as held for sale if their carrying amounts will be recovered principally through a sale transaction rather than through continuing use. This condition is satisfied when the asset is available for immediate sale in its present condition, management is committed to the sale, and it is highly probable to occur within one year. Non-current assets (and disposal groups) classified as held for sale are measured at the lower of their previous carrying amount and fair value less costs to sell and if significant, are presented separately from other assets on our Consolidated Balance Sheets.

A disposal group is classified as a discontinued operation if it meets the following conditions: (i) it is a component that can be distinguished operationally and financially from the rest of our operations and (ii) it represents either a separate major line of business or is part of a single co-ordinated plan to dispose of a separate major line of business or geographical area of operations. Disposal groups classified as discontinued operations are presented separately from our continuing operations in our Consolidated Statements of Income.

Financial instruments – Recognition and measurement

Securities

Securities are classified at inception, based on management's intention, as at fair value through profit or loss (FVTPL), available-for-sale (AFS) or held-to-maturity. Certain debt securities with fixed or determinable payments and which are not quoted in an active market may be classified as loans and receivables.

Trading securities include securities purchased for sale in the near term which are classified as at FVTPL by nature and securities designated as at FVTPL under the fair value option. Obligations to deliver trading securities sold but not yet purchased are recorded as liabilities and carried at fair value. Realized and unrealized gains and losses on these securities are recorded as Trading revenue in Non-interest income. Dividends and interest income accruing on Trading securities are recorded in Interest income. Interest and dividends accrued on interest-bearing and equity securities sold short are recorded in Interest expense.

AFS securities include: (i) securities which may be sold to meet liquidity needs, in response to or in anticipation of changes in interest rates and resulting prepayment risk, changes in foreign currency risk, changes in funding sources or terms, and (ii) loan substitute securities which are client financings that have been structured as after-tax investments rather than conventional loans in order to provide the clients with a borrowing rate advantage. AFS securities are measured at fair value. Unrealized gains and losses arising from changes in fair value are recorded in OCI. Changes in foreign exchange rates for AFS equity securities are recognized in Other components of equity, while changes in foreign exchange rates for AFS debt securities are recognized in Foreign exchange revenue, other than trading in Non-interest income. When the security is sold, the cumulative gain or loss recorded in Other components of equity is included as Net gains on AFS securities in Non-interest income. Purchase premiums or discounts on AFS debt securities are amortized over the life of the security using the effective interest method and are recognized in Net interest income. Dividends and interest income accruing on AFS securities are recorded in Interest income.

At each reporting date, and more frequently when conditions warrant, we evaluate our AFS securities to determine whether there is any objective evidence of impairment. Such evidence includes: for debt instruments, when an adverse effect on future cash flows from the asset or group of assets can be reliably estimated; for equity securities, when there is a significant or prolonged decline in the fair value of the investment below its cost.

When assessing debt instruments for impairment, we primarily consider counterparty ratings and security-specific factors, including subordination, external ratings, and the value of any collateral held for which there may not be a readily accessible market. Significant judgment is required in assessing impairment as management is required to consider all available evidence in determining whether objective evidence of impairment exists and whether the principal and interest on the AFS debt security can be fully recovered. For complex debt instruments we use cash flow projection models which incorporate actual and projected cash flows for each security based on security-specific factors using a number of assumptions and inputs that involve management judgment, such as default, prepayment and recovery rates. Due to the subjective nature of choosing these inputs and assumptions, the actual amount of the future cash flows and their timing may differ from the estimates used by management and consequently may cause a different conclusion as to the recognition of impairment or measurement of impairment losses.

When assessing equity securities for impairment, we consider factors which include the length of time and extent the fair value has been below cost, along with management's assessment of the financial condition, business and other risks of the issuer. Management weighs all these factors to determine the impairment but to the extent that management judgment may differ from the actual experience of the timing and amount of the recovery of the fair value, the estimate for impairment could change from period to period based upon future events that may or may not occur, and the conclusion for the impairment of the equity securities may differ.

If an AFS security is impaired, the cumulative unrealized loss previously recognized in Other components of equity is removed from equity and recognized in Net gains on AFS securities under Non-interest income. This amount is determined as the difference between the cost/amortized cost and current fair value of the security less any impairment loss previously recognized. Subsequent to impairment, further declines in fair value are recorded in Non-interest income, while increases in fair value are recognized in Other components of equity until sold. For AFS debt securities, reversal of previously recognized impairment losses is recognized in our Consolidated Statements of Income if the recovery is objectively related to a specific event occurring after recognition of the impairment loss.

Held-to-maturity securities are debt securities where we have the intention and the ability to hold the investment until its maturity date. These securities are initially recorded at fair value and are subsequently measured at amortized cost using the effective interest method, less any impairment losses which we assess using the same impairment model as loans. Interest income and amortization of premiums and discounts on debt securities are recorded in Net interest income. For held-to-maturity securities, reversal of previously recognized impairment losses is recognized in our Consolidated Statements of Income if the recovery is objectively related to a specific event occurring after the recognition of

the impairment loss. Reversals of impairment losses on held-to-maturity securities are recorded to a maximum of what the amortized cost of the investment would have been, had the impairment not been recognized at the date the impairment is reversed. Held-to-maturity securities have been included with AFS securities on our Consolidated Balance Sheets.

We account for all of our securities using settlement date accounting and changes in fair value between the trade date and settlement date are reflected in income for securities classified or designated as at FVTPL, and changes in the fair value of AFS securities between the trade and settlement dates are recorded in OCI except for changes in foreign exchange rates on debt securities, which are recorded in Non-interest income.

Fair value option

A financial instrument can be designated as at FVTPL (the fair value option) on its initial recognition. An instrument that is designated as at FVTPL by way of this fair value option must have a reliably measurable fair value and satisfy one of the following criteria: (i) it eliminates or significantly reduces a measurement or recognition inconsistency that would otherwise arise from measuring assets or liabilities, or recognizing gains and losses on them on a different basis (an accounting mismatch); (ii) it belongs to a group of financial assets or financial liabilities or both that are managed, evaluated, and reported to key management personnel on a fair value basis in accordance with our risk management strategy, and we can demonstrate that significant financial risks are eliminated or significantly reduced; or (iii) there is an embedded derivative in the financial or non-financial host contract and the derivative is not closely related to the host contract. These instruments cannot be reclassified out of the FVTPL category while they are held or issued.

Financial assets designated as at FVTPL are recorded at fair value and any unrealized gain or loss arising due to changes in fair value is included in Trading revenue or Non-interest income – Other. Financial liabilities designated as at FVTPL are recorded at fair value and fair value changes attributable to changes in our own credit risk are recorded in OCI. Amounts recognized in OCI will not be reclassified subsequently to net income. The remaining fair value changes are recorded in Trading revenue or Non-interest income – Other. Upon initial recognition, if we determine that presenting the effects of own credit risk changes in OCI would create or enlarge an accounting mismatch in net income, the full fair value change in our debt designated as at FVTPL is recognized in net income.

To determine the fair value adjustments on our debt designated as at FVTPL, we calculate the present value of the instruments based on the contractual cash flows over the term of the arrangement by using our effective funding rate at the beginning and end of the period with the change in present value recorded in OCI, Trading revenue or Non-interest income – Other as appropriate.

Determination of fair value

The fair value of a financial instrument is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. We determine fair value by incorporating all factors that market participants would consider in setting a price, including commonly accepted valuation approaches.

The Board of Directors provides oversight on valuation of financial instruments, primarily through the Audit Committee and Risk Committee. The Audit Committee reviews the presentation and disclosure of financial instruments that are measured at fair value, while the Risk Committee assesses the adequacy of governance structures and control processes for the valuation of these instruments.

We have established policies, procedures and controls for valuation methodologies and techniques to ensure that fair value is reasonably estimated. Major valuation processes and controls include, but are not limited to, profit and loss decomposition, independent price verification (IPV) and model validation standards. These control processes are managed by either Finance or Group Risk Management and are independent of the relevant businesses and their trading functions. Profit and loss decomposition is a process to explain the fair value changes of certain positions and is performed daily for trading portfolios. All fair value instruments are subject to IPV, a process whereby trading function valuations are verified against external market prices and other relevant market data. Market data sources include traded prices, brokers and price vendors. We give priority to those third-party pricing services and prices having the highest and most consistent accuracy. The level of accuracy is determined over time by comparing third-party price values to traders' or system values, to other pricing service values and, when available, to actual trade data. Quoted prices for identical instruments from pricing services or brokers are generally not adjusted unless there are issues such as stale prices. If multiple quotes for identical instruments are received, fair value is based on an average of the prices received or the quote from the most reliable vendor, after the outlier prices that fall outside of the pricing range are removed. Other valuation techniques are used when a price or quote is not available. Some valuation processes use models to determine fair value. We have a systematic and consistent approach to control model use. Valuation models are approved for use within our model risk management framework. The framework addresses, among other things, model development standards, validation processes and procedures, and approval authorities. Model validation ensures that a model is suitable for its intended use and sets parameters for its use. All models are revalidated regularly by qualified personnel who are independent of the model design and development. Annually our model risk profile is reported to the Board of Directors.

IFRS 13 *Fair Value Measurement* permits an exception, through an accounting policy choice, to measure the fair value of a portfolio of financial instruments on a net open risk position basis when certain criteria are met. We have elected to use this policy choice to determine the fair value of certain portfolios of financial instruments, primarily derivatives, based on a net exposure to market or credit risk.

We record valuation adjustments to appropriately reflect counterparty credit quality of our derivative portfolio, differences between the overnight index swap (OIS) curve and London Interbank Offered Rates (LIBOR) for collateralized derivatives, funding valuation adjustments (FVA) for uncollateralized and under-collateralized over-the-counter (OTC) derivatives, unrealized gains or losses at inception of the transaction, bid-offer spreads, unobservable parameters and model limitations. These adjustments may be subjective as they require significant judgment in the input selection, such as implied probability of default and recovery rate, and are intended to arrive at a fair value that is determined based on assumptions that market participants would use in pricing the financial instrument. The realized price for a transaction may be different from its recorded value, previously estimated using management judgment. Valuation adjustments may therefore impact unrealized gains and losses recognized in Non-interest income – Trading revenue or Other.

Valuation adjustments are recorded for the credit risk of our derivative portfolios in order to arrive at their fair values. Credit valuation adjustments (CVA) take into account our counterparties' creditworthiness, the current and potential future mark-to-market of transactions, and the effects of credit mitigants such as master netting and collateral agreements. CVA amounts are derived from estimates of exposure at default, probability of default, recovery rates on a counterparty basis, and market and credit factor correlations. Exposure at default is the value of expected derivative related assets and liabilities at the time of default, estimated through modeling using underlying risk factors. Probability of default and recovery rate are implied from the market prices for credit protection and the credit ratings of the counterparty. When market data is unavailable, it is estimated by incorporating assumptions and adjustments that market participants would use for determining fair value using these inputs. Correlation is the statistical measure of how credit and market factors may move in relation to one another. Correlation is estimated using historical data. CVA is calculated daily and changes are recorded in Non-interest income – Trading revenue.

In the determination of the fair value of collateralized OTC derivatives using the OIS curve, our valuation approach accounts for the difference between certain OIS rates and LIBOR as valuation adjustments.

FVA are also calculated to incorporate the cost and benefit of funding in the valuation of uncollateralized and under-collateralized OTC derivatives. Future expected cash flows of these derivatives are discounted to reflect the cost and benefit of funding the derivatives by using a funding curve, implied volatilities and correlations as inputs.

Where required, a valuation adjustment is made to reflect the unrealized gain or loss at inception of a financial instrument contract where the fair value of that financial instrument is not obtained from a quoted market price or cannot be evidenced by other observable market transactions based on a valuation technique incorporating observable market data.

A bid-offer valuation adjustment is required when a financial instrument is valued at the mid-market price, instead of the bid or offer price for asset or liability positions, respectively. The valuation adjustment takes into account the spread from the mid to either the bid or offer price.

Some valuation models require parameter calibration from such factors as market observable option prices. The calibration of parameters may be sensitive to factors such as the choice of instruments or optimization methodology. A valuation adjustment is also estimated to mitigate the uncertainties of parameter calibration and model limitations.

In determining fair value, a hierarchy is used which prioritizes the inputs to valuation techniques. The fair value hierarchy gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1) and the lowest priority to unobservable inputs (Level 3). Determination of fair value based on this hierarchy requires the use of observable market data whenever available. Level 1 inputs are unadjusted quoted prices in active markets for identical assets or liabilities that we have the ability to access at the measurement date. Level 2 inputs include quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active, and model inputs that are either observable, or can be corroborated by observable market data for substantially the full term of the assets or liabilities. Level 3 inputs are one or more inputs that are unobservable and significant to the fair value of the asset or liability. Unobservable inputs are used to measure fair value to the extent that observable inputs are not available at the measurement date. The availability of inputs for valuation may affect the selection of valuation techniques. The classification of a financial instrument in the hierarchy for disclosure purposes is based upon the lowest level of input that is significant to the measurement of fair value.

Where observable prices or inputs are not available, management judgment is required to determine fair values by assessing other relevant sources of information such as historical data, proxy information from similar transactions, and through extrapolation and interpolation techniques. For more complex or illiquid instruments, significant judgment is required in the determination of the model used, the selection of model inputs, and in some cases the application of valuation adjustments to the model value or quoted price for inactively traded financial instruments, as the selection of model inputs may be subjective and the inputs may be unobservable. Unobservable inputs are inherently uncertain as there is little or no market data available from which to determine the level at which the transaction would occur under normal business circumstances. Appropriate parameter uncertainty and market risk valuation adjustments for such inputs and other model risk valuation adjustments are assessed in all such instances.

Interest

Interest is recognized in Interest income and Interest expense in the Consolidated Statements of Income for all interest-bearing financial instruments using the effective interest method. The effective interest rate is the rate that discounts estimated future cash flows over the expected life of the financial asset or liability to the net carrying amount upon initial recognition. Significant judgment is applied in determining the effective interest rate due to uncertainty in the timing and amounts of future cash flows.

Transaction costs

Transaction costs are expensed as incurred for financial instruments classified or designated as at FVTPL. For other financial instruments, transaction costs are capitalized on initial recognition. For financial assets and financial liabilities measured at amortized cost, capitalized transaction costs are amortized through net income over the estimated life of the instrument using the effective interest method. For AFS financial assets measured at fair value that do not have fixed or determinable payments and no fixed maturity, capitalized transaction costs are recognized in net income when the asset is derecognized or becomes impaired.

Offsetting financial assets and financial liabilities

Financial assets and financial liabilities are offset on the balance sheet when there exists both a legally enforceable right to offset the recognized amounts and an intention to settle on a net basis, or realize the asset and settle the liability simultaneously.

Assets purchased under reverse repurchase agreements and sold under repurchase agreements

We purchase securities under agreements to resell (reverse repurchase agreements) and take possession of these securities. We monitor the market value of the securities purchased and additional collateral is obtained when appropriate. We have the right to liquidate the collateral held in the event of counterparty default. Reverse repurchase agreements are treated as collateralized lending transactions. We also sell securities under agreements to repurchase (repurchase agreements), which are treated as collateralized borrowing transactions. The securities received under reverse repurchase agreements and securities delivered under repurchase agreements are not recognized on, or derecognized from, our Consolidated Balance Sheets, respectively, unless the risks and rewards of ownership are obtained or relinquished.

Reverse repurchase agreements and repurchase agreements are carried on our Consolidated Balance Sheets at the amounts at which the securities were initially acquired or sold, except when they are designated as at FVTPL and are recorded at fair value. Interest earned on reverse repurchase agreements is included in Interest income, and interest incurred on repurchase agreements is included in Interest expense in our Consolidated Statements of Income. Changes in fair value for reverse repurchase agreements and repurchase agreements designated as at FVTPL are included in Trading revenue or Other in Non-interest income.

Derivatives

Derivatives are primarily used in sales and trading activities. Derivatives are also used to manage our exposure to interest, currency, credit and other market risks. The most frequently used derivative products are interest rate swaps, interest rate futures, forward rate agreements, interest rate options, foreign exchange forward contracts, cross currency swaps, foreign currency futures, foreign currency options, equity swaps and credit derivatives. All derivative instruments are recorded on our Consolidated Balance Sheets at fair value, including those derivatives that are embedded in financial or non-financial contracts and are not closely related to the host contracts.

When derivatives are embedded in other financial instruments or host contracts, such combinations are known as hybrid instruments with the effect that some of the cash flows of a hybrid instrument vary in a way similar to a stand-alone derivative. If the host contract is not carried at fair value with changes in fair value reported in our Consolidated Statements of Income, the embedded derivative is generally required to be separated from the host contract and accounted for separately as at FVTPL if the economic characteristics and risks of the embedded derivative are not closely related to those of the host contract. All embedded derivatives are presented on a combined basis with the host contracts although they are separated for measurement purposes when conditions requiring separation are met.

When derivatives are used in sales and trading activities, the realized and unrealized gains and losses on these derivatives are recognized in Trading revenue in Non-interest income. Derivatives with positive fair values are reported as Derivative assets and derivatives with negative fair values are reported as Derivative liabilities. In accordance with our policy for offsetting financial assets and financial liabilities, the net fair value of certain derivative assets and liabilities are reported as an asset or liability, as appropriate. Valuation adjustments are included in the fair value of Derivative assets and Derivative liabilities. Premiums paid and premiums received are shown in Derivative assets and Derivative liabilities, respectively.

When derivatives are used to manage our own exposures, we determine for each derivative whether hedge accounting can be applied, as discussed in the Hedge accounting section below.

Hedge accounting

We use derivatives and non-derivatives in our hedging strategies to manage our exposure to interest rate, currency, credit and other market risks. Where hedge accounting can be applied, a hedge relationship is designated and documented at inception to detail the particular risk management objective and strategy for undertaking the hedge transaction. The documentation identifies the specific asset, liability or anticipated cash flows being hedged, the risk that is being hedged, the type of hedging instrument used and how effectiveness will be assessed. We assess, both at the inception of the hedge and on an ongoing basis, whether the hedging instruments are 'highly effective' in offsetting changes in the fair value or cash flows of the hedged items. A hedge is regarded as highly effective only if the following criteria are met: (i) at inception of the hedge and throughout its life, the hedge is expected to be highly effective in achieving offsetting changes in fair value or cash flows attributable to the hedged risk, and (ii) actual results of the hedge are within a pre-determined range. In the case of hedging a forecast transaction, the transaction must have a high probability of occurring and must present an exposure to variations in cash flows that could ultimately affect the reported net profit or loss. Hedge accounting is discontinued when it is determined that the hedging instrument is no longer effective as a hedge, the hedging instrument or hedged item is terminated or sold, or the forecast transaction is no longer deemed highly probable. Refer to Note 8 for the fair value of derivatives and non-derivative instruments categorized by their hedging relationships, as well as derivatives that are not designated in hedging relationships.

Fair value hedges

In a fair value hedging relationship, the carrying value of the hedged item is adjusted for changes in fair value attributable to the hedged risk and recognized in Non-interest income. Changes in fair value of the hedged item, to the extent that the hedging relationship is effective, are offset by changes in the fair value of the hedging derivative, which are also recognized in Non-interest income. When hedge accounting is discontinued, the carrying value of the hedged item is no longer adjusted and the cumulative fair value adjustments to the carrying value of the hedged items are amortized to Net income over the expected remaining life of the hedged items.

We predominantly use interest rate swaps to hedge our exposure to changes in a fixed interest rate instrument's fair value caused by changes in interest rates.

Cash flow hedges

In a cash flow hedging relationship, the effective portion of the change in the fair value of the hedging derivative, net of taxes, is recognized in OCI while the ineffective portion is recognized in Non-interest income. When hedge accounting is discontinued, the cumulative amounts previously recognized in Other components of equity are reclassified to Net interest income during the periods when the variability in the cash flows of the hedged item affects Net interest income. Unrealized gains and losses on derivatives are reclassified immediately to Net income when the hedged item is sold or terminated early, or when the forecast transaction is no longer expected to occur.

We predominantly use interest rate swaps to hedge the variability in cash flows related to a variable-rate asset or liability.

Net investment hedges

In hedging our foreign currency exposure to a net investment in a foreign operation, the effective portion of foreign exchange gains and losses on the hedging instruments, net of applicable taxes, is recognized in OCI and the ineffective portion is recognized in Non-interest income. The amounts, or a portion thereof, previously recognized in Other components of equity are recognized in Net income on the disposal, or partial disposal, of the foreign operation.

We use foreign exchange contracts and foreign currency-denominated liabilities to manage our foreign currency exposures to net investments in foreign operations having a functional currency other than the Canadian dollar.

Loans

Loans are non-derivative financial assets with fixed or determinable payments that are not quoted in an active market and which are not classified as AFS. Loans are initially recognized at fair value. When loans are issued at a market rate, fair value is represented by the cash advanced to the borrowers. Loans are subsequently measured at amortized cost using the effective interest method less impairment, unless we intend to sell them in the near future upon origination or they have been designated as at FVTPL, in which case they are carried at fair value.

We assess our loans (including debt securities classified as loans) for objective evidence of impairment at each balance sheet date. Evidence of impairment may include indications that the borrower is experiencing significant financial difficulty, probability of bankruptcy or other financial reorganization, as well as a measurable decrease in the estimated future cash flows evidenced by the adverse changes in the payments status of the borrower or economic conditions that correlate with defaults. Whenever a payment is 90 days past due, loans other than credit card balances and loans guaranteed or insured by a Canadian government (Federal or Provincial) or a Canadian government agency (collectively, Canadian government) are classified as impaired unless they are fully secured and collection efforts are reasonably expected to result in repayment of debt within 180 days of the loans becoming past due. Loans guaranteed by a Canadian government are classified as impaired when the loan is contractually 365 days in arrears. Credit card balances are generally classified as impaired when a payment is 180 days in arrears.

Assets acquired to satisfy loan commitments are recorded at their fair value less costs to sell. Fair value is determined based on either current market value where available or discounted cash flows. Any excess of the carrying value of the loan over the fair value of the assets acquired is recognized by a charge to Provision for credit losses.

Interest on loans is recognized in Interest income – Loans using the effective interest method. The estimated future cash flows used in this calculation include those determined by the contractual term of the asset, all fees that are considered to be integral to the effective interest rate, transaction costs and all other premiums or discounts. Fees that relate to activities such as originating, restructuring or renegotiating loans are deferred and recognized as Interest income over the expected term of such loans using the effective interest method. Where there is a reasonable expectation that a loan will be originated, commitment and standby fees are also recognized as interest income over the expected term of the resulting loans using the effective interest method. Otherwise, such fees are recorded as Other Liabilities and amortized into Non-interest income over the commitment or standby period. Prepayment fees on mortgage loans are not included as part of the effective

interest rate at origination as the amounts are not reliably measurable. If prepayment fees are received on a renewal of a mortgage loan, the fee is included as part of the effective interest rate, and if not renewed, the prepayment fee is recognized in interest income at the prepayment date.

Allowance for credit losses

An allowance for credit losses is established if there is objective evidence that we will be unable to collect all amounts due on our loans portfolio according to the original contractual terms or the equivalent value. This portfolio includes on-balance sheet exposures, such as loans and acceptances, and off-balance sheet items such as letters of credit, guarantees and unfunded commitments.

The allowance for credit losses is increased by the impairment losses recognized and decreased by the amount of write-offs, net of recoveries. The allowance for credit losses for on-balance sheet items is included as a reduction to assets, and the allowance for credit losses relating to off-balance sheet items is included in Provisions under Other Liabilities.

We assess whether objective evidence of impairment exists individually for loans that are individually significant and collectively for loans that are not individually significant. If we determine that no objective evidence of impairment exists for an individually assessed loan, whether significant or not, the loan is included in a group of loans with similar credit risk characteristics and collectively assessed for impairment. Loans that are individually assessed for impairment and for which an impairment loss is recognized are not included in a collective assessment of impairment.

Allowance for credit losses represent management's best estimates of losses incurred in our loan portfolio at the balance sheet date. Management's judgment is required in making assumptions and estimations when calculating allowances on both individually and collectively assessed loans. The underlying assumptions and estimates used for both individually and collectively assessed loans can change from period to period and may significantly affect our results of operations.

Individually assessed loans

Loans which are individually significant are assessed individually for objective indicators of impairment. A loan is considered impaired when we determine that we will not be able to collect all amounts due according to the original contractual terms or the equivalent value.

Credit exposures of individually significant loans are evaluated based on factors including the borrower's overall financial condition, resources and payment record, and where applicable, the realizable value of any collateral. If there is evidence of impairment leading to an impairment loss, then the amount of the loss is determined as the difference between the carrying amount of the loan, including accrued interest, and the estimated recoverable amount. The estimated recoverable amount is measured as the present value of expected future cash flows discounted at the loan's original effective interest rate, including cash flows that may result from the realization of collateral less costs to sell. Individually-assessed impairment losses reduce the carrying amount of the loan through the use of an allowance account and the amount of the loss is recognized in Provision for credit losses in our Consolidated Statements of Income. Following impairment, interest income is recognized on the unwinding of the discount from the initial recognition of impairment.

Significant judgment is required in assessing evidence of impairment and estimation of the amount and timing of future cash flows when determining the impairment loss. When assessing objective evidence of impairment we primarily consider specific factors such as the financial condition of the borrower, the borrower's default or delinquency in interest or principal payments, local economic conditions and other observable data. In determining the estimated recoverable amount we consider discounted expected future cash flows at the effective interest rate using a number of assumptions and inputs. Management judgment is involved when choosing these inputs and assumptions used such as the expected amount of the loan that will not be recovered and the cost of time delays in collecting principal and/or interest, and when estimating the value of any collateral held for which there may not be a readily accessible market. Changes in the amount expected to be recovered would have a direct impact on the Provision for credit losses and may result in a change in the Allowance for credit losses.

Collectively assessed loans

Loans which are not individually significant, or which are individually assessed and not determined to be impaired, are collectively assessed for impairment. For the purposes of a collective evaluation of impairment, loans are grouped on the basis of similar risk characteristics, taking into account loan type, industry, geographic location, collateral type, past due status and other relevant factors.

The collective impairment allowance is determined by reviewing factors including: (i) historical loss experience, which takes into consideration historical probabilities of default, loss given default and exposure at default, in portfolios with similar credit risk characteristics, and (ii) management's judgment on the level of impairment losses based on historical experience relative to the actual level as reported at the balance sheet date, taking into consideration the current portfolio credit quality trends, business and economic and credit conditions, the impact of policy and process changes, and other supporting factors. Future cash flows for a group of loans are collectively evaluated for impairment on the basis of the contractual cash flows of the loans in the group and historical loss experience for loans with credit risk characteristics similar to those in the group. Historical loss experience is adjusted based on current observable data to reflect the effects of current conditions that did not affect the period on which the historical loss experience is based and to remove the effects of conditions in the historical period that do not currently exist. The methodology and assumptions used for estimating future cash flows are reviewed regularly to reduce any differences between loss estimates and actual loss experience. Collectively-assessed impairment losses reduce the carrying amount of the aggregated loan position through an allowance account and the amount of the loss is recognized in Provision for credit losses. Following impairment, interest income is recognized on the unwinding of the discount from the initial recognition of impairment.

The methodology and assumptions used to calculate collective impairment allowances are subject to uncertainty, in part because it is not practicable to identify losses on an individual loan basis due to the large number of individually insignificant loans in the portfolio. Significant judgment is required in assessing historical loss experience, the loss identification period and its relationship to current portfolios including delinquency, and loan balances; and current business, economic and credit conditions including industry specific performance, unemployment and country risks. Changes in these assumptions would have a direct impact on the Provision for credit losses and may result in changes in the related Allowance for credit losses.

Write-off of loans

Loans and the related impairment allowance for credit losses are written off, either partially or in full, when there is no realistic prospect of recovery. Where loans are secured, they are generally written off after receipt of any proceeds from the realization of the collateral. In circumstances where the net realizable value of any collateral has been determined and there is no reasonable expectation of further recovery, write off may be earlier. For credit cards, the balances and related allowance for credit losses are generally written off when payment is 180 days in arrears. Personal loans are generally written off at 150 days past due, except for loans guaranteed or insured by a Canadian government or Canadian government agency, which are written off when the loan is contractually 365 days in arrears.

Derecognition of financial assets

Financial assets are derecognized from our Consolidated Balance Sheets when our contractual rights to the cash flows from the assets have expired, when we retain the rights to receive the cash flows of the assets but assume an obligation to pay those cash flows to a third party subject to certain pass-through requirements or when we transfer our contractual rights to receive the cash flows and substantially all of the risk and rewards of the assets have been transferred. When we retain substantially all of the risks and rewards of the transferred assets, the transferred assets are not derecognized from our Consolidated Balance Sheets and are accounted for as secured financing transactions. When we neither retain nor transfer substantially all risks and rewards of ownership of the assets, we derecognize the assets if control over the assets is relinquished. If we retain control over the transferred assets, we continue to recognize the transferred assets to the extent of our continuing involvement.

Management's judgment is applied in determining whether the contractual rights to the cash flows from the transferred assets have expired or whether we retain the rights to receive cash flows on the assets but assume an obligation to pay for those cash flows. We derecognize transferred financial assets if we transfer substantially all the risks and rewards of the ownership in the assets. When assessing whether we have transferred substantially all of the risk and rewards of the transferred assets, management considers the Bank's exposure before and after the transfer with the variability in the amount and timing of the net cash flows of the transferred assets. In transfers in which we retain the servicing rights, management has applied judgment in assessing the benefits of servicing against market expectations. When the benefits of servicing are greater than fair value, a servicing asset is recognized in Other assets in our Consolidated Balance Sheets. When the benefits of servicing are less than fair value, a servicing liability is recognized in Other liabilities in our Consolidated Balance Sheets.

Derecognition of financial liabilities

We derecognize a financial liability from our Consolidated Balance Sheets when our obligation specified in the contract expires, or is discharged or cancelled. We recognize the difference between the carrying amount of a financial liability transferred and the consideration paid in our Consolidated Statements of Income.

Guarantees

Financial guarantee contracts are contracts that contingently require us to make specified payments (in cash, other assets, our own shares or provision of services) to reimburse the holder for a loss it incurs because a specified debtor fails to make payment when due in accordance with the original or modified terms of a debt instrument. Liabilities are recognized on our Consolidated Balance Sheets at the inception of a guarantee for the fair value of the obligation undertaken in issuing the guarantee. Financial guarantees are subsequently remeasured at the higher of (i) the amount initially recognized less accumulated amortization and (ii) our best estimate of the present value of the expenditure required to settle the present obligation at the end of the reporting period.

If the financial guarantee contract meets the definition of a derivative, it is measured at fair value at each balance sheet date and reported under Derivatives on our Consolidated Balance Sheets.

Insurance and segregated funds

Premiums from long-duration contracts, primarily life insurance, are recognized when due in Non-interest income – Insurance premiums, investment and fee income. Premiums from short-duration contracts, primarily property and casualty, and fees for administrative services are recognized in Insurance premiums, investment and fee income over the related contract period. Unearned premiums of the short-duration contracts, representing the unexpired portion of premiums, are reported in Other liabilities. Investments made by our insurance operations are classified as AFS or loans and receivables, except for investments supporting the policy benefit liabilities on life and health insurance contracts and a portion of property and casualty contracts. These are designated as at FVTPL with changes in fair value reported in Insurance premiums, investment and fee income.

Insurance claims and policy benefit liabilities represent current claims and estimates for future insurance policy benefits. Liabilities for life insurance contracts are determined using the Canadian Asset Liability Method (CALM), which incorporates assumptions for mortality, morbidity, policy lapses and surrenders, investment yields, policy dividends, operating and policy maintenance expenses, and provisions for adverse deviation. These assumptions are reviewed at least annually and updated in response to actual experience and market conditions. Liabilities for property and casualty insurance represent estimated provisions for reported and unreported claims. Liabilities for life and property and casualty insurance are included in Insurance claims and policy benefit liabilities. Changes in Insurance claims and policy benefit liabilities are included in the Insurance policyholder benefits, claims and acquisition expense in our Consolidated Statements of Income in the period in which the estimates change.

Premiums ceded for reinsurance and reinsurance recoveries on policyholder benefits and claims incurred are reported in income and expense as appropriate. Reinsurance recoverables, which relate to paid benefits and unpaid claims, are included in Other assets.

Acquisition costs for new insurance business consist of commissions, premium taxes, certain underwriting costs and other costs that vary with the acquisition of new business. Deferred acquisition costs for life insurance products are implicitly recognized in Insurance claims and policy benefit liabilities by CALM. For property and casualty insurance, these costs are classified as Other assets and amortized over the policy term.

Segregated funds are lines of business in which we issue an insurance contract where the benefit amount is directly linked to the market value of the investments held in the underlying fund. The contractual arrangement is such that the underlying segregated fund assets are registered in our name but the segregated fund policyholders bear the risks and rewards of the funds' investment performance. Liabilities for these contracts are calculated based on contractual obligations using actuarial assumptions and are at least equivalent to the surrender or transfer value calculated by reference to the value of the relevant underlying funds or indices. Segregated funds' assets and liabilities are separately presented on our Consolidated Balance Sheets. As the segregated fund policyholders bear the risks and rewards of the funds' performance, investment income earned by the segregated funds and expenses incurred by the segregated funds are offset and are not separately presented in our Consolidated Statements of Income. Fee income we earn from segregated funds includes management fees, mortality, policy administration and surrender charges, and these fees are recorded in Non-interest income – Insurance premiums, investment and fee income. We provide minimum death benefit and maturity value guarantees on segregated funds. The liability associated with these minimum guarantees is recorded in Insurance claims and policy benefit liabilities.

Liability adequacy tests are performed for all insurance contract portfolios at each balance sheet date to ensure the adequacy of insurance contract liabilities. Current best estimates of future contractual cash flows, claims handling and administration costs, and investment returns from the assets backing the liabilities are taken into account in the tests. When the test results indicate that there is a deficiency in liabilities, the deficiency is charged immediately to our Consolidated Statements of Income by writing down the deferred acquisition costs in Other assets and/or increasing Insurance claims and policy benefit liabilities.

Employee benefits – Pensions and other post-employment benefits

Our defined benefit pension expense, which is included in Non-interest expense – Human resources, consists of the cost of employee pension benefits for the current year's service, net interest on the net defined benefit liability (asset), past service cost and gains or losses on settlement. Remeasurements of the net defined benefit obligation, which comprise actuarial gains and losses and return on plan assets (excluding amounts included in net interest on the net defined benefit liability), are recognized immediately in OCI in the period in which they occur. Actuarial gains and losses comprise experience adjustments (the effects of differences between the previous actuarial assumptions and what has actually occurred), as well as the effects of changes in actuarial assumptions. Amounts recognized in OCI will not be reclassified subsequently to net income. Past service cost is the change in the present value of the defined benefit obligation resulting from a plan amendment or curtailment and is charged immediately to income.

For each defined benefit pension plan, we recognize the present value of our defined benefit obligations less the fair value of the plan assets as a defined benefit liability reported in Other liabilities – Employee benefit liabilities on our Consolidated Balance Sheets. For plans where there is a net defined benefit asset, the amount is reported as an asset in Other assets – Employee benefit assets on our Consolidated Balance sheets.

The calculation of defined benefit expenses and obligations requires significant judgment as the recognition is dependent on discount rates and various actuarial assumptions such as healthcare cost trend rates, projected salary increases, retirement age, and mortality and termination rates. Due to the long-term nature of these plans, such estimates and assumptions are subject to inherent risks and uncertainties. For our pension and other post-employment benefit plans, the discount rate is determined by reference to market yields on high quality corporate bonds. Since the discount rate is based on currently available yields, and involves management's assessment of market liquidity, it is only a proxy for future yields. Actuarial assumptions, set in accordance with current practices in the respective countries of our plans, may differ from actual experience as country specific statistics are only estimates of future employee behaviour. These assumptions are determined by management and are reviewed by actuaries at least annually. Changes to any of the above assumptions may affect the amounts of benefits obligations, expenses and remeasurements that we recognize.

Our contributions to defined contribution pension plans are expensed when employees have rendered services in exchange for such contributions. Defined contribution pension expense is included in Non-interest expense – Human resources.

Share-based compensation

We offer share-based compensation plans to certain key employees and to our non-employee directors.

To account for stock options granted to employees, compensation expense is recognized over the applicable vesting period with a corresponding increase in equity. Fair value is determined by using option valuation models, which take into account the exercise price of the option, the current share price, the risk free interest rate, the expected volatility of the share price over the life of the option and other relevant factors. When the options are exercised, the exercise price proceeds together with the amount initially recorded in equity are credited to common shares. Our other share-based compensation plans include performance deferred share plans and deferred share unit plans for key employees (the Plans). The obligations for the Plans are accrued over their vesting periods. The Plans are settled in cash.

For cash-settled awards, our accrued obligations are adjusted to their fair value at each balance sheet date. For share-settled awards, our expected obligations recognized in equity are based on the fair value of our common shares at the date of grant. Changes in our obligations, net of related hedges, are recorded as Non-interest expense – Human resources in our Consolidated Statements of Income with a corresponding increase in Other liabilities for cash-settled awards and in Retained earnings for share-settled awards. Compensation expense is recognized in the year the awards are earned by plan participants based on the vesting schedule of the relevant plans, net of estimated forfeitures.

The compensation cost attributable to options and awards granted to employees who are eligible to retire or will become eligible to retire during the vesting period is recognized immediately if the employee is eligible to retire on the grant date or over the period between the grant date and the date the employee becomes eligible to retire.

Our contributions to the employee savings and share ownership plans are expensed as incurred.

Income taxes

Income tax comprises current tax and deferred tax and is recognized in our Consolidated Statements of Income except to the extent that it relates to items recognized directly in equity, in which case it is recognized in equity.

Current income tax payable on profits is recognized as an expense based on the applicable tax laws in each jurisdiction in the period in which profits arise, calculated using tax rates enacted or substantively enacted by the balance sheet date. Deferred tax is recognized on temporary differences between the carrying amounts of assets and liabilities for accounting and tax purposes. A deferred income tax asset or liability is determined for each temporary difference, except for earnings related to our subsidiaries, branches, associates and interests in joint ventures where the temporary differences will not reverse in the foreseeable future and we have the ability to control the timing of reversal. Deferred tax assets and liabilities are determined based on the tax rates that are expected to be in effect in the period that the asset is realized or the liability is settled, based on tax rates and tax laws that have been enacted or substantively enacted at the balance sheet date. Current tax assets and liabilities are offset when they are levied by the same taxation authority on either the same taxable entity or different taxable entities within the same tax reporting group (which intends to settle on a net basis), and when there is a legal right to offset. Deferred tax assets and liabilities are offset when the same conditions are satisfied. Our Consolidated Statements of Income include items that are non-taxable or non-deductible for income tax purposes and, accordingly, this causes the income tax provision to be different from what it would be if based on statutory rates.

Deferred income taxes accumulated as a result of temporary differences and tax loss carryforwards are included in Other assets and Other liabilities. On a quarterly basis, we review our deferred income tax assets to determine whether it is probable that the benefits associated with these assets will be realized; this review involves evaluating both positive and negative evidence.

We are subject to income tax laws in various jurisdictions where we operate, and the complex tax laws are potentially subject to different interpretations by us and the relevant taxation authorities. Significant judgment is required in the interpretation of the relevant tax laws, and the determination of our tax provision which includes our best estimate of tax positions that are under audit or appeal by relevant taxation authorities. We perform a review on a quarterly basis to incorporate our best assessment based on information available, but additional liability and income tax expense could result based on decisions made by the relevant tax authorities.

The determination of our deferred tax asset or liability also requires significant management judgment as the recognition is dependent on our projection of future taxable profits and tax rates that are expected to be in effect in the period the asset is realized or the liability is settled. Any changes in our projection will result in changes in deferred tax assets or liabilities on our Consolidated Balance Sheets, and also deferred tax expense in our Consolidated Statements of Income.

Business combinations, goodwill and other intangibles

All business combinations are accounted for using the acquisition method. Non-controlling interests, if any, are recognized at their proportionate share of the fair value of identifiable assets and liabilities, unless otherwise indicated. Identifiable intangible assets are recognized separately from goodwill and included in Other intangibles. Goodwill represents the excess of the price paid for the business acquired over the fair value of the net identifiable assets acquired on the date of acquisition.

Goodwill

Goodwill is allocated to cash-generating units or groups of cash-generating units for the purpose of impairment testing, which is undertaken at the lowest level at which goodwill is monitored for internal management purposes. Impairment testing is performed annually as at August 1, or more frequently if there are objective indicators of impairment, by comparing the recoverable amount of a cash-generating unit (CGU) with its carrying amount. The recoverable amount of a CGU is the higher of its value in use and its fair value less costs of disposal. Value in use is the present value of the expected future cash flows from a CGU. Fair value less costs of disposal is the amount obtainable from the sale of a CGU in an orderly transaction between market participants, less disposal costs. The fair value of a CGU is estimated using valuation techniques such as a discounted cash flow method, adjusted to reflect the considerations of a prospective third-party buyer. External evidence such as binding sale agreements or recent transactions for similar businesses within the same industry is considered to the extent that it is available.

Significant judgment is involved in estimating the model inputs used to determine the recoverable amount of our CGUs, in particular future cash flows, discount rates and terminal growth rates, due to the uncertainty in the timing and amount of cash flows and the forward-looking nature of these inputs. Future cash flows are based on financial plans agreed by management which are estimated based on forecast results, business initiatives, planned capital investments and returns to shareholders. Discount rates are based on the bank-wide cost of capital, adjusted for CGU-specific risks and currency exposure as reflected by differences in expected inflation. Bank-wide cost of capital is based on the Capital Asset Pricing Model. CGU-specific risks include country risk, business/operational risk, geographic risk (including political risk, devaluation risk, and government regulation), currency risk, and price risk (including product pricing risk and inflation). Terminal growth rates reflect the expected long-term gross domestic product growth and inflation for the countries within which the CGU operates. Changes in these assumptions may impact the amount of impairment loss recognized in Non-interest expense.

The carrying amount of a CGU includes the carrying amount of assets, liabilities and goodwill allocated to the CGU. If the recoverable amount is less than the carrying value, the impairment loss is allocated first to reduce the carrying amount of any goodwill allocated to the CGU and then to the other non-financial assets of the CGU proportionately based on the carrying amount of each asset. Any impairment loss is charged to income in the period in which the impairment is identified. Goodwill is stated at cost less accumulated impairment losses. Subsequent reversals of goodwill impairment are prohibited.

Upon disposal of a portion of a CGU, the carrying amount of goodwill related to the portion of the CGU sold is included in the determination of gains or losses on disposal. The carrying amount is determined based on the relative fair value of the disposed portion to the total CGU.

Other intangibles

Intangible assets represent identifiable non-monetary assets and are acquired either separately or through a business combination, or generated internally. Intangible assets acquired through a business combination are recognized separately from goodwill when they are separable or arise from contractual or other legal rights, and their fair value can be measured reliably. The cost of a separately acquired intangible asset includes its purchase price and directly attributable costs of preparing the asset for its intended use. In respect of internally generated intangible assets, cost includes all directly attributable costs necessary to create, produce, and prepare the asset to be capable of operating in the manner intended by management. Research and development costs that are not eligible for capitalization are expensed. After initial recognition, an intangible asset is carried at its cost less any accumulated amortization and accumulated impairment losses, if any. Intangible assets with a finite-life are amortized on a straight-line basis over their estimated useful lives as follows: computer software – 3 to 10 years; and customer relationships – 10 to 20 years. We do not have any intangible assets with indefinite lives.

Intangible assets are assessed for indicators of impairment at each reporting period. If there is an indication that an intangible asset may be impaired, an impairment test is performed by comparing the carrying amount of the intangible asset to its recoverable amount. Where it is not possible to estimate the recoverable amount of an individual asset, we estimate the recoverable amount of the CGU to which the asset belongs. If the recoverable amount of the asset (or CGU) is less than its carrying amount, the carrying amount of the intangible asset is written down to its recoverable amount as an impairment loss.

An impairment loss recognized previously is reversed if there is a change in the estimates used to determine the recoverable amount of the asset (or CGU) since the last impairment loss was recognized. If an impairment loss is subsequently reversed, the carrying amount of the asset (or CGU) is revised to the lower of its recoverable amount and the carrying amount that would have been determined (net of amortization) had there been no prior impairment.

Due to the subjective nature of these estimates, significant judgment is required in determining the useful lives and recoverable amounts of our intangible assets, and assessing whether certain events or circumstances constitute objective evidence of impairment. Estimates of the recoverable amounts of our intangible assets rely on certain key inputs, including future cash flows and discount rates. Future cash flows are based on sales projections and allocated costs which are estimated based on forecast results and business initiatives. Discount rates are based on the bank-wide cost of capital, adjusted for asset-specific risks. Changes in these assumptions may impact the amount of impairment loss recognized in Non-interest expense.

Other

Translation of foreign currencies

Monetary assets and liabilities denominated in foreign currencies are translated into Canadian dollars at rates prevailing at the balance sheet date. Foreign exchange gains and losses resulting from the translation and settlement of these items are recognized in Non-interest income in the Consolidated Statements of Income.

Non-monetary assets and liabilities that are measured at historical cost are translated into Canadian dollars at historical rates. Non-monetary financial assets classified as AFS securities, such as equity instruments, that are measured at fair value are translated into Canadian dollars at rates prevailing at the balance sheet date, and the resulting foreign exchange gains and losses are recorded in Other components of equity until the asset is sold or becomes impaired.

Assets and liabilities of our foreign operations with functional currencies other than Canadian dollars are translated into Canadian dollars at rates prevailing at the balance sheet date, and income and expenses of these foreign operations are translated at average rates of exchange for the reporting period.

Unrealized gains or losses arising as a result of the translation of our foreign operations along with the effective portion of related hedges are reported in Other components of equity on an after-tax basis. Upon disposal or partial disposal of a foreign operation, an appropriate portion of the accumulated net translation gains or losses is included in Non-interest income.

Premises and equipment
Premises and equipment includes land, buildings, leasehold improvements, computer equipment, furniture, fixtures and other equipment, and are stated at cost less accumulated depreciation, except for land which is not depreciated, and accumulated impairment losses. Cost comprises the purchase price, any costs directly attributable to bringing the asset to the location and condition necessary for its intended use, and the initial estimate of any disposal costs. Depreciation is recorded principally on a straight–line basis over the estimated useful lives of the assets, which are 25 to 50 years for buildings, 3 to 10 years for computer equipment, and 7 to 10 years for furniture, fixtures and other equipment. The amortization period for leasehold improvements is the lesser of the useful life of the leasehold improvements or the lease term plus the first renewal period, if reasonably assured of renewal, up to a maximum of 10 years. Depreciation methods, useful lives, and residual values are reassessed at each reporting period and adjusted as appropriate. Gains and losses on disposal are recorded in Non–interest income.

Premises and equipment are assessed for indicators of impairment at each reporting period. If there is an indication that an asset may be impaired, an impairment test is performed by comparing the asset's carrying amount to its recoverable amount. Where it is not possible to estimate the recoverable amount of an individual asset, we estimate the recoverable amount of the CGU to which the asset belongs and test for impairment at the CGU level. An impairment charge is recorded to the extent the recoverable amount of an asset (or CGU), which is the higher of value in use and fair value less costs of disposal, is less than its carrying amount. Value in use is the present value of the future cash flows expected to be derived from the asset (or CGU). Fair value less costs of disposal is the amount obtainable from the sale of the asset (or CGU) in an orderly transaction between market participants, less costs of disposal.

After the recognition of impairment, the depreciation charge is adjusted in future periods to reflect the asset's revised carrying amount. If an impairment is later reversed, the carrying amount of the asset is revised to the lower of the asset's recoverable amount and the carrying amount that would have been determined (net of depreciation) had there been no prior impairment loss. The depreciation charge in future periods is adjusted to reflect the revised carrying amount.

Provisions
Provisions are liabilities of uncertain timing or amount and are recognized when we have a present legal or constructive obligation as a result of a past event, it is probable that an outflow of resources will be required to settle the obligation, and a reliable estimate can be made of the amount of the obligation. Provisions are measured as the best estimate of the consideration required to settle the present obligation at the reporting date. Significant judgment is required in determining whether a present obligation exists and in estimating the probability, timing and amount of any outflows. We record provisions related to litigation, asset retirement obligations, and the allowance for off-balance sheet and other items. Provisions are recorded under Other liabilities on our Consolidated Balance Sheets.

We are required to estimate the results of ongoing legal proceedings, expenses to be incurred to dispose of capital assets, and credit losses on undrawn commitments and guarantees. The forward-looking nature of these estimates requires us to use a significant amount of judgment in projecting the timing and amount of future cash flows. We record our provisions on the basis of all available information at the end of the reporting period and make adjustments on a quarterly basis to reflect current expectations. Should actual results differ from our expectations, we may incur expenses in excess of the provisions recognized.

When some or all of the economic benefits required to settle a provision are expected to be recovered from a third party, such as an insurer, a separate asset is recognized if it is virtually certain that reimbursement will be received.

Commissions and fees
Portfolio management and other management advisory and service fees are recognized based on the applicable service contracts. Fees related to provision of services including asset management, wealth management, financial planning and custody services that cover a specified service period, are recognized over the period in which the service is provided. Investment management and custodial fees are generally calculated as a percentage of daily or period-end net asset values, and are received monthly, quarterly, semi-annually or annually, depending on the terms of the contracts. Management fees are generally derived from assets under management (AUM) when our clients solicit the investment capabilities of an investment manager and administrative fees are derived from assets under administration (AUA) where the investment strategy is directed by the client or a designated third party manager. Performance-based fees, which are earned upon exceeding certain benchmarks or performance targets, are recognized only when the benchmark or performance targets are achieved. Fees such as underwriting fees and brokerage fees that are related to the provision of specific transaction type services are recognized when the service has been completed.

When service fees and other costs are incurred in relation to commissions and fees earned and we have significant risks and rewards associated with delivering the service, we record these costs on a gross basis in either Non-interest expense – Other or Non-interest expense – Human resources, as applicable.

Dividend income
Dividend income is recognized when the right to receive payment is established. This is the ex-dividend date for listed equity securities, and usually the date when shareholders have approved the dividend for unlisted equity securities.

Leasing
A lease is an agreement whereby the lessor conveys to the lessee the right to use an asset for an agreed upon period of time in return for a payment or series of payments. A finance lease is a lease that transfers substantially all the risks and rewards incidental to ownership of the leased asset to the lessee, where title may or may not eventually be transferred. An operating lease is a lease other than a finance lease.

Operating leases
When we are the lessee in an operating lease, we record rental payments on a straight-line basis over the lease term in Non-interest expense.

Finance leases
When we are the lessee in a finance lease, we initially record both the leased asset and the related lease obligation in Premises and equipment, Other intangibles and Other liabilities on our Consolidated Balance Sheets at an amount equal to the fair value of the leased asset or, if lower, the present value of the minimum lease payments, each determined at the date of inception of the lease. Initial direct costs directly attributed to the lease are recognized as an asset under the finance lease.

Earnings per share
Earnings per share is computed by dividing Net income available to common shareholders by the weighted average number of common shares outstanding for the period. Net income available to common shareholders is determined after deducting dividend entitlements of preferred

shareholders, any gains (losses) on redemption of preferred shares net of related income taxes and the net income attributable to non-controlling interests.

Diluted earnings per share reflects the potential dilution that could occur if additional common shares are assumed to be issued under securities or contracts that entitle their holders to obtain common shares in the future, to the extent such entitlement is not subject to unresolved contingencies. For contracts that may be settled in cash or in common shares at our option, diluted earnings per share is calculated based on the assumption that such contracts will be settled in shares. Income and expenses associated with these types of contracts are excluded from the Net income available to common shareholders, and the additional number of shares that would be issued is included in the diluted earnings per share calculation. These contracts include our convertible Preferred Shares and Trust Capital Securities with the conversion assumed to have taken place at the beginning of the period or on the date of issue, if later. For stock options whose exercise price is less than the average market price of our common shares, they are assumed to be exercised and the proceeds are used to repurchase common shares at the average market price for the period. The incremental number of common shares issued under stock options and repurchased from proceeds is included in the calculation of diluted earnings per share.

Share capital

We classify a financial instrument that we issue as a financial asset, financial liability or an equity instrument in accordance with the substance of the contractual arrangement.

Our common shares held by us are classified as treasury shares in equity and accounted for at weighted average cost. Upon the sale of treasury shares, the difference between the sale proceeds and the cost of the shares is recognized in Retained earnings. Financial instruments issued by us are classified as equity instruments when there is no contractual obligation to transfer cash or other financial assets. Incremental costs directly attributable to the issue of equity instruments are included in equity as a deduction from the proceeds, net of tax. Financial instruments that will be settled by a variable number of our common shares upon their conversion by the holders as well as the related accrued distributions are classified as liabilities on our Consolidated Balance Sheets. Dividends and yield distributions on these instruments are classified as Interest expense in our Consolidated Statements of Income.

Future changes in accounting policy and disclosure

The following standards have been issued, but are not yet effective for us. We are currently assessing the impact of adopting these standards on our Consolidated Financial Statements:

IFRS 9 *Financial Instruments* (IFRS 9)

In July 2014, the IASB issued the complete version of IFRS 9, first issued in November 2009, which brings together the classification and measurement, impairment and hedge accounting phases of the IASB's project to replace IAS 39 *Financial Instruments: Recognition and Measurement* (IAS 39).

IFRS 9 introduces a principles-based approach to the classification of financial assets based on an entity's business model and the nature of the cash flows of the asset. All financial assets, including hybrid contracts, are measured as at FVTPL, fair value through OCI or amortized cost. For financial liabilities, IFRS 9 includes the requirements for classification and measurement previously included in IAS 39.

IFRS 9 also introduces an expected credit loss impairment model for all financial assets not measured as at FVTPL. The model has three stages: (1) on initial recognition, a loss allowance is recognized and maintained equal to 12 months of expected credit losses; (2) if credit risk increases significantly relative to initial recognition, the loss allowance is increased to cover full lifetime expected credit losses; and (3) when a financial asset is considered credit-impaired, the loss allowance continues to reflect lifetime expected credit losses and interest revenue is calculated based on the carrying amount of the asset, net of the loss allowance, rather than its gross carrying amount. Changes in the required loss allowance, including the impact of movement between 12 months and lifetime expected credit losses, will be recorded in profit or loss.

Finally, IFRS 9 introduces a new hedge accounting model that aligns the accounting for hedge relationships more closely with an entity's risk management activities, permits hedge accounting to be applied more broadly to a greater variety of hedging instruments and risks and requires additional disclosures. IFRS 9 includes an accounting policy choice to retain the IAS 39 requirements for hedge accounting, which we will elect to apply.

We adopted the own credit provisions of IFRS 9 in the second quarter of 2014. The new impairment and classification and measurement requirements will be applied by adjusting our Consolidated Balance Sheet on November 1, 2017, the date of initial application, with no restatement of comparative period financial information.

The adoption of IFRS 9 is expected to result in certain differences in the classification of financial assets when compared to our classification under IAS 39. The most significant changes include approximately $25 billion of debt securities previously classified as AFS to be classified as amortized cost, and approximately $2.5 billion of equities and debt securities previously classified as AFS to be classified as at FVTPL. Based on current estimates, the adoption of IFRS 9 is expected to result in a reduction to retained earnings as at November 1, 2017 of approximately $600 million, net of taxes. The primary impact is attributable to increases in the allowance for credit losses under the new impairment requirements. We continue to monitor and refine certain elements of our impairment process in advance of Q1 2018 reporting.

IFRS 15 *Revenue from Contracts with Customers* (IFRS 15)

In May 2014, the IASB issued IFRS 15, which establishes the principles for reporting about the nature, amount, timing and uncertainty of revenue and cash flows arising from an entity's contracts with customers. The standard provides a single, principles-based five-step model for revenue recognition to be applied to contracts with customers except for revenue arising from items such as financial instruments, insurance contracts and leases. The majority of our revenue, including net interest income, is not expected to be impacted. In April 2016, the IASB issued amendments to IFRS 15, which clarify the underlying principles of IFRS 15 and provide additional transitional relief on initial application. IFRS 15 and its amendments will be effective for us on November 1, 2018.

IFRS 16 *Leases* (IFRS 16)

In January 2016, the IASB issued IFRS 16, which sets out the principles for the recognition, measurement, presentation and disclosure of leases. The standard removes the current requirement for lessees to classify leases as finance leases or operating leases by introducing a single lessee accounting model that requires the recognition of lease assets and lease liabilities on the balance sheet for most leases. Lessees will also recognize depreciation expense on the lease asset and interest expense on the lease liability in the statement of income. There are no significant changes to lessor accounting aside from enhanced disclosure requirements. IFRS 16 will be effective for us on November 1, 2019.

IAS 7 *Statement of Cash Flows* (IAS 7)

In January 2016, the IASB issued amendments to IAS 7, which will require specific disclosures for movements in certain liabilities on the statement of cash flows. These amendments will be effective for us on November 1, 2017 and we will adopt these disclosures in our 2018 Consolidated Financial Statements. The adoption of these amendments is not expected to have a material impact on our consolidated financial statements.

IFRS 17 *Insurance Contracts* (IFRS 17)
In May 2017, the IASB issued IFRS 17 to establish a comprehensive global insurance standard which provides guidance on the recognition, measurement, presentation and disclosures of insurance contracts. IFRS 17 requires entities to measure insurance contract liabilities at their current fulfillment values using one of three approaches. This new standard will be effective for us on November 1, 2021 and will be applied retrospectively with restatement of comparatives unless impracticable.

Note 3 Fair value of financial instruments

Carrying value and fair value of financial instruments
The following tables provide a comparison of the carrying and fair values for each classification of financial instruments. Embedded derivatives are presented on a combined basis with the host contracts. For measurement purposes, they are carried at fair value when conditions requiring separation are met.

	As at October 31, 2017						
	Carrying value and fair value			Carrying value	Fair value		
(Millions of Canadian dollars)	Financial instruments classified as at FVTPL	Financial instruments designated as at FVTPL	Available-for-sale instruments measured at fair value	Financial instruments measured at amortized cost	Financial instruments measured at amortized cost	Total carrying amount	Total fair value
Financial assets							
Interest-bearing deposits with banks	$ –	$ 20,752	$ –	$ 11,910	$ 11,910	$ 32,662	$ 32,662
Securities							
Trading	116,720	10,937	–	–	–	127,657	127,657
Available-for-sale (1)	–	–	75,877	14,845	14,771	90,722	90,648
	116,720	10,937	75,877	14,845	14,771	218,379	218,305
Assets purchased under reverse repurchase agreements and securities borrowed	–	138,979	–	81,998	81,999	220,977	220,978
Loans							
Retail	69	–	–	383,857	380,782	383,926	380,851
Wholesale	1,837	2,329	–	154,525	153,967	158,691	158,133
	1,906	2,329	–	538,382	534,749	542,617	538,984
Other							
Derivatives	95,023	–	–	–	–	95,023	95,023
Other assets (2)	–	1,213	–	44,598	44,598	45,811	45,811
Financial liabilities							
Deposits							
Personal	$ 184	$ 13,794		$ 246,235	$ 246,147	$ 260,213	$ 260,125
Business and government (3)	(9)	94,518		411,156	412,495	505,665	507,004
Bank (4)	–	2,072		21,685	21,708	23,757	23,780
	175	110,384		679,076	680,350	789,635	790,909
Other							
Obligations related to securities sold short	30,008	–		–	–	30,008	30,008
Obligations related to assets sold under repurchase agreements and securities loaned	–	133,947		9,137	9,138	143,084	143,085
Derivatives	92,127	–		–	–	92,127	92,127
Other liabilities (5)	(1,132)	–		49,440	49,426	48,308	48,294
Subordinated debentures	–	–		9,265	9,559	9,265	9,559

(Millions of Canadian dollars)	As at October 31, 2016						
	Carrying value and fair value			Carrying value	Fair value		
	Financial instruments classified as at FVTPL	Financial instruments designated as at FVTPL	Available-for-sale instruments measured at fair value	Financial instruments measured at amortized cost	Financial instruments measured at amortized cost	Total carrying amount	Total fair value
Financial assets							
Interest-bearing deposits with banks	$ –	$ 15,967	$ –	$ 11,884	$ 11,884	$ 27,851	$ 27,851
Securities							
Trading	141,265	10,027	–	–	–	151,292	151,292
Available-for-sale (1)	–	–	69,922	14,879	15,207	84,801	85,129
	141,265	10,027	69,922	14,879	15,207	236,093	236,421
Assets purchased under reverse repurchase agreements and securities borrowed	–	121,692	–	64,610	64,498	186,302	186,190
Loans							
Retail	71	–	–	368,145	369,012	368,216	369,083
Wholesale	1,437	904	–	151,047	150,720	153,388	153,061
	1,508	904	–	519,192	519,732	521,604	522,144
Other							
Derivatives	118,944	–	–	–	–	118,944	118,944
Other assets (2)	–	894	–	43,981	43,979	44,875	44,873
Financial liabilities							
Deposits							
Personal	$ 113	$ 15,142		$ 235,295	$ 235,490	$ 250,550	$ 250,745
Business and government (3)	–	82,871		405,136	406,881	488,007	489,752
Bank (4)	–	730		18,302	18,312	19,032	19,042
	113	98,743		658,733	660,683	757,589	759,539
Other							
Obligations related to securities sold short	50,369	–		–	–	50,369	50,369
Obligations related to assets sold under repurchase agreements and securities loaned	–	88,863		14,578	14,583	103,441	103,446
Derivatives	116,550	–		–	–	116,550	116,550
Other liabilities (5)	282	10		43,865	43,838	44,157	44,130
Subordinated debentures	–	131		9,631	9,700	9,762	9,831

(1) AFS securities include held-to-maturity securities that are recorded at amortized cost.
(2) Includes Customers' liability under acceptances and financial instruments recognized in Other assets.
(3) Business and government deposits include deposits from regulated deposit-taking institutions other than banks.
(4) Bank deposits refer to deposits from regulated deposit-taking institutions.
(5) Includes Acceptances and financial instruments recognized in Other liabilities.

Loans and receivables designated as at fair value through profit or loss

For our loans and receivables designated as at FVTPL, we measure the change in fair value attributable to changes in credit risk as the difference between the total change in the fair value of the instrument during the period and the change in fair value calculated using the appropriate risk-free yield curves.

(Millions of Canadian dollars)	As at	
	October 31, 2017	October 31, 2016
	Carrying amount of loans and receivables designated as at FVTPL (1)	Carrying amount of loans and receivables designated as at FVTPL (1)
Interest-bearing deposits with banks	**$ 20,752**	$ 15,967
Assets purchased under reverse repurchase agreements and securities borrowed	**138,979**	121,692
Loans – Wholesale	**2,329**	904
Other assets	**343**	132
	$ 162,403	$ 138,695

(1) The carrying amounts of loans and receivables designated as at FVTPL represent their maximum exposure to credit risk.

There were no significant changes in the fair value of the loans and receivables designated as at FVTPL attributable to changes in credit risk during the years ended October 31, 2017 and October 31, 2016, and cumulatively since initial recognition of the assets. The extent to which credit derivatives or similar instruments mitigate the maximum exposure to credit risk is nominal as at October 31, 2017 and October 31, 2016.

Liabilities designated as at fair value through profit or loss

For our financial liabilities designated as at FVTPL, we take into account changes in our own credit spread and the expected duration of the instrument to measure the change in fair value attributable to changes in credit risk.

(Millions of Canadian dollars)	As at or for the year ended October 31, 2017 (1)				
	Contractual maturity amount	Carrying value	Difference between carrying value and contractual maturity amount	Changes in fair value attributable to changes in credit risk included in OCI for positions still held	Cumulative change in fair value attributable to changes in credit risk for positions still held (2)
Term deposits					
Personal	$ 13,633	$ 13,794	$ 161	$ 34	$ 59
Business and government (3)	93,532	94,518	986	398	423
Bank (4)	2,072	2,072	–	–	–
	109,237	110,384	1,147	432	482
Obligations related to assets sold under repurchase agreements and securities loaned	133,967	133,947	(20)	–	–
Other liabilities	–	–	–	–	–
Subordinated debentures	–	–	–	–	–
	$ 243,204	$ 244,331	$ 1,127	$ 432	$ 482

(Millions of Canadian dollars)	As at or for the year ended October 31, 2016 (1)				
	Contractual maturity amount	Carrying value	Difference between carrying value and contractual maturity amount	Changes in fair value attributable to changes in credit risk included in OCI for positions still held	Cumulative change in fair value attributable to changes in credit risk for positions still held (2)
Term deposits					
Personal	$ 15,138	$ 15,142	$ 4	$ 99	$ 25
Business and government (3)	81,860	82,871	1,011	354	25
Bank (4)	730	730	–	–	–
	97,728	98,743	1,015	453	50
Obligations related to assets sold under repurchase agreements and securities loaned	88,863	88,863	–	–	–
Other liabilities	10	10	–	–	–
Subordinated debentures	128	131	3	1	(2)
	$ 186,729	$ 187,747	$ 1,018	$ 454	$ 48

(1) There are no changes in fair value attributable to changes in credit risk included in net income for positions still held.
(2) The cumulative change is measured from the initial recognition of the liabilities designated as at FVTPL. For the year ended October 31, 2017, $16 million of fair value gains previously included in OCI relate to financial liabilities derecognized during the year (October 31, 2016 – $14 million fair value gains).
(3) Business and government term deposits include amounts from regulated deposit-taking institutions other than regulated banks.
(4) Bank term deposits refer to amounts from regulated deposit-taking institutions.

Net gains (losses) from financial instruments classified and designated as at fair value through profit or loss

Financial instruments classified as at FVTPL, which includes mainly trading securities, derivatives, trading liabilities, and financial assets and liabilities designated as at FVTPL are measured at fair value with realized and unrealized gains and losses recognized in Non-interest income, primarily in Trading revenue.

(Millions of Canadian dollars)	For the year ended	
	October 31 2017	October 31 2016
Net gains (losses) (1)		
Classified as at fair value through profit or loss (2)	$ 1,112	$ 371
Designated as at fair value through profit or loss (3)	(68)	216
	$ 1,044	$ 587
By product line (1)		
Interest rate and credit	$ 662	$ 404
Equities	(54)	(345)
Foreign exchange and commodities	436	528
	$ 1,044	$ 587

(1) Excludes the following amounts related to our insurance operations and included in Insurance premiums, investment and fee income in the Consolidated Statements of Income: Net losses from financial instruments designated as at FVTPL of $148 million (October 31, 2016 – gains of $617 million).
(2) Excludes derivatives designated in a hedging relationship. Refer to Note 8 for net gains (losses) on these derivatives.
(3) For the year ended October 31, 2017, $645 million of net fair value losses on financial liabilities designated as at FVTPL, other than those attributable to changes in our own credit risk, were included in Non-interest income (October 31, 2016 – gains of $428 million).

Net interest income from financial instruments

Interest and dividend income arising from financial assets and financial liabilities and the associated costs of funding are reported in Net interest income.

(Millions of Canadian dollars)	For the year ended October 31 2017	October 31 2016
Interest income (1)		
Financial instruments held as at fair value through profit or loss	**$ 6,043**	$ 5,181
Other categories of financial instruments	**20,861**	19,271
	26,904	24,452
Interest expense (1)		
Financial instruments held as at fair value through profit or loss	**$ 3,934**	$ 2,952
Other categories of financial instruments	**5,830**	4,969
	9,764	7,921
Net interest income	**$ 17,140**	$ 16,531

(1) Excludes the following amounts related to our insurance operations and included in Insurance premiums, investment and fee income in the Consolidated Statements of Income: Interest income of $459 million (October 31, 2016 – $474 million), and Interest expense of $5 million (October 31, 2016 – $4 million).

Net fee income

For the year ended October 31, 2017, we earned $5,139 million in fees from banking services (October 31, 2016 – $4,817 million). For the year ended October 31, 2017, we also earned $11,191 million in fees from investment management, trust, custodial, underwriting, brokerage and other similar fiduciary services to retail and institutional clients (October 31, 2016 – $10,378 million[1]). These fees are included in Non-interest income.

(1) Effective Q4 2017, service fees and other costs incurred in association with certain commissions and fees earned are presented on a gross basis in non-interest expense. Comparative amounts have been reclassified to conform with this presentation.

Fair value of assets and liabilities measured at fair value on a recurring basis and classified using the fair value hierarchy

	As at											
	October 31, 2017						October 31, 2016					
	Fair value measurements using			Total gross fair value	Netting adjustments	Assets/ liabilities at fair value	Fair value measurements using			Total gross fair value	Netting adjustments	Assets/ liabilities at fair value
(Millions of Canadian dollars)	Level 1	Level 2	Level 3				Level 1	Level 2	Level 3			
Financial assets												
Interest-bearing deposits with banks	$ –	$ 20,752	$ –	$ 20,752	$	$ 20,752	$ –	$ 15,967	$ –	$ 15,967	$	$ 15,967
Securities												
Trading												
Canadian government debt (1)												
Federal	9,374	7,929	–	17,303		17,303	13,072	10,214	–	23,286		23,286
Provincial and municipal	–	11,422	–	11,422		11,422	–	11,928	–	11,928		11,928
U.S. state, municipal and agencies debt (1)	1,226	29,634	–	30,860		30,860	3,358	37,002	1	40,361		40,361
Other OECD government debt (2)	934	10,420	–	11,354		11,354	1,390	5,530	–	6,920		6,920
Mortgage-backed securities (1)	–	1,298	–	1,298		1,298	–	1,457	–	1,457		1,457
Asset-backed securities												
Non-CDO securities (3)	–	732	–	732		732	–	557	4	561		561
Corporate debt and other debt	52	21,655	29	21,736		21,736	25	20,630	62	20,717		20,717
Equities	29,674	2,853	425	32,952		32,952	43,155	2,531	376	46,062		46,062
	41,260	85,943	454	127,657		127,657	61,000	89,849	443	151,292		151,292
Available-for-sale (4)												
Canadian government debt (1)												
Federal	477	1,124	–	1,601		1,601	44	378	–	422		422
Provincial and municipal	–	2,503	–	2,503		2,503	–	2,364	–	2,364		2,364
U.S. state, municipal and agencies debt (1)	8	28,999	508	29,515		29,515	1	24,668	747	25,416		25,416
Other OECD government debt	479	8,673	–	9,152		9,152	3,416	10,484	–	13,900		13,900
Mortgage-backed securities (1)	–	934	–	934		934	–	395	–	395		395
Asset-backed securities												
CDO	–	3,623	–	3,623		3,623	–	1,630	–	1,630		1,630
Non-CDO securities	–	2,671	203	2,874		2,874	–	1,886	217	2,103		2,103
Corporate debt and other debt	–	23,662	797	24,459		24,459	–	21,110	956	22,066		22,066
Equities	339	38	711	1,088		1,088	376	331	756	1,463		1,463
Loan substitute securities	–	24	4	28		28	49	25	–	74		74
	1,303	72,251	2,223	75,777		75,777	3,886	63,271	2,676	69,833		69,833
Assets purchased under reverse repurchase agreements and securities borrowed	–	138,979	–	138,979		138,979	–	121,692	–	121,692		121,692
Loans	–	4,056	179	4,235		4,235	–	2,083	329	2,412		2,412
Other												
Derivatives												
Interest rate contracts	–	106,145	380	106,525		106,525	3	153,216	555	153,774		153,774
Foreign exchange contracts	–	42,871	63	42,934		42,934	–	56,752	26	56,778		56,778
Credit derivatives	–	157	–	157		157	–	191	–	191		191
Other contracts	3,510	10,141	307	13,958		13,958	2,855	3,613	307	6,775		6,775
Valuation adjustments	–	(722)	(3)	(725)		(725)	–	(1,429)	(3)	(1,432)		(1,432)
Total gross derivatives	3,510	158,592	747	162,849		162,849	2,858	212,343	885	216,086		216,086
Netting adjustments					(67,826)	(67,826)					(97,142)	(97,142)
Total derivatives						95,023						118,944
Other assets	966	247	–	1,213		1,213	762	132	–	894		894
	$ 47,039	$ 480,820	$ 3,603	$531,462	$ (67,826)	$ 463,636	$ 68,506	$ 505,337	$ 4,333	$ 578,176	$ (97,142)	$ 481,034
Financial Liabilities												
Deposits												
Personal	$ –	$ 13,513	$ 465	$ 13,978	$	$ 13,978	$ –	$ 14,830	$ 425	$ 15,255	$	$ 15,255
Business and government	–	94,509	–	94,509		94,509	–	82,869	2	82,871		82,871
Bank	–	2,072	–	2,072		2,072	–	730	–	730		730
Other												
Obligations related to securities sold short	12,407	17,601	–	30,008		30,008	32,672	17,696	1	50,369		50,369
Obligations related to assets sold under repurchase agreements and securities loaned	–	133,947	–	133,947		133,947	–	88,863	–	88,863		88,863
Derivatives												
Interest rate contracts	–	100,765	835	101,600		101,600	–	145,055	1,003	146,058		146,058
Foreign exchange contracts	–	40,497	42	40,539		40,539	–	57,438	41	57,479		57,479
Credit derivatives	–	258	–	258		258	–	263	–	263		263
Other contracts	3,417	13,461	488	17,366		17,366	3,135	5,543	429	9,107		9,107
Valuation adjustments	–	55	13	68		68	–	(133)	7	(126)		(126)
Total gross derivatives	3,417	155,036	1,378	159,831		159,831	3,135	208,166	1,480	212,781		212,781
Netting adjustments					(67,704)	(67,704)					(96,231)	(96,231)
Total derivatives						92,127						116,550
Other liabilities	130	(1,286)	24	(1,132)		(1,132)	124	80	88	292		292
Subordinated debentures	–	–	–	–		–	–	131	–	131		131
	$ 15,954	$ 415,392	$ 1,867	$433,213	$ (67,704)	$ 365,509	$ 35,931	$ 413,365	$ 1,996	$ 451,292	$ (96,231)	$ 355,061

(1) As at October 31, 2017, residential and commercial mortgage-backed securities (MBS) included in all fair value levels of trading securities were $17,977 million and $nil (October 31, 2016 – $14,987 million and $10 million), respectively, and in all fair value levels of AFS securities were $13,352 million and $727 million (October 31, 2016 – $13,212 million and $346 million), respectively.
(2) OECD stands for Organisation for Economic Co-operation and Development.
(3) CDO stands for collateralized debt obligations.
(4) Excludes $100 million of AFS securities (October 31, 2016 – $89 million) that are carried at cost.

Fair values of our significant assets and liabilities measured on a recurring basis are determined and classified in the fair value hierarchy table using the following valuation techniques and inputs.

Interest-bearing deposits with banks
A majority of our deposits with banks are designated as at FVTPL. These FVTPL deposits are composed of short-dated deposits placed with banks, and are included in Interest-bearing deposits with banks in the fair value hierarchy table. The fair values of these instruments are determined using the discounted cash flow method. The inputs to the valuation models include interest rate swap curves and credit spreads, where applicable. They are classified as Level 2 instruments in the hierarchy as the inputs are observable.

Government bonds (Canadian, U.S. and other OECD governments)
Government bonds are included in Canadian government debt, U.S. state, municipal and agencies debt, Other OECD government debt and Obligations related to securities sold short in the fair value hierarchy table. The fair values of government issued or guaranteed debt securities in active markets are determined by reference to recent transaction prices, broker quotes, or third-party vendor prices and are classified as Level 1 in the hierarchy. The fair values of securities that are not traded in active markets are based on either security prices, or valuation techniques using implied yields and risk spreads derived from prices of actively traded and similar government securities. Securities with observable prices or rate inputs as compared to transaction prices, dealer quotes or vendor prices are classified as Level 2 in the hierarchy. Securities where inputs are unobservable are classified as Level 3 in the hierarchy.

Corporate and U.S. municipal bonds
The fair values of corporate and U.S. municipal bonds, which are included in Corporate debt and other debt, U.S. state, municipal and agencies debt and Obligations related to securities sold short in the fair value hierarchy table, are determined using either recently executed transaction prices, broker quotes, pricing services, or in certain instances, the discounted cash flow method using rate inputs such as benchmark yields (Canadian Dealer Offered Rate, LIBOR and other similar reference rates) and risk spreads of comparable securities. Securities with observable prices or rate inputs are classified as Level 2 in the hierarchy. Securities where inputs are unobservable are classified as Level 3 in the hierarchy.

Asset-backed securities and Mortgage-backed securities
Asset-backed securities (ABS) and MBS are included in Asset-backed securities, Mortgage-backed securities, Canadian government debt, U.S. state, municipal and agencies debt, and Obligations related to securities sold short in the fair value hierarchy table. ABS include collateralized debt obligations (CDO). Inputs for valuation of MBS and CDO are, when available, traded prices, dealer or lead manager quotes, broker quotes and vendor prices of the identical securities. When prices of the identical securities are not readily available, we use industry standard models with inputs such as discount margins, yields, default, prepayment and loss severity rates that are implied from transaction prices, dealer quotes or vendor prices of comparable instruments. Where security prices and inputs are observable, ABS and MBS are classified as Level 2 in the hierarchy. Otherwise, they are classified as Level 3 in the hierarchy.

Auction rate securities
Auction rate securities (ARS) are included in U.S. state, municipal and agencies debt, and Asset-backed securities in the fair value hierarchy table. The valuation of ARS involves discounting forecasted cash flows from the underlying collateral and incorporating multiple inputs such as default, prepayment, deferment and redemption rates, and credit spreads. These inputs are unobservable, and therefore, ARS are classified as Level 3 in the hierarchy. All relevant data must be assessed and significant judgment is required to determine the appropriate valuation inputs.

Equities
Equities and Obligations related to securities sold short in the fair value hierarchy table consist of listed and unlisted common shares, private equities and hedge funds with certain redemption restrictions. The fair values of common shares are based on quoted prices in active markets, where available, and are classified as Level 1 in the hierarchy. Where quoted prices in active markets are not readily available, fair value is determined based on quoted market prices for similar securities or through valuation techniques, such as multiples of earnings and the discounted cash flow method with forecasted cash flows and discount rate as inputs. Private equities are classified as Level 3 in the hierarchy as their inputs are not observable. Hedge funds are valued using Net Asset Values (NAV). If we can redeem a hedge fund at NAV prior to the next quarter end, the fund is classified as Level 2 in the hierarchy. Otherwise, it is classified as Level 3 in the hierarchy.

Derivatives
The fair values of exchange-traded derivatives, such as interest rate and equity options and futures, are based on quoted market prices and are classified as Level 1 in the hierarchy. OTC derivatives primarily consist of interest rate and cross currency swaps, interest rate options, foreign exchange forward contracts and options, and commodity options and swaps. The exchange-traded or OTC interest rate, foreign exchange and equity derivatives are included in Interest rate contracts, Foreign exchange contracts and Other contracts, respectively, in the fair value hierarchy table. The fair values of OTC derivatives are determined using valuation models when quoted market prices or third-party consensus pricing information are not available. The valuation models, such as discounted cash flow method or Black-Scholes option model, incorporate observable or unobservable inputs for interest and foreign exchange rates, equity and commodity prices (including indices), credit spreads, corresponding market volatility levels, and other market-based pricing factors. Other adjustments to fair value include bid-offer, CVA, FVA, OIS, parameter and model uncertainties, and unrealized gain or loss at inception of a transaction. A derivative instrument is classified as Level 2 in the hierarchy if observable market inputs are available or the unobservable inputs are not significant to the fair value. Otherwise, it is classified as Level 3 in the hierarchy.

Securities borrowed or purchased under resale agreements and securities loaned or sold under repurchase agreements
In the fair value hierarchy table, these instruments are included in Assets purchased under reverse repurchase agreements and securities borrowed, and Obligations related to assets sold under repurchase agreements and securities loaned. The fair values of these contracts are determined using valuation techniques such as the discounted cash flow method using interest rate curves as inputs. They are classified as Level 2 instruments in the hierarchy as the inputs are observable.

Deposits
A majority of our deposits are measured at amortized cost but certain deposits are designated as at FVTPL. These FVTPL deposits include deposits taken from clients, the issuance of certificates of deposits and promissory notes, and interest rate and equity linked notes, and are included in Deposits in the fair value hierarchy table. The fair values of these instruments are determined using the discounted cash flow method and derivative option valuation models. The inputs to the valuation models include benchmark yield curves, credit spreads, interest rates, equity and interest rate volatility, dividends and correlation, where applicable. They are classified as Level 2 or 3 instruments in the hierarchy, depending on the significance of the unobservable credit spreads, volatility, dividend and correlation rates.

Obligations related to securities sold short
Fair values of the Obligations related to securities sold short are based on unadjusted quoted prices in active markets, where available, and are classified as Level 1 in the fair value hierarchy. Where quoted prices in active markets are not readily available, they are primarily classified as Level 2.

Quantitative information about fair value measurements using significant unobservable inputs (Level 3 Instruments)
The following table presents fair values of our significant Level 3 financial instruments, valuation techniques used to determine their fair values, ranges and weighted averages of unobservable inputs.

As at October 31, 2017 (Millions of Canadian dollars, except for prices, percentages and ratios)

		Fair value				Range of input values (2) (3)		
Products	Reporting line in the fair value hierarchy table	Assets	Liabilities	Valuation techniques	Significant unobservable inputs (1)	Low	High	Weighted average / Inputs distribution (4)
Non-derivative financial instruments								
Auction rate securities				Discounted cash flows	Discount margins	1.13%	2.95%	1.71%
	U.S. state, municipal and agencies debt	508			Default rates	3.00%	3.40%	3.00%
	Asset-backed securities	197			Prepayment rates	4.00%	10.00%	4.29%
					Recovery rates	40.00%	97.50%	95.95%
Corporate debt				Price-based	Prices	$ 20.00	$ 119.30	$ 113.77
	Corporate debt and other debt	33		Discounted cash flows	Yields	n.a.	n.a.	n.a.
	Loans	179			Capitalization rates	n.a.	n.a.	n.a.
	Obligations related to securities sold short		–		Credit spread	1.11%	11.59%	6.35%
					Credit enhancement	12.82%	17.10%	14.16%
Government debt and municipal bonds				Price-based	Prices	$ 63.43	$ 93.29	$ 64.18
	U.S. state, municipal and agencies debt	–		Discounted cash flows	Yields	0.17%	13.04%	3.22%
	Corporate debt and other debt	793						
Private equities, hedge fund investments and related equity derivatives				Market comparable	EV/EBITDA multiples	9.30X	16.60X	13.32X
	Equities	1,136		Price-based	P/E multiples	4.80X	27.40X	19.42X
	Derivative related assets	–		Discounted cash flows	EV/Rev multiples	1.50X	9.51X	5.75X
	Derivative related liabilities		97		Liquidity discounts (5)	15.00%	40.00%	25.24%
	Loan substitute securities	4			Discount rate	11.00%	11.00%	11.00%
					Net asset values/prices (6)	n.a.	n.a.	n.a.
Derivative financial instruments								
Interest rate derivatives and interest-rate-linked structured notes (7)	Derivative related assets	415		Discounted cash flows	Interest rates	2.23%	2.56%	Even
	Derivative related liabilities		843	Option pricing model	CPI swap rates	1.72%	1.90%	Even
					IR-IR correlations	19.00%	67.00%	Even
					FX-IR correlations	29.00%	56.00%	Even
					FX-FX correlations	68.00%	68.00%	Even
Equity derivatives and equity-linked structured notes (7)				Discounted cash flows	Dividend yields	0.02%	10.49%	Lower
	Derivative related assets	302		Option pricing model	Equity (EQ)-EQ correlations	15.00%	97.34%	Middle
	Deposits		465		EQ-FX correlations	(70.00)%	39.10%	Middle
	Derivative related liabilities		369		EQ volatilities	3.00%	110.00%	Lower
Other (8)								
	Asset-backed securities	6						
	Derivative related assets	30						
	Deposits		–					
	Derivative related liabilities		69					
	Other liabilities		24					
Total		$ 3,603	$ 1,867					

As at October 31, 2016 (Millions of Canadian dollars, except for prices, percentages and ratios)

		Fair value				Range of input values (2) (3)		
Products	Reporting line in the fair value hierarchy table	Assets	Liabilities	Valuation techniques	Significant unobservable inputs (1)	Low	High	Weighted average / Inputs distribution (4)
Non-derivative financial instruments								
Auction rate securities				Discounted cash flows	Discount margins	1.57%	3.75%	2.43%
	U.S. state, municipal and agencies debt	717			Default rates	3.00%	9.30%	3.02%
	Asset-backed securities	193			Prepayment rates	4.00%	10.00%	4.44%
					Recovery rates	40.00%	97.50%	92.37%
Corporate debt				Price-based	Prices	$ 20.00	$ 127.54	$ 111.93
	Corporate debt and other debt	98		Discounted cash flows	Yields	5.25%	8.85%	7.39%
	Loans	329			Capitalization rates	5.99%	8.35%	7.17%
	Obligations related to securities sold short		1		Credit spread	1.51%	12.54%	7.02%
					Credit enhancement	12.04%	16.05%	14.04%
Government debt and municipal bonds				Price-based	Prices	$ 60.00	$ 99.79	$ 63.30
	U.S. state, municipal and agencies debt	31		Discounted cash flows	Yields	1.48%	20.92%	4.16%
	Corporate debt and other debt	920						
Private equities, hedge fund investments and related equity derivatives				Market comparable	EV/EBITDA multiples	6.94X	15.50X	9.65X
	Equities	1,132		Price-based	P/E multiples	12.12X	23.25X	14.45X
	Derivative related assets	77		Discounted cash flows	EV/Rev multiples	0.30X	5.90X	3.42X
	Derivative related liabilities		168		Liquidity discounts (5)	15.00%	40.00%	29.21%
	Loan substitute securities	–			Discount rate	12.00%	17.00%	16.53%
					Net asset values/prices (6)	n.a.	n.a.	n.a.
Derivative financial instruments								
Interest rate derivatives and interest-rate-linked structured notes (7)	Derivative related assets	566		Discounted cash flows	Interest rates	1.79%	2.43%	Even
	Derivative related liabilities		1,014	Option pricing model	CPI swap rates	1.49%	1.97%	Even
					IR-IR correlations	19.00%	67.00%	Even
					FX-IR correlations	29.00%	56.00%	Even
					FX-FX correlations	68.00%	68.00%	Even
Equity derivatives and equity-linked structured notes (7)				Discounted cash flows	Dividend yields	0.04%	20.64%	Lower
	Derivative related assets	217		Option pricing model	Equity (EQ)-EQ correlations	13.90%	97.40%	Middle
	Deposits		425		EQ-FX correlations	(71.40)%	32.40%	Middle
	Derivative related liabilities		242		EQ volatilities	3.00%	118.00%	Lower
Other (8)								
	Asset-backed securities	28						
	Derivative related assets	25						
	Deposits		2					
	Derivative related liabilities		56					
	Other liabilities		88					
Total		$ 4,333	$ 1,996					

(1) The acronyms stand for the following: (i) Enterprise Value (EV); (ii) Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA); (iii) Price / Earnings (P/E); (iv) Revenue (Rev); (v) Consumer Price Index (CPI); Interest Rate (IR); Foreign Exchange (FX); and Equity (EQ).

(2) The low and high input values represent the actual highest and lowest level inputs used to value a group of financial instruments in a particular product category. These input ranges do not reflect the level of input uncertainty, but are affected by the different underlying instruments within the product category. The input ranges will therefore vary from period to period based on the characteristics of the underlying instruments held at each balance sheet date. Where provided, the weighted average of the input values is calculated based on the relative fair values of the instruments within the product category. The weighted averages for derivatives are not presented in the table as they would not provide a comparable metric; instead, distribution of significant unobservable inputs within the range for each product category is indicated in the table.

(3) Price-based inputs are significant for certain debt securities and are based on external benchmarks, comparable proxy instruments or pre-quarter-end trade data. For these instruments, the price input is expressed in dollars for each $100 par value. For example, with an input price of $105, an instrument is valued at a premium over its par value.

(4) The level of aggregation and diversity within each derivative instrument category may result in certain ranges of inputs being wide and inputs being unevenly distributed across the range. In the table, we indicated whether the majority of the inputs are concentrated toward the upper, middle, or lower end of the range, or evenly distributed throughout the range.

(5) Fair value of securities with liquidity discount inputs totalled $54 million (October 31, 2016 – $127 million).

(6) NAV of a hedge fund is total fair value of assets less liabilities divided by the number of fund units. The NAV of the funds and the corresponding equity derivatives referenced to NAV are not considered observable as we cannot redeem certain of these hedge funds at NAV prior to the next quarter end. Private equities are valued based on NAV or valuation techniques. The range for NAV per unit or price per share has not been disclosed for the hedge funds or private equities due to the dispersion of prices given the diverse nature of the investments.

(7) The structured notes contain embedded equity or interest rate derivatives with unobservable inputs that are similar to those of the equity or interest rate derivatives.

(8) Other primarily includes certain insignificant instruments such as commodity derivatives, foreign exchange derivatives, credit derivatives, bank-owned life insurance and Bank funding and deposits.

n.a. not applicable

Sensitivity to unobservable inputs and interrelationships between unobservable inputs

Yield, credit spreads/discount margins

A financial instrument's yield is the interest rate used to discount future cash flows in a valuation model. An increase in the yield, in isolation, would result in a decrease in a fair value measurement and vice versa. A credit spread/discount margin is the difference between a debt instrument's yield and a benchmark instrument's yield. Benchmark instruments have high credit quality ratings, similar maturities and are often government bonds. The credit spread/discount margin therefore represents the discount rate used to determine the present value of future cash flows of an asset to reflect the market return required for uncertainty in the estimated cash flows. The credit spread/discount margin for an instrument forms part of the yield used in a discounted cash flow method. Generally, an increase in the credit spread or discount margin will result in a decrease in fair value, and vice versa.

Funding spread

Funding spreads are credit spreads specific to our funding or deposit rates. A decrease in funding spreads, on its own, will increase fair value of our liabilities, and vice versa.

Default rates

A default rate is the rate at which borrowers fail to make scheduled loan payments. A decrease in the default rate will typically increase the fair value of the loan, and vice versa. This effect will be significantly more pronounced for a non-government guaranteed loan than a government guaranteed loan.

Prepayment rates

A prepayment rate is the rate at which a loan will be repaid in advance of its expected amortization schedule. Prepayments change the future cash flows of a loan. An increase in the prepayment rate in isolation will result in an increase in fair value when the loan interest rate is lower than the then current reinvestment rate, and a decrease in the prepayment rate in isolation will result in a decrease in fair value when the loan interest rate is lower than the then current reinvestment rate. Prepayment rates are generally negatively correlated with interest rates.

Recovery and loss severity rates

A recovery rate is an estimation of the amount that can be collected in a loan default scenario. The recovery rate is the recovered amount divided by the loan balance due, expressed as a percentage. The inverse concept of recovery is loss severity. Loss severity rate is an estimation of the loan amount not collected when a loan defaults. The loss severity rate is the loss amount divided by the loan balance due, expressed as a percentage. Generally, an increase in the recovery rate or a decrease in the loss severity rate will increase the loan fair value, and vice versa.

Capitalization rates

A capitalization rate is a rate of return on a real estate property investment calculated by dividing a property's income by the property's value. A lower capitalization rate increases the property value, and vice versa.

Volatility rates

Volatility measures the potential variability of future prices and is often measured as the standard deviation of price movements. Volatility is an input to option pricing models used to value derivatives and issued structured notes. Volatility is used in valuing equity, interest rate, commodity and foreign exchange options. A higher volatility rate means that the underlying price or rate movements are more likely to occur. Higher volatility rates may increase or decrease an option's fair value depending on the option's terms. The determination of volatility rates is dependent on various factors, including but not limited to, the underlying's market price, the strike price and maturity.

Dividend yields

A dividend yield is the underlying equity's expected dividends expressed as an annual percentage of its price. Dividend yield is used as an input for forward equity price and option models. Higher dividend yields will decrease the forward price, and vice versa. A higher dividend yield will increase or decrease an option's value, depending on the option's terms.

Correlation rates

Correlation is the linear relationship between the movements in two different variables. Correlation is an input to the valuation of derivative contracts and issued structured notes when an instrument's payout is determined by correlated variables. When variables are positively correlated, an increase in one variable will result in an increase in the other variable. When variables are negatively correlated, an increase in one variable will result in a decrease in the other variable. The referenced variables can be within a single asset class or market (equity, interest rate, commodities, credit and foreign exchange) or between variables in different asset classes (equity to foreign exchange, or interest rate to foreign exchange). Changes in correlation will either increase or decrease a financial instrument's fair value depending on the terms of the instrument.

Interest rates

An interest rate is the percentage amount charged on a principal or notional amount. Increasing interest rates will decrease the discounted cash flow value of a financial instrument, and vice versa.

Consumer Price Index swap rates

A CPI swap rate is expressed as a percentage of an increase in the average price of a basket of consumer goods and services, such as transportation, food and medical care. An increase in the CPI swap rate will cause inflation swap payments to be larger, and vice versa.

EV/EBITDA multiples, P/E multiples, EV/Rev multiples, and liquidity discounts

Private equity valuation inputs include EV/EBITDA multiples, P/E multiples and EV/Rev multiples. These are used to calculate either enterprise value or share value of a company based on a multiple of earnings or revenue estimates. Higher multiples equate to higher fair values for all multiple types, and vice versa. A liquidity discount may be applied when few or no transactions exist to support the valuations.

Credit Enhancement
Credit enhancement is an input to the valuation of securitized transaction and is the amount of loan loss protection for a senior tranche. Credit enhancement is expressed as a percentage of the transaction size. An increase in credit enhancement will cause the credit spread to decrease and the tranche fair value to increase, and vice versa.

Interrelationships between unobservable inputs
Unobservable inputs, including the above discount margin, default rate, prepayment rate, and recovery and loss severity rates, may not be independent of each other. For example, the discount margin can be affected by a change in default rate, prepayment rate, or recovery and loss severity rates. Discount margins will generally decrease when default rates decline or when recovery rates increase.

Changes in fair value measurement for instruments measured on a recurring basis and categorized in Level 3
The following tables present the changes in fair value measurements on a recurring basis for instruments included in Level 3 of the fair value hierarchy.

	For the year ended October 31, 2017								
(Millions of Canadian dollars)	Fair value at beginning of period	Total realized/ unrealized gains (losses) included in earnings	Total unrealized gains (losses) included in OCI (1)	Purchases of assets/ issuances of liabilities	Sales of assets/ settlements of liabilities and other (2)	Transfers into Level 3	Transfers out of Level 3	Fair value at end of period	Changes in unrealized gains (losses) included in earnings for assets and liabilities for positions still held
Assets									
Securities									
Trading									
Canadian government debt									
Provincial and municipal	$ –	$ –	$ –	$ –	$ –	$ –	$ –	$ –	$ –
U.S. state, municipal and agencies debt	1	–	–	–	(1)	–	–	–	–
Mortgage-backed securities	–	–	–	–	–	–	–	–	–
Asset-backed securities									
CDO	–	–	–	–	–	–	–	–	–
Non-CDO securities	4	–		7	(10)	–	(1)	–	–
Corporate debt and other debt	62	(4)	1	52	(68)	20	(34)	29	(3)
Equities	376	(143)	(18)	275	(81)	17	(1)	425	(119)
	443	(147)	(17)	334	(160)	37	(36)	454	(122)
Available-for-sale									
U.S. state, municipal and agencies debt	747	(5)	(19)	–	(215)	–	–	508	n.a.
Asset-backed securities									
Non-CDO securities	217	–	7	–	(21)	–	–	203	n.a.
Corporate debt and other debt	956	(1)	(34)	119	(55)	–	(188)	797	n.a.
Equities	756	62	45	45	(197)	–	–	711	n.a.
Loan substitute securities	–	–	–	4	–	–	–	4	n.a.
	2,676	56	(1)	168	(488)	–	(188)	2,223	n.a.
Loans	329	(5)	(5)	405	(512)	–	(33)	179	–
Other									
Net derivative balances (3)									
Interest rate contracts	(448)	49	(20)	33	(2)	4	(71)	(455)	74
Foreign exchange contracts	(15)	49	2	(3)	(7)	1	(6)	21	17
Credit derivatives	–	–	–	–	–	–	–	–	–
Other contracts	(122)	80	2	(76)	2	(58)	(9)	(181)	52
Valuation adjustments	(10)	–	–	–	(6)	–	–	(16)	–
Other assets	–	–	–	–	–	–	–	–	–
	$ 2,853	$ 82	$ (39)	$ 861	$ (1,173)	$ (16)	$ (343)	$ 2,225	$ 21
Liabilities									
Deposits									
Personal	$ (425)	$ (20)	$ 14	$ (387)	$ 85	$ (277)	$ 545	$ (465)	$ 5
Business and government	(2)	–	–	–	–	–	2	–	–
Other									
Obligations related to securities sold short	(1)	–	–	–	1	–	–	–	–
Other liabilities	(88)	(4)	2	–	66	–	–	(24)	–
	$ (516)	$ (24)	$ 16	$ (387)	$ 152	$ (277)	$ 547	$ (489)	$ 5

(Millions of Canadian dollars)	For the year ended October 31, 2016								
	Fair value at beginning of period	Total realized/ unrealized gains (losses) included in earnings	Total unrealized gains (losses) included in OCI (1)	Purchases of assets/ issuances of liabilities	Sales of assets/ settlements of liabilities and other (2)	Transfers into Level 3	Transfers out of Level 3	Fair value at end of period	Changes in unrealized gains (losses) included in earnings for assets and liabilities for positions still held
Assets									
Securities									
Trading									
Canadian government debt									
Provincial and municipal	$ 5	$ –	$ –	$ –	$ –	$ –	$ (5)	$ –	$ –
U.S. state, municipal and agencies debt	16	(2)	–	21	(34)	–	–	1	–
Mortgage-backed securities	15	(1)	–	8	(22)	–	–	–	–
Asset-backed securities									
CDO	5	–	–	–	(5)	1	(1)	–	–
Non-CDO securities	23	(4)	–	23	(39)	1	–	4	–
Corporate debt and other debt	191	–	5	144	(294)	159	(143)	62	–
Equities	123	(160)	7	492	(89)	10	(7)	376	(163)
	378	(167)	12	688	(483)	171	(156)	443	(163)
Available-for-sale									
U.S. state, municipal and agencies debt	797	(12)	26	93	(157)	–	–	747	n.a.
Asset-backed securities									
Non-CDO securities	197	(1)	18	26	(23)	–	–	217	n.a.
Corporate debt and other debt	1,757	(5)	17	2,437	(2,825)	21	(446)	956	n.a.
Equities	987	50	(49)	76	(308)	–	–	756	n.a.
Loan substitute securities	–	–	–	–	–	–	–	–	n.a.
	3,738	32	12	2,632	(3,313)	21	(446)	2,676	n.a.
Loans	472	17	(13)	102	(641)	396	(4)	329	–
Other									
Net derivative balances (3)									
Interest rate contracts	(446)	(18)	1	30	(18)	29	(26)	(448)	(17)
Foreign exchange contracts	58	(66)	(6)	(19)	(2)	23	(3)	(15)	(64)
Credit derivatives	(1)	–	–	–	1	–	–	–	(2)
Other contracts	(313)	(121)	(1)	(39)	213	51	88	(122)	55
Valuation adjustments	(47)	–	–	–	23	–	14	(10)	–
Other assets	–	(2)	–	2	–	–	–	–	–
	$ 3,839	$ (325)	$ 5	$ 3,396	$ (4,220)	$ 691	$ (533)	$ 2,853	$ (191)
Liabilities									
Deposits									
Personal	$ (389)	$ (24)	$ 2	$ (207)	$ 82	$ (562)	$ 673	$ (425)	$ (16)
Business and government	(8)	(1)	–	–	9	(2)	–	(2)	(1)
Other									
Obligations related to securities sold short	–	–	–	(1)	–	–	–	(1)	–
Other liabilities	(47)	(22)	(3)	(93)	23	–	54	(88)	(11)
	$ (444)	$ (47)	$ (1)	$ (301)	$ 114	$ (564)	$ 727	$ (516)	$ (28)

(1) These amounts include the foreign currency translation gains or losses arising on consolidation of foreign subsidiaries relating to the Level 3 instruments, where applicable. The unrealized gains on AFS securities recognized in OCI were $84 million for the year ended October 31, 2017 (October 31, 2016 – losses of $27 million), excluding the translation gains or losses arising on consolidation.

(2) Other includes amortization of premiums or discounts recognized in net income.

(3) Net derivatives as at October 31, 2017 included derivative assets of $747 million (October 31, 2016 – $885 million) and derivative liabilities of $1,378 million (October 31, 2016 – $1,480 million).

n.a. not applicable

Transfers between fair value hierarchy levels for instruments carried at fair value on a recurring basis

Transfers between Level 1 and Level 2, and transfers into and out of Level 3 are assumed to occur at the end of the period. For an asset or a liability that transfers into Level 3 during the period, the entire change in fair value for the period is excluded from the Total realized/unrealized gains (losses) included in earnings column of the above reconciliation, whereas for transfers out of Level 3 during the period, the entire change in fair value for the period is included in the same column of the above reconciliation.

Transfers between Level 1 and 2 are dependent on whether fair value is obtained on the basis of quoted market prices in active markets (Level 1).

During the year ended October 31, 2017, transfers out of Level 1 to Level 2 included Trading U.S. state, municipal and agencies debt and Obligations related to securities sold short of $1,143 million and $1,472 million, respectively. During the year ended October 31, 2016, transfers out of Level 1 to Level 2 included $266 million of Trading U.S. state, municipal and agencies debt and $490 million of Obligations related to securities sold short.

During the year ended October 31, 2017, transfers out of Level 2 to Level 1 included $339 million of Trading U.S. state, municipal and agencies debt and $80 million of Obligations related to securities sold short. During the year ended October 31, 2016, transfers out of Level 2 to Level 1 included $424 million of Trading U.S. state, municipal and agencies debt, $65 million of AFS U.S. state, municipal and agencies debt and $11 million of Obligations related to securities sold short.

Transfers between Level 2 and Level 3 are primarily due to either a change in the market observability for an input, or a change in an unobservable input's significance to a financial instrument's fair value.

For the year ended October 31, 2017, transfers of Other contracts were due to changes in the market observability of inputs, and transfers relating to AFS Corporate debt and other debt, and Personal deposits were due to changes in the significance of unobservable inputs to their fair value.

During the year ended October 31, 2017, significant transfers out of Level 3 to Level 2 included $188 million of AFS Corporate debt and other debt, and $545 million of Personal deposits. In addition, during the year ended October 31, 2017, significant transfers out of Level 3 to Level 2 included $52 million (net assets) of OTC equity options in Other contracts comprised of $321 million of derivative related assets and $269 million of derivative related liabilities. During the year ended October 31, 2016, significant transfers out of Level 3 to Level 2 included $143 million of Trading Corporate debt and other debt, $446 million of AFS Corporate debt and other debt and $673 million of Personal deposits. In addition, during the year ended October 31, 2016, significant transfers out of Level 3 to Level 2 included $28 million (net assets) of OTC equity options in Other contracts comprised of $682 million of derivative related assets and $654 million of derivative related liabilities and $24 million (net assets) of commodity swaps in Other contracts comprised of $126 million of derivative related assets and $102 million of derivative related liabilities.

During the year ended October 31, 2017, significant transfers out of Level 2 to Level 3 included $277 million of Personal deposits. In addition, during the year ended October 31, 2017, significant transfers out of Level 2 to Level 3 included $11 million (net liabilities) of OTC equity options in Other contracts comprised of $94 million of derivative related assets and $105 million of derivative related liabilities. During the year ended October 31, 2016, significant transfers out of Level 2 to Level 3 included $159 million of Trading Corporate debt and other debt, $396 million of Loans and $562 million of Personal deposits. In addition, during the year ended October 31, 2016, significant transfers out of Level 2 to Level 3 included $58 million (net assets) of OTC equity options in Other contracts comprised of $407 million of derivative related assets and $349 million of derivative related liabilities.

Positive and negative fair value movements of Level 3 financial instruments from using reasonably possible alternative assumptions

A financial instrument is classified as Level 3 in the fair value hierarchy if one or more of its unobservable inputs may significantly affect the measurement of its fair value. In preparing the financial statements, appropriate levels for these unobservable input parameters are chosen so that they are consistent with prevailing market evidence or management judgment. Due to the unobservable nature of the prices or rates, there may be uncertainty about the valuation of these Level 3 financial instruments.

The following table summarizes the impacts to fair values of Level 3 financial instruments using reasonably possible alternative assumptions. This sensitivity disclosure is intended to illustrate the potential impact of the relative uncertainty in the fair value of Level 3 financial instruments. In reporting the sensitivities below, we offset balances in instances where: (i) the move in valuation factor caused an offsetting positive and negative fair value movement, (ii) both offsetting instruments are in Level 3, and (iii) exposures are managed and reported on a net basis. With respect to overall sensitivity, it is unlikely in practice that all reasonably possible alternative assumptions would simultaneously be realized.

	As at					
	October 31, 2017			October 31, 2016		
(Millions of Canadian dollars)	Level 3 fair value	Positive fair value movement from using reasonably possible alternatives	Negative fair value movement from using reasonably possible alternatives	Level 3 fair value	Positive fair value movement from using reasonably possible alternatives	Negative fair value movement from using reasonably possible alternatives
Securities						
Trading						
U.S. state, municipal and agencies debt	$ –	$ –	$ –	$ 1	$ –	$ –
Asset-backed securities	–	–	–	4	–	–
Corporate debt and other debt	29	–	–	62	1	(1)
Equities	425	–	–	376	–	–
Available-for-sale						
U.S. state, municipal and agencies debt	508	8	(20)	747	14	(31)
Asset-backed securities	203	15	(21)	217	13	(19)
Corporate debt and other debt	797	6	(6)	956	8	(8)
Equities	711	40	(24)	756	74	(13)
Loan substitute securities	4	2	–	–	–	–
Loans	179	2	(3)	329	9	(10)
Derivatives	747	34	(30)	885	17	(16)
	$ 3,603	$ 107	$ (104)	$ 4,333	$ 136	$ (98)
Deposits	$ (465)	$ 11	$ (11)	$ (427)	$ 13	$ (13)
Derivatives	(1,378)	37	(48)	(1,480)	33	(53)
Other						
Securities sold short and other liabilities	(24)	–	–	(89)	–	–
	$ (1,867)	$ 48	$ (59)	$ (1,996)	$ 46	$ (66)

Sensitivity results

As at October 31, 2017, the effects of applying other reasonably possible alternative assumptions to the Level 3 asset positions would be an increase of $107 million and a decrease of $104 million in fair value, of which $71 million and $70 million would be recorded in Other components of equity, respectively. The effects of applying these assumptions to the Level 3 liability positions would result in a decrease of $48 million and an increase of $59 million in fair value.

Level 3 valuation inputs and approaches to developing reasonably possible alternative assumptions
The following is a summary of the unobservable inputs used in the valuation of the Level 3 instruments and our approaches to developing reasonably possible alternative assumptions used to determine sensitivity.

Financial assets or liabilities	Sensitivity methodology
Asset-backed securities, corporate debt, government debt, municipal bonds and loans	Sensitivities are determined based on adjusting, plus or minus one standard deviation, the bid-offer spreads or input prices if a sufficient number of prices is received, adjusting input parameters such as credit spreads or using high and low vendor prices as reasonably possible alternative assumptions.
Auction rate securities	Sensitivity of ARS is determined by decreasing the discount margin between 11% and 26% and increasing the discount margin between 27% and 44%, depending on the specific reasonable range of fair value uncertainty for each particular financial instrument's market. Changes to the discount margin reflect historical monthly movements in the student loan asset-backed securities market.
Private equities, hedge fund investments and related equity derivatives	Sensitivity of direct private equity investments is determined by (i) adjusting the discount rate by 2% when the discounted cash flow method is used to determine fair value, (ii) adjusting the price multiples based on the range of multiples of comparable companies when price-based models are used, or (iii) using an alternative valuation approach. Net asset values of the private equity funds, hedge funds and related equity derivatives are provided by the fund managers, and as a result, there are no other reasonably possible alternative assumptions for these investments.
Interest rate derivatives	Sensitivities of interest rate and cross currency swaps are derived using plus or minus one standard deviation of the inputs, and an amount based on model and parameter uncertainty, where applicable.
Equity derivatives	Sensitivity of the Level 3 position is determined by shifting the unobservable model inputs by plus or minus one standard deviation of the pricing service market data including volatility, dividends or correlations, as applicable.
Bank funding and deposits	Sensitivities of deposits are calculated by shifting the funding curve by plus or minus certain basis points.
Structured notes	Sensitivities for interest-rate-linked and equity-linked structured notes are derived by adjusting inputs by plus or minus one standard deviation, and for other deposits, by estimating a reasonable move in the funding curve by plus or minus certain basis points.

Fair value for financial instruments that are carried at amortized cost and classified using the fair value hierarchy

(Millions of Canadian dollars)	Fair value always approximates carrying value (1)	Fair value may not approximate carrying value – Fair value measurements using Level 1	Level 2	Level 3	Total	Total fair value
As at October 31, 2017						
Interest-bearing deposits with banks	$ 11,880	$ –	$ 30	$ –	$ 30	$ 11,910
Held-to-maturity securities (2)	–	–	14,754	17	14,771	14,771
Assets purchased under reverse repurchase agreements and securities borrowed	58,605	–	23,394	–	23,394	81,999
Loans						
Retail	65,991	–	309,855	4,936	314,791	380,782
Wholesale	8,930	–	139,128	5,909	145,037	153,967
	74,921	–	448,983	10,845	459,828	534,749
Other assets	43,963	–	433	202	635	44,598
	189,369	–	487,594	11,064	498,658	688,027
Deposits						
Personal	182,440	–	62,981	726	63,707	246,147
Business and government	261,898	–	149,618	979	150,597	412,495
Bank	16,615	–	5,079	14	5,093	21,708
	460,953	–	217,678	1,719	219,397	680,350
Obligations related to assets sold under repurchase agreements and securities loaned	7,774	–	1,364	–	1,364	9,138
Other liabilities	43,733	–	311	5,382	5,693	49,426
Subordinated debentures	–	–	9,504	55	9,559	9,559
	$ 512,460	$ –	$ 228,857	$ 7,156	$ 236,013	$ 748,473

(Millions of Canadian dollars)	Fair value always approximates carrying value (1)	Fair value may not approximate carrying value – Fair value measurements using Level 1	Level 2	Level 3	Total	Total fair value
As at October 31, 2016						
Interest-bearing deposits with banks	$ 11,820	$ –	$ 64	$ –	$ 64	$ 11,884
Held-to-maturity securities (2)	–	2	15,194	11	15,207	15,207
Assets purchased under reverse repurchase agreements and securities borrowed	41,686	–	22,812	–	22,812	64,498
Loans						
Retail	66,404	–	297,602	5,006	302,608	369,012
Wholesale	6,155	–	137,216	7,349	144,565	150,720
	72,559	–	434,818	12,355	447,173	519,732
Other assets	43,229	–	457	293	750	43,979
	169,294	2	473,345	12,659	486,006	655,300
Deposits						
Personal	175,114	–	59,475	901	60,376	235,490
Business and government	241,950	–	163,782	1,149	164,931	406,881
Bank	12,387	–	5,883	42	5,925	18,312
	429,451	–	229,140	2,092	231,232	660,683
Obligations related to assets sold under repurchase agreements and securities loaned	13,032	–	1,551	–	1,551	14,583
Other liabilities	38,467	–	265	5,106	5,371	43,838
Subordinated debentures	–	–	9,643	57	9,700	9,700
	$ 480,950	$ –	$ 240,599	$ 7,255	$ 247,854	$ 728,804

(1) Certain financial instruments have not been assigned to a level as the carrying amount always approximates their fair values due to their short-term nature (instruments that are receivable or payable on demand, or with original maturity of three months or less) and insignificant credit risk.

(2) Included in Securities – Available-for-sale on the Consolidated Balance Sheets.

Fair values of financial assets and liabilities carried at amortized cost and disclosed in the table above are determined using the following valuation techniques and inputs.

Held-to-maturity securities

Fair values of Canadian Federal and OECD government bonds, and corporate bonds are based on quoted prices. Fair values of certain Non-OECD government bonds are based on vendor prices or the discounted cash flow method with yield curves of other countries' government bonds as inputs.

Assets purchased under reverse repurchase agreements and securities borrowed, and Obligations related to assets sold under repurchase agreements and securities loaned
Valuation methods used for the long-term instruments are described in the Fair value of assets and liabilities measured on a recurring basis and classified using the fair value hierarchy section of this note. The carrying values of short-term instruments generally approximate their fair values.

Loans – Retail
Retail loans include residential mortgages, personal and small business loans and credit cards. For residential mortgages, and personal and small business loans, we segregate the portfolio based on certain attributes such as product type, contractual interest rate, term to maturity and credit scores, if applicable. Fair values of these loans are determined by the discounted cash flow method using applicable inputs such as prevailing interest rates, contractual and posted client rates, client discounts, credit spreads, prepayment rates and loan-to-value ratios. Fair values of credit card receivables are also calculated based on a discounted cash flow method with portfolio yields, charge offs and monthly payment rates as inputs. The carrying values of short-term and variable rate loans generally approximate their fair values.

Loans – Wholesale
Wholesale loans include Business, Bank and Sovereign loans. Where market prices are available, loans are valued based on market prices. Otherwise, fair value is determined by the discounted cash flow method using the following inputs: market interest rates and market based spreads of assets with similar credit ratings and terms to maturity, loss given default, expected default frequency implied from credit default swap prices, if available, and relevant pricing information such as contractual rate, origination and maturity dates, redemption price, coupon payment frequency and date convention.

Deposits
Deposits are comprised of demand, notice, and term deposits which include senior deposit notes we have issued to provide us with long-term funding. Fair values of term deposits are determined by one of several valuation techniques: (i) for term deposits and similar instruments, we segregate the portfolio based on term to maturity. Fair values of these instruments are determined by the discounted cash flow method using inputs such as client rates for new sales of the corresponding terms; and (ii) for senior deposit notes, we use actual traded prices, vendor prices or the discounted cash flow method using a market interest rate curve and our funding spreads as inputs. The carrying values of short-term term deposits, and demand and notice deposits generally approximate their fair values.

Other assets and Other liabilities
Other assets and Other liabilities include receivables and payables relating to certain commodities. Fair values of the commodity receivables and payables are calculated by the discounted cash flow method using applicable inputs such as market interest rates, counterparties' credit spreads, our funding spreads, commodity forward prices and spot prices.

Subordinated debentures
Fair values of Subordinated debentures are based on recent transaction prices.

Note 4 Securities

Carrying value of securities

The following table presents the contractual maturities of the carrying values of financial instruments held at the end of the period:

(Millions of Canadian dollars)	As at October 31, 2017						
	Term to maturity (1)					With no specific maturity	Total
	Within 3 months	3 months to 1 year	1 year to 5 years	5 years to 10 years	Over 10 years		
Trading (2)							
Canadian government debt	$ 1,757	$ 11,362	$ 8,047	$ 1,447	$ 6,112	$ –	$ 28,725
U.S. state, municipal and agencies debt	3,527	2,031	4,685	4,145	16,472	–	30,860
Other OECD government debt	834	4,846	4,843	260	571	–	11,354
Mortgage-backed securities	–	–	67	22	1,209	–	1,298
Asset-backed securities	85	63	249	162	173	–	732
Corporate debt and other debt							
Bankers' acceptances	246	–	–	–	–	–	246
Certificates of deposit	28	22	67	4	5	–	126
Other (3)	2,625	5,038	6,010	2,784	4,907	–	21,364
Equities	–	–	–	–	–	32,952	32,952
	9,102	23,362	23,968	8,824	29,449	32,952	127,657
Available-for-sale (2)							
Canadian government debt							
Federal							
Amortized cost	5	–	1,528	17	58	–	1,608
Fair value	5	–	1,521	17	58	–	1,601
Yield (4)	1.7%	–	0.9%	1.8%	4.3%	–	1.1%
Provincial and municipal							
Amortized cost	25	71	1,838	41	539	–	2,514
Fair value	25	71	1,836	40	531	–	2,503
Yield (4)	1.6%	2.0%	2.1%	2.8%	4.1%	–	2.5%
U.S. state, municipal and agencies debt							
Amortized cost	1,284	2,768	1,087	1,723	22,615	–	29,477
Fair value	1,284	2,765	1,085	1,720	22,661	–	29,515
Yield (4)	1.2%	1.6%	1.5%	3.0%	2.7%	–	2.5%
Other OECD government debt							
Amortized cost	824	2,367	5,894	60	–	–	9,145
Fair value	824	2,367	5,901	60	–	–	9,152
Yield (4)	0.4%	1.0%	1.5%	1.1%	–	–	1.3%
Mortgage-backed securities							
Amortized cost	–	–	–	15	919	–	934
Fair value	–	–	–	15	919	–	934
Yield (4)	–	–	–	2.9%	2.2%	–	2.3%
Asset-backed securities							
Amortized cost	960	67	688	3,030	1,774	–	6,519
Fair value	956	67	690	3,039	1,745	–	6,497
Yield (4)	1.2%	1.6%	1.6%	2.6%	2.4%	–	2.2%
Corporate debt and other debt							
Amortized cost	3,332	2,917	17,006	461	680	–	24,396
Fair value	3,336	2,918	17,060	464	681	–	24,459
Yield (4)	1.3%	1.5%	1.8%	2.8%	4.6%	–	1.8%
Equities							
Cost	–	–	–	–	–	875	875
Fair value	–	–	–	–	–	1,188	1,188
Loan substitute securities							
Cost	–	–	–	–	–	29	29
Fair value	–	–	–	–	–	28	28
Yield (4)	–	–	–	–	–	4.3%	4.3%
Amortized cost	6,430	8,190	28,041	5,347	26,585	904	75,497
Fair value	6,430	8,188	28,093	5,355	26,595	1,216	75,877
Held-to-maturity (2)							
Amortized cost	9	54	5,960	4,754	4,068	–	14,845
Fair value	9	54	5,941	4,761	4,006	–	14,771
Total carrying value of securities (2)	$ 15,541	$ 31,604	$ 58,021	$ 18,933	$ 60,112	$ 34,168	$ 218,379

(Millions of Canadian dollars)	As at October 31, 2016						
	Term to maturity (1)					With no specific maturity	Total
	Within 3 months	3 months to 1 year	1 year to 5 years	5 years to 10 years	Over 10 years		
Trading (2)							
Canadian government debt	$ 6,761	$ 10,350	$ 9,208	$ 2,742	$ 6,153	$ –	$ 35,214
U.S. state, municipal and agencies debt	6,582	6,150	5,912	5,988	15,729	–	40,361
Other OECD government debt	1,639	1,646	2,808	389	438	–	6,920
Mortgage-backed securities	–	34	3	1	1,419	–	1,457
Asset-backed securities	42	80	219	139	81	–	561
Corporate debt and other debt							
Bankers' acceptances	361	–	–	–	–	–	361
Certificates of deposit	155	132	14	2	19	–	322
Other (3)	1,748	4,450	7,473	2,472	3,891	–	20,034
Equities	–	–	–	–	–	46,062	46,062
	17,288	22,842	25,637	11,733	27,730	46,062	151,292
Available-for-sale (2)							
Canadian government debt							
Federal							
Amortized cost	43	1	291	27	56	–	418
Fair value	43	1	293	27	58	–	422
Yield (4)	0.5%	0.3%	1.5%	1.8%	4.2%	–	1.7%
Provincial and municipal							
Amortized cost	–	139	1,863	90	252	–	2,344
Fair value	–	139	1,873	92	260	–	2,364
Yield (4)	–	1.3%	1.9%	4.1%	3.8%	–	2.2%
U.S. state, municipal and agencies debt							
Amortized cost	1,030	895	1,735	1,161	20,668	–	25,489
Fair value	1,029	896	1,734	1,159	20,598	–	25,416
Yield (4)	2.7%	0.9%	1.9%	2.7%	2.4%	–	2.4%
Other OECD government debt							
Amortized cost	3,109	1,396	9,070	293	7	–	13,875
Fair value	3,108	1,398	9,095	292	7	–	13,900
Yield (4)	(0.1)%	1.1%	1.1%	1.0%	3.9%	–	0.8%
Mortgage-backed securities							
Amortized cost	–	16	27	19	330	–	392
Fair value	–	16	27	20	332	–	395
Yield (4)	–	2.2%	2.2%	2.8%	2.3%	–	2.3%
Asset-backed securities							
Amortized cost	671	9	539	834	1,733	–	3,786
Fair value	671	8	540	835	1,679	–	3,733
Yield (4)	–	1.1%	1.1%	2.2%	2.2%	–	1.6%
Corporate debt and other debt							
Amortized cost	1,520	2,933	16,457	553	552	–	22,015
Fair value	1,521	2,934	16,495	558	558	–	22,066
Yield (4)	1.7%	1.8%	1.6%	2.8%	4.7%	–	1.8%
Equities							
Cost	–	–	–	–	–	1,291	1,291
Fair value	–	–	–	–	–	1,552	1,552
Loan substitute securities							
Cost	–	–	–	–	–	70	70
Fair value	–	–	–	–	–	74	74
Yield (4)	–	–	–	–	–	4.5%	4.5%
Amortized cost	6,373	5,389	29,982	2,977	23,598	1,361	69,680
Fair value	6,372	5,392	30,057	2,983	23,492	1,626	69,922
Held-to-maturity (2)							
Amortized cost	130	116	4,521	5,718	4,394	–	14,879
Fair value	130	116	4,583	5,953	4,425	–	15,207
Total carrying value of securities (2)	$ 23,790	$ 28,350	$ 60,215	$ 20,434	$ 55,616	$ 47,688	$ 236,093

(1) Actual maturities may differ from contractual maturities shown above since borrowers may have the right to extend or prepay obligations with or without penalties.
(2) Trading securities and AFS securities are recorded at fair value. Held-to-maturity securities, included in Available-for-sale securities on the balance sheet, are recorded at amortized cost.
(3) Primarily composed of corporate debt, supra-national debt, and commercial paper.
(4) The weighted average yield is derived using the contractual interest rate and the carrying value at the end of the year for the respective securities.

Unrealized gains and losses on available-for-sale securities (1) (2)

(Millions of Canadian dollars)	As at October 31, 2017 Cost/ Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair value	As at October 31, 2016 Cost/ Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair value
Canadian government debt								
Federal	$ 1,608	$ 2	$ (9)	$ 1,601	$ 418	$ 4	$ –	$ 422
Provincial and municipal	2,514	7	(18)	2,503	2,344	22	(2)	2,364
U.S. state, municipal and agencies debt (3)	29,477	242	(204)	29,515	25,489	57	(130)	25,416
Other OECD government debt	9,145	18	(11)	9,152	13,875	35	(10)	13,900
Mortgage-backed securities	934	1	(1)	934	392	5	(2)	395
Asset-backed securities								
CDO	3,610	13	–	3,623	1,628	2	–	1,630
Non-CDO securities	2,909	10	(45)	2,874	2,158	5	(60)	2,103
Corporate debt and other debt	24,396	106	(43)	24,459	22,015	89	(38)	22,066
Equities	875	320	(7)	1,188	1,291	273	(12)	1,552
Loan substitute securities	29	–	(1)	28	70	4	–	74
	$ 75,497	$ 719	$ (339)	$ 75,877	$ 69,680	$ 496	$ (254)	$ 69,922

(1) Excludes $14,845 million of held-to-maturity securities as at October 31, 2017 (October 31, 2016 – $14,879 million) that are carried at amortized cost.
(2) The majority of the MBS are residential. Cost/Amortized cost, gross unrealized gains, gross unrealized losses and fair value related to commercial MBS are $727 million, $1 million, $1 million and $727 million, respectively as at October 31, 2017 (October 31, 2016 – $346 million, $1 million, $1 million and $346 million).
(3) Includes securities issued by U.S. non-agencies backed by government insured assets, MBS and asset-backed securities issued by U.S. government agencies.

AFS securities are assessed for objective evidence of impairment at each reporting date and more frequently when conditions warrant. Depending on the nature of the securities under review, we apply specific methodologies to assess whether the cost/amortized cost of the security would be recovered. As at October 31, 2017, our gross unrealized losses on AFS securities were $339 million (October 31, 2016 – $254 million). We believe that there is no objective evidence of impairment on our AFS securities that are in an unrealized loss position as at October 31, 2017.

Net gains and losses on available-for-sale securities (1)

(Millions of Canadian dollars)	For the year ended October 31 2017	October 31 2016
Realized gains	$ 246	$ 179
Realized losses	(22)	(17)
Impairment losses	(52)	(86)
	$ 172	$ 76

(1) The following related to our insurance operations are excluded from Net gains and losses on AFS securities and are included in Insurance premiums, investment and fee income in the Consolidated Statements of Income for the year ended October 31, 2017: Realized gains of $23 million (October 31, 2016 - $14 million), realized losses of $1 million (October 31, 2016 – $nil) and $nil in impairment losses (October 31, 2016 – $4 million).

During the year ended October 31, 2017, $172 million of net gains were recognized in Non-interest income as compared to $76 million in the prior year. The current year reflects net realized gains of $224 million mainly comprised of distributions from, and gains on sales of certain Equities, Other OECD government debt, and Loan substitute securities. Also included in the net gains are $52 million of impairment losses primarily on certain Equities and U.S. state, municipal and agencies debt. This compares to net realized gains for the year ended October 31, 2016 of $162 million which was partially offset by $86 million of impairment losses.

Held-to-maturity securities

Held-to-maturity securities measured at amortized cost are subject to periodic impairment review and are classified as impaired when, in management's opinion, there is no longer reasonable assurance of the timely collection of the full amount of principal and interest. The impairment review of held-to-maturity securities is primarily based on the impairment model for loans. We believe that there is no objective evidence of impairment on our held-to-maturity securities as at October 31, 2017.

Reclassification of financial instruments

The following table provides information regarding certain securities that we reclassified in prior reporting periods:

Financial instruments reclassified in prior periods

	As at			
	October 31, 2017		October 31, 2016	
(Millions of Canadian dollars)	Carrying value	Fair value	Carrying value	Fair value
Financial assets – FVTPL reclassified to available-for-sale (1)				
CDO	$ –	$ –	$ –	$ –
Financial assets – Available-for-sale reclassified to loans and receivables (2) (3)				
Canadian government debt – Federal	2,747	2,737	3,692	3,697
Financial assets – Available-for-sale reclassified to held-to-maturity (2)				
Canadian government debt – Federal	3,674	3,645	3,923	3,970
	$ 6,421	$ 6,382	$ 7,615	$ 7,667

(1) On October 1, 2011, we reclassified $1,872 million of certain CDO from classified as FVTPL to AFS.
(2) On October 1, 2015, we reclassified $4,132 million and $5,240 million, respectively, of certain debt securities from classified as AFS to loans and receivables, and from classified as AFS to held-to-maturity.
(3) During the year ended October 31, 2016, we reclassified $897 million of certain debt securities from classified as AFS to loans and receivables.

The following table provides the amounts recorded in net income and OCI from the debt securities after the reclassification.

	For the year ended			
	October 31, 2017		October 31, 2016	
(Millions of Canadian dollars)	Unrealized gains (losses) during the period (1)	Interest income/ gains (losses) recognized in net income during the period	Unrealized gains (losses) during the period (1)	Interest income/ gains (losses) recognized in net income during the period
FVTPL reclassified to available-for-sale				
CDO	$ –	$ –	$ (4)	$ 11
Available-for-sale reclassified to loans and receivables (2)				
Canadian government debt – Federal	(15)	56	(7)	91
Available-for-sale reclassified to held-to-maturity (2)				
Canadian government debt – Federal	(77)	128	(38)	135
	$ (92)	$ 184	$ (49)	$ 237

(1) This represents the unrealized gains or losses that would have been recognized in profit or loss (for reclassifications from FVTPL) or OCI (for reclassifications from AFS) had the assets not been reclassified.
(2) Interest income/gains (losses) recognized in net income during the period includes amortization of net unrealized gains associated with reclassified assets that were included in Other components of equity on the date of reclassification.

Note 5 Loans

	As at							
	October 31, 2017				October 31, 2016			
(Millions of Canadian dollars)	Canada	United States	Other International	Total	Canada	United States	Other International	Total
Retail (1)								
Residential mortgages	$ 255,799	$ 11,449	$ 3,100	$ 270,348	$ 241,800	$ 10,014	$ 3,184	$ 254,998
Personal	82,022	6,357	3,915	92,294	82,205	6,853	4,408	93,466
Credit cards (2)	17,491	294	250	18,035	16,601	267	260	17,128
Small business (3)	4,493	–	–	4,493	3,878	–	–	3,878
	359,805	18,100	7,265	385,170	344,484	17,134	7,852	369,470
Wholesale (1)								
Business (4)	74,425	51,556	20,310	146,291	65,756	58,010	20,304	144,070
Bank (5)	1,027	2,498	437	3,962	1,027	445	207	1,679
Sovereign (6)	7,370	934	1,049	9,353	6,625	827	1,168	8,620
	82,822	54,988	21,796	159,606	73,408	59,282	21,679	154,369
Total loans	442,627	73,088	29,061	544,776	417,892	76,416	29,531	523,839
Allowance for loan losses	(1,406)	(234)	(519)	(2,159)	(1,491)	(262)	(482)	(2,235)
Total loans net of allowance for loan losses	$ 441,221	$ 72,854	$ 28,542	$ 542,617	$ 416,401	$ 76,154	$ 29,049	$ 521,604

(1) Geographic information is based on residence of borrower.
(2) The credit cards business is managed as a single portfolio and includes both consumer and business cards.
(3) Includes small business exposure managed on a pooled basis.
(4) Includes small business exposure managed on an individual client basis.
(5) Bank refers primarily to regulated deposit-taking institutions and securities firms.
(6) Sovereign refers to all central governments and agencies, central banks, as well as other qualifying public sector entities and multilateral development banks.

Loans maturity and rate sensitivity

(Millions of Canadian dollars)	As at October 31, 2017							
	Maturity term (1)				Rate sensitivity			
	Under 1 year (2)	1 to 5 years	Over 5 years	Total	Floating	Fixed Rate	Non-rate-sensitive	Total
Retail	**$ 202,221**	**$ 165,337**	**$ 17,612**	**$ 385,170**	**$ 112,299**	**$ 267,124**	**$ 5,747**	**$ 385,170**
Wholesale	**123,570**	**27,907**	**8,129**	**159,606**	**21,202**	**136,111**	**2,293**	**159,606**
Total loans	**$ 325,791**	**$ 193,244**	**$ 25,741**	**$ 544,776**	**$ 133,501**	**$ 403,235**	**$ 8,040**	**$ 544,776**
Allowance for loan losses				**(2,159)**				**(2,159)**
Total loans net of allowance for loan losses				**$ 542,617**				**$ 542,617**

(Millions of Canadian dollars)	As at October 31, 2016							
	Maturity term (1)				Rate sensitivity			
	Under 1 year (2)	1 to 5 years	Over 5 years	Total	Floating	Fixed Rate	Non-rate-sensitive	Total
Retail	$ 190,834	$ 161,953	$ 16,683	$ 369,470	$ 116,355	$ 247,021	$ 6,094	$ 369,470
Wholesale (3)	121,625	23,721	9,023	154,369	24,223	126,790	3,356	154,369
Total loans	$ 312,459	$ 185,674	$ 25,706	$ 523,839	$ 140,578	$ 373,811	$ 9,450	$ 523,839
Allowance for loan losses				(2,235)				(2,235)
Total loans net of allowance for loan losses				$ 521,604				$ 521,604

(1) Generally, based on the earlier of contractual repricing or maturity date.
(2) Includes variable rate loans that can be repriced at the clients' discretion without penalty.
(3) Amounts have been revised from those previously presented.

Allowance for credit losses

(Millions of Canadian dollars)	For the year ended October 31, 2017						
	Balance at beginning of period	Provision for credit losses	Write-offs	Recoveries	Unwind of discount	Exchange rate changes/ other	Balance at end of period
Retail							
Residential mortgages	$ 273	$ 90	$ (53)	$ 8	$ (21)	$ –	$ 297
Personal	529	422	(543)	116	(11)	(1)	512
Credit cards	386	427	(565)	131	–	–	379
Small business	65	29	(38)	9	(3)	(6)	56
	1,253	968	(1,199)	264	(35)	(7)	1,244
Wholesale							
Business	979	180	(226)	66	(69)	(18)	912
Bank	–	–	–	–	–	–	–
	979	180	(226)	66	(69)	(18)	912
Acquired credit-impaired loans	3	2	–	–	–	(2)	3
Total allowance for loan losses	2,235	1,150	(1,425)	330	(104)	(27)	2,159
Allowance for off-balance sheet and other items (1)	91	–	–	–	–	–	91
Total allowance for credit losses	**$ 2,326**	**$ 1,150**	**$ (1,425)**	**$ 330**	**$ (104)**	**$ (27)**	**$ 2,250**
Individually assessed	$ 365	$ 86	$ (139)	$ 47	$ (52)	$ (3)	$ 304
Collectively assessed	1,961	1,064	(1,286)	283	(52)	(24)	1,946
Total allowance for credit losses	**$ 2,326**	**$ 1,150**	**$ (1,425)**	**$ 330**	**$ (104)**	**$ (27)**	**$ 2,250**

(Millions of Canadian dollars)	For the year ended October 31, 2016						
	Balance at beginning of period	Provision for credit losses	Write-offs	Recoveries	Unwind of discount	Exchange rate changes/ other	Balance at end of period
Retail							
Residential mortgages	$ 242	$ 77	$ (42)	$ 5	$ (24)	$ 15	$ 273
Personal	530	458	(556)	111	(14)	–	529
Credit cards	386	442	(564)	122	–	–	386
Small business	64	34	(40)	10	(3)	–	65
	1,222	1,011	(1,202)	248	(41)	15	1,253
Wholesale							
Business	805	528	(321)	38	(59)	(12)	979
Bank	2	(3)	–	–	–	1	–
	807	525	(321)	38	(59)	(11)	979
Acquired credit-impaired loans	–	10	–	–	–	(7)	3
Total allowance for loan losses	2,029	1,546	(1,523)	286	(100)	(3)	2,235
Allowance for off-balance sheet and other items (1)	91	–	–	–	–	–	91
Total allowance for credit losses	$ 2,120	$ 1,546	$ (1,523)	$ 286	$ (100)	$ (3)	$ 2,326
Individually assessed	$ 252	$ 351	$ (224)	$ 25	$ (50)	$ 11	$ 365
Collectively assessed	1,868	1,195	(1,299)	261	(50)	(14)	1,961
Total allowance for credit losses	$ 2,120	$ 1,546	$ (1,523)	$ 286	$ (100)	$ (3)	$ 2,326

(1) The allowance for off-balance sheet and other items is reported separately in Other liabilities – Provisions.

Net interest income after provision for credit losses

(Millions of Canadian dollars)	For the year ended October 31 2017	October 31 2016
Net interest income	$ 17,140	$ 16,531
Provision for credit losses	1,150	1,546
Net interest income after provision for credit losses	$ 15,990	$ 14,985

Loans past due but not impaired

	As at							
	October 31, 2017				October 31, 2016			
(Millions of Canadian dollars)	1 to 29 days (1)	30 to 89 days	90 days and greater	Total	1 to 29 days (1)	30 to 89 days	90 days and greater	Total
Retail	$ 3,097	$ 1,337	$ 307	$ 4,741	$ 3,450	$ 1,296	$ 337	$ 5,083
Wholesale	1,251	424	–	1,675	848	372	–	1,220
	$ 4,348	$ 1,761	$ 307	$ 6,416	$ 4,298	$ 1,668	$ 337	$ 6,303

(1) Amounts presented may include loans past due as a result of administrative processes, such as mortgage loans on which payments are restrained pending payout due to sale or refinancing. Past due loans arising from administrative processes are not representative of the borrowers' ability to meet their payment obligations.

Gross carrying value of loans individually determined to be impaired (1)

(Millions of Canadian dollars)	As at October 31 2017	October 31 2016
Retail (2)	$ –	$ 16
Wholesale (2)		
Business	1,126	2,130
Bank	–	2
Acquired credit-impaired loans	256	418
Total	$ 1,382	$ 2,566

(1) Average balance of gross individually assessed impaired loans for the year ended October 31, 2017 was $2,065 million (October 31, 2016 – $2,037 million).
(2) Excludes acquired credit-impaired (ACI) loans.

Acquired credit-impaired loans

ACI loans resulting from the acquisition of City National include Retail, Wholesale and Federal Deposit Insurance Corporation (FDIC) covered loans. The following table provides further details of our ACI loans.

(Millions of Canadian dollars)	As at October 31 2017	October 31 2016
City National		
Unpaid principal balance (1)	$ 245	$ 409
Credit-related fair value adjustments	(5)	(12)
Interest rate and other related premium/(discount)	16	21
Carrying value	256	418
Individually assessed allowance	(3)	(3)
Carrying value net of related allowance	$ 253	$ 415

(1) Represents contractual amount owed net of write-offs since the acquisition of the loan.

FDIC covered loans

FDIC covered loans are loans that, as at the reporting date, are subject to loss-share agreements with the FDIC under which the FDIC reimburses us for 80% of the net losses incurred on the underlying loan portfolio. As at October 31, 2017, the balance of FDIC covered loans recorded in Loans on the Consolidated Balance Sheet was $6 million (October 31, 2016 – $374 million). The decrease in FDIC covered loans during the period was primarily due to the expiry of certain loss-share agreements and loan repayments. As at October 31, 2017, the balances for indemnification assets and clawback liabilities were $nil and $26 million (October 31, 2016 – $2 million and $26 million), respectively.

Note 6 Derecognition of financial assets

We enter into transactions in which we transfer financial assets such as loans or securities to structured entities or other third parties. The majority of assets transferred under repurchase agreements, securities lending agreements, and in our Canadian residential mortgage securitization transactions do not qualify for derecognition as we continue to be exposed to substantially all of the risks and rewards of the transferred assets, such as prepayment, credit, price, interest rate and foreign exchange risks.

Transferred financial assets not derecognized

Securitization of Canadian residential mortgage loans

We securitize insured Canadian residential mortgage loans through the creation of MBS pools under the National Housing Act MBS (NHA MBS) program. All loans securitized under the NHA MBS program are required to be insured by the Canadian Mortgage and Housing Corporation (CMHC) or a third-party insurer. We require the borrower to pay the insurance for mortgages in which the loan amount is greater than 80% of the original appraised value of the property (loan-to-value (LTV) ratio). For residential mortgage loans securitized under this program with an LTV ratio less than 80%, we are required to insure the mortgages at our own expense. Under the NHA MBS program, we are responsible for making all payments due on our issued MBS, regardless of whether we collect the necessary funds from the mortgagor or the insurer. When a borrower defaults on a mortgage payment, we submit a claim to the insurer if the amount recovered from the collection or foreclosure process is lower than the sum of the principal balance, accrued interest and collection costs on the outstanding loan. The insurance claim process is managed by the insurance provider in accordance with the insurer's policies and covers the entire unpaid loan balance plus generally up to 12 months of interest, selling costs and other eligible expenses. If an insurance claim is denied, a loss is recognized in Provision for credit losses in our Consolidated Statements of Income. The amount recorded as a loss is not significant to our Consolidated Financial Statements and no significant losses were incurred due to legal action arising from mortgage default during 2017 and 2016.

We sell the NHA MBS pools primarily to a government-sponsored structured entity under the Canada Mortgage Bond (CMB) program. The entity periodically issues CMBs, which are guaranteed by the government, and sells them to third-party investors. Proceeds of the CMB issuances are used by the entity to purchase the NHA MBS pools from eligible NHA MBS issuers who participate in the issuance of a particular CMB series. Our continuing involvement includes servicing the underlying residential mortgage loans we have securitized, either ourselves or through a third-party servicer. We also act as counterparty in interest rate swap agreements where we pay the entity the interest due to CMB investors and receive the interest on the underlying MBS and reinvested assets. As part of the swaps, we are also required to maintain a principal reinvestment account for principal payments received on the underlying mortgage loans to meet the repayment obligation upon maturity of the CMB. We reinvest the collected principal payments in permitted investments as outlined in the swap agreements.

We have determined that certain of the NHA MBS program loans transferred to the entity do not qualify for derecognition as we have not transferred substantially all of the risks and rewards of ownership. As a result, these transferred MBS continue to be classified as residential mortgage loans and recognized on our Consolidated Balance Sheets. The cash received for these transferred MBS is treated as a secured borrowing and a corresponding liability is recorded in Deposits – Business and government on our Consolidated Balance Sheets.

Securities sold under repurchase agreements and securities loaned

We also enter into transactions such as repurchase agreements and securities lending agreements where we transfer assets under agreements to repurchase them at a future date and retain substantially all of the risks and rewards associated with the assets. These transferred assets remain on our Consolidated Balance Sheets and are accounted for as collateralized borrowing transactions.

The following table provides information on the carrying amount and fair value of the transferred assets that did not qualify for derecognition, and their associated liabilities.

	As at							
	October 31, 2017				October 31, 2016			
(Millions of Canadian dollars)	**Canadian residential mortgage loans (1) (2)**	**Securities sold under repurchase agreements (3)**	**Securities loaned (3)**	**Total**	Canadian residential mortgage loans (1) (2)	Securities sold under repurchase agreements (3)	Securities loaned (3)	Total
Carrying amount of transferred assets that do not qualify for derecognition	**$ 33,948**	**$ 139,249**	**$ 3,835**	**$ 177,032**	$ 33,648	$ 100,556	$ 2,885	$ 137,089
Carrying amount of associated liabilities	**33,861**	**139,249**	**3,835**	**176,945**	33,670	100,556	2,885	137,111
Fair value of transferred assets	**$ 33,529**	**$ 139,249**	**$ 3,835**	**$ 176,613**	$ 33,574	$ 100,556	$ 2,885	$ 137,015
Fair value of associated liabilities	**34,314**	**139,249**	**3,835**	**177,398**	34,730	100,556	2,885	138,171
Fair value of net position	**$ (785)**	**$ –**	**$ –**	**$ (785)**	$ (1,156)	$ –	$ –	$ (1,156)

(1) Includes Canadian residential mortgage loans transferred primarily to Canada Housing Trust at the initial securitization and other permitted investments used for funding requirements after the initial securitization.
(2) CMB investors have legal recourse only to the transferred assets, and do not have recourse to our general assets.
(3) Does not include over-collateralization of assets pledged.

Note 7 Structured entities

In the normal course of business, we engage in a variety of financial transactions with structured entities to support our financing and investing needs as well as those of our customers. A structured entity is an entity in which voting or similar rights are not the dominant factor in deciding control. Structured entities are generally created to achieve a narrow and well defined objective with restrictions around their ongoing activities. We consolidate a structured entity when we control the entity in accordance with our accounting policy as described in Note 2. In other cases, we may sponsor or have an interest in such an entity but may not consolidate it.

Consolidated structured entities

We consolidate the following structured entities, whose assets and liabilities are recorded on our Consolidated Balance Sheets. Third-party investors in these structured entities generally have recourse only to the assets of the related entity and do not have recourse to our general assets unless we breach our contractual obligations to those entities. In the ordinary course of business, the assets of each consolidated structured entity can generally only be used to settle the obligations of that entity.

RBC-administered multi-seller conduit

We administer multi-seller ABCP conduit programs (multi-seller conduits) which primarily purchase financial assets from clients and finance those purchases by issuing ABCP.

We generally do not maintain ownership in the multi-seller conduits and generally do not have rights to, or control of, their assets. As the administrative agent, we earn a residual fee for providing services such as coordinating funding activities, transaction structuring, documentation, execution and monitoring. We serve as the placement agent for the multi-seller conduits and may purchase ABCP issued by these conduits from time to time in order to facilitate the overall program liquidity. The ABCP issued by each multi-seller conduit has recourse to the financial assets owned by each conduit, and is non-recourse to us except through our participation in liquidity and/or credit enhancement facilities.

In 2017, we began issuing ABCP through a multi-seller conduit administered by us. This conduit is primarily used to purchase financial assets, in multiple currencies, from clients and finance those purchases by issuing ABCP or borrowing from us. Unlike the other multi-seller conduits that we administer, this conduit does not have a first loss investor which has substantive power to direct the significant operating activities of the conduit. This conduit is consolidated because we have exposure to variability of returns from performance in the multi-seller arrangements through providing transaction-specific and program-wide liquidity, credit and loan facilities to the conduit and have decision-making power over the relevant activities. We also earn an administration fee for providing administrative services to the conduit. As of October 31, 2017, $583 million of financial assets held by the conduit was included in Loans and $499 million of ABCP issued by the conduit was included in Deposits on our Consolidated Balance Sheets. For more information on unconsolidated multi-seller conduit programs, refer to unconsolidated structured entities below.

Credit card securitization vehicle

We securitize a portion of our credit card receivables through a structured entity on a revolving basis. The entity purchases co-ownership interests in a pool of credit card receivables and issues senior and subordinated term notes collateralized by that co-ownership interest in the underlying pool of credit card receivables. Investors who purchase the term notes have recourse only to that co-ownership interest in the underlying pool of credit card receivables.

We continue to service the credit card receivables and perform an administrative role for the entity. We also retain risk in the underlying pool of credit card receivables through our retained interest in the transferred assets, the cash reserve balance we fund from time to time, and also through certain subordinated notes which we retain. Additionally, we may own some senior notes as investments or for market-making activities; we have provided subordinated loans to the entity to pay upfront expenses; and we act as counterparty to interest rate and cross currency swap agreements which hedge the entity's interest rate and currency risk exposure.

We consolidate the structured entity because we have decision making power over the timing and size of future issuances and other relevant activities which were predetermined by us at inception. We also obtain significant funding benefits and are exposed to variability from the performance of the underlying credit cards through our retained interest. As at October 31, 2017, $7.5 billion of notes issued by our credit card securitization vehicle were included in Deposits on our Consolidated Balance Sheets (October 31, 2016 – $9.8 billion).

Collateralized commercial paper vehicle

We established a funding vehicle that provides loans to us and finances those loans by issuing commercial paper to third-party investors. The structured entity's commercial paper carries an equivalent credit rating to RBC because we are obligated to advance funds to the entity in the event there are insufficient funds from other sources to settle maturing commercial paper. We pledge collateral to secure the loans and are exposed to the market and credit risks of the pledged securities. We administer the entity and earn an administration fee for providing these services.

We consolidate the structured entity because we have decision making power over the relevant activities, are the sole borrower from the structure, and are exposed to a majority of the residual ownership risks through the credit support provided. As at October 31, 2017, $12.2 billion of commercial paper issued by the vehicle was included in Deposits on our Consolidated Balance Sheets (October 31, 2016 – $9.6 billion).

Innovative capital vehicles

RBC Capital Trust was created to issue innovative capital instruments, the proceeds from which were used to purchase mortgages from RBC. We consolidate the trust as, through our roles as trustee, administrative agent and equity investor, we have the decision making power over the relevant activities of the trust and are exposed to variability from the performance of the underlying mortgages. Refer to Note 20 for further details on our innovative capital instruments.

Covered bonds

We periodically transfer mortgages to RBC Covered Bond Guarantor Limited Partnership (the Guarantor LP) to support funding activities and asset coverage requirements under our covered bonds program. The Guarantor LP was created to guarantee interest and principal payments under the covered bond program. The covered bonds guaranteed by the Guarantor LP are direct, unsecured and unconditional obligations of RBC; therefore, investors have a claim against the Bank which will continue if the covered bonds are not paid by the Bank and the mortgage assets in the Guarantor LP are insufficient to satisfy the obligations owing on the covered bonds. We act as general partner, limited partner, swap counterparty, lender and liquidity provider to the Guarantor LP, servicer for the underlying mortgages as well as the registered issuer of the covered bonds.

We consolidate the Guarantor LP as we have the decision making power over the relevant activities through our role as general partner and are exposed to variability from the performance of the underlying mortgages. As at October 31, 2017, the total amount of mortgages transferred and outstanding was $52.5 billion (October 31, 2016 – $53.8 billion) and $37.3 billion of covered bonds were recorded as Deposits on our Consolidated Balance Sheets (October 31, 2016 – $40.5 billion).

Municipal bond TOB structures

We sell taxable and tax-exempt municipal bonds into Tender Option Bond (TOB) structures, which consist of a credit enhancement (CE) trust and a TOB trust. The CE trust purchases a bond from us, financed with a trust certificate issued to the TOB trust. The TOB trust then issues floating-rate certificates to short-term investors and a residual certificate that is held by us. We are the remarketing agent for the floating-rate certificates and provide a liquidity facility to the TOB trust which require us to purchase any certificates tendered but not successfully remarketed. We also provide

a letter of credit to the CE trust under which we are required to extend funding if there are any losses on the underlying bonds. We earn interest on the residual certificate and receive market-based fees for acting as remarketing agent and providing the liquidity facility and letter of credit.

We consolidate both the CE trust and TOB trust when we are the holder of the residual certificate as we have decision making power over the relevant activities, including the selection of the underlying municipal bonds and the ability to terminate the structure, and are exposed to variability from the performance of the underlying municipal bonds. As at October 31, 2017, $5.2 billion of municipal bonds were included in AFS securities related to consolidated TOB structures (October 31, 2016 - $2.5 billion) and a corresponding $5.2 billion of floating-rate certificates were included in Deposits on our Consolidated Balance Sheets (October 31, 2016 – $2.5 billion).

Non-RBC managed investment funds

We enter into certain fee-based equity derivative transactions where our investments in the reference funds are held by an intermediate limited partnership entity (intermediate entity) in which we hold a substantial majority of the equity interests. We consolidate the intermediate entity because we have decision making power to direct all the activities of the entity and are exposed to a majority of the risks and rewards through our equity investments. As at October 31, 2017, $68 million of Trading securities representing our investments in the reference funds were recorded on our Consolidated Balance Sheets (October 31, 2016 – $179 million).

RBC managed investment funds

We are sponsors and investment managers of mutual and pooled funds, which give us the ability to direct the investment decisions of the funds. We consolidate those mutual and pooled funds in which our interests, which include direct investment in seed capital plus management or performance fees, indicate that we are acting as a principal. As at October 31, 2017, $473 million of Trading securities held in the consolidated funds (October 31, 2016 - $498 million) and $148 million of Other liabilities representing the fund units held by third parties (October 31, 2016 – $126 million) were recorded on our Consolidated Balance Sheets.

Unconsolidated structured entities

We have interests in certain structured entities that we do not consolidate but have recorded assets and liabilities on our Consolidated Balance Sheets related to our transactions and involvement with these entities.

The following table presents the assets and liabilities recorded on our Consolidated Balance Sheets and our maximum exposure to loss related to our interests in unconsolidated structured entities. It also presents the size of each class of unconsolidated structured entity, as measured by the total assets of the entities in which we have an interest.

	As at October 31, 2017						
(Millions of Canadian dollars)	Multi-seller conduits (1) (2)	Structured finance	Non-RBC managed investment funds	RBC managed investment funds	Third-party securitization vehicles (3)	Other	Total
On-balance sheet assets							
Securities	$ 1,028	$ –	$ 2,903	$ 162	$ –	$ 707	$ 4,800
Loans	371	1,078	–	–	3,246	750	5,445
Derivatives	17	–	–	–	–	32	49
Other assets	–	443	–	177	–	77	697
	$ 1,416	$ 1,521	$ 2,903	$ 339	$ 3,246	$ 1,566	$ 10,991
On-balance sheet liabilities							
Derivatives	$ 41	$ –	$ –	$ –	$ –	$ –	$ 41
Other liabilities	–	–	–	–	–	–	–
	$ 41	$ –	$ –	$ –	$ –	$ –	$ 41
Maximum exposure to loss (4)	$ 38,639	$ 4,280	$ 3,153	$ 367	$ 6,767	$ 2,062	$ 55,268
Total assets of unconsolidated structured entities	$ 37,871	$ 16,778	$ 533,219	$ 329,907	$ 62,411	$ 79,655	$ 1,059,841

	As at October 31, 2016						
(Millions of Canadian dollars)	Multi-seller conduits (1) (2)	Structured finance	Non-RBC managed investment funds	RBC managed investment funds	Third-party securitization vehicles	Other	Total
On-balance sheet assets							
Securities	$ 675	$ –	$ 2,543	$ 213	$ –	$ 777	$ 4,208
Loans	733	1,179	–	–	4,359	–	6,271
Derivatives	11	–	–	–	3	21	35
Other assets	–	549	3	156	–	75	783
	$ 1,419	$ 1,728	$ 2,546	$ 369	$ 4,362	$ 873	$ 11,297
On-balance sheet liabilities							
Derivatives	$ 68	$ –	$ –	$ –	$ –	$ 3	$ 71
Other liabilities	–	–	27	–	–	1	28
	$ 68	$ –	$ 27	$ –	$ –	$ 4	$ 99
Maximum exposure to loss (4)	$ 39,475	$ 4,725	$ 3,378	$ 370	$ 8,998	$ 1,301	$ 58,247
Total assets of unconsolidated structured entities	$ 38,703	$ 20,650	$ 587,125	$ 308,683	$ 113,627	$ 63,792	$ 1,132,580

(1) Total assets of unconsolidated structured entities represent the maximum assets that may have to be purchased by the conduits under purchase commitments outstanding. Of the purchase commitments outstanding, the conduits have purchased financial assets totalling $25.2 billion as at October 31, 2017 (October 31, 2016 – $24.6 billion).

(2) Securities include $1 billion of asset-backed commercial paper (ABCP) purchased pursuant to the Risk Retention Rules (October 31, 2016 – $670 million).

(3) Excludes on-balance sheet assets which are held by our consolidated structured entities.

(4) The maximum exposure to loss resulting from our interests in these entities consists mostly of investments, loans, fair value of derivatives, liquidity and credit enhancement facilities. The maximum exposure to loss of the multi-seller conduits is higher than the on-balance sheet assets primarily because of the notional amounts of the backstop liquidity and credit enhancement facilities. Refer to Note 25.

Below is a description of our involvement with each significant class of unconsolidated structured entity.

Multi-seller conduits

We administer multi-seller ABCP conduit programs. Multi-seller conduits primarily purchase financial assets from clients and finance those purchases by issuing ABCP.

In certain multi-seller conduit arrangements, we do not maintain any ownership of the multi-seller conduits that we administer and have no rights to, or control of, its assets. As the administrative agent, we earn a residual fee for providing services such as coordinating funding activities, transaction structuring, documentation, execution and monitoring. The ABCP issued by each multi-seller conduit is in the conduit's own name with recourse to the financial assets owned by the multi-seller conduit, and is non-recourse to us except through our participation in liquidity and/or credit enhancement facilities.

In October 2014, the U.S. federal regulators adopted regulations related to the credit risk retention requirements for asset-backed securities (Risk Retention Rules) of the Dodd-Frank Act. The Risk Retention Rules went into effect in December 2016. We purchase ABCP from the U.S. multi-seller conduits to comply with this requirement. We continue to serve as a placement agent for the multi-seller conduits and may purchase ABCP issued by these conduits from time to time in order to facilitate the overall program liquidity.

We provide transaction-specific and program-wide liquidity facilities to the multi-seller conduits. In addition, we provide program-wide credit enhancement to the multi-seller conduits which obligate us to purchase assets or advance funds in the event the multi-seller conduit does not otherwise have funds from other sources, such as from the liquidity facilities, to settle maturing ABCP. In some cases, we or another third party may provide transaction-specific credit enhancement which can take various forms. We receive market-based fees for providing these liquidity and credit facilities.

For certain transactions, we act as counterparty to foreign exchange forward contracts and interest rate swaps to facilitate our clients' securitization of fixed rate and/or foreign currency denominated assets through the conduits. These derivatives expose us to foreign exchange and interest rate risks that are centrally managed by our foreign exchange trading and swap desks, respectively, and credit risk on the underlying assets that is mitigated by the credit enhancement described below.

Each transaction is structured with transaction-specific first loss protection provided by the third-party seller. This enhancement can take various forms, including but not limited to overcollateralization, excess spread, subordinated classes of financial assets, guarantees or letters of credit. The amount of this enhancement varies but is generally sized to cover a multiple of loss experience.

An unrelated third party (expected loss investor) absorbs losses, up to a maximum contractual amount, that may occur in the future on the assets in the multi-seller conduits before the multi-seller conduits' debt holders and us. In return for assuming this multi-seller conduit first-loss position, each multi-seller conduit pays the expected loss investor a return commensurate with its risk position. The expected loss investor has substantive power to direct the majority of the activities which significantly impact the conduit's economic performance, including initial selection and approval of the asset purchase commitments and liquidity facilities, approval of renewal and amendment of these transactions and facilities, sale or transfer of assets, ongoing monitoring of asset performance, mitigation of losses, and management of the ABCP liabilities.

We do not consolidate these multi-seller conduits as we do not control the conduit as noted above.

Structured finance

We purchased U.S. ARS from certain trusts (U.S. ARS Trusts) which fund their long-term investments in student loans by issuing short-term senior and subordinated notes. We are subject to losses on these U.S. ARS Trusts if defaults are experienced on the underlying student loans; however, in the majority of these structures, the principal and accrued interest on the student loans are guaranteed by U.S. government agencies. We act as auction agent for some of these entities but have no legal obligation to purchase the notes issued by these entities in the auction process. We do not consolidate these U.S. ARS Trusts as we do not have decision making power over the investing and financing activities of the Trusts, which are the activities that most significantly affect the performance of the Trusts.

Additionally, we invest in certain municipal bond TOB structures that we do not consolidate. These structures are similar to those consolidated municipal bond TOB structures described above; however, the residual certificates are held by third-parties. We provide liquidity facilities on the floating-rate certificates which may be drawn if certificates are tendered but not able to be remarketed. We do not have decision making power over the relevant activities of the structures; therefore, we do not consolidate these structures. The assets transferred into these programs are derecognized from our Consolidated Balance Sheets.

We provide senior warehouse financing to structured entities that are established by third parties to acquire loans for the purposes of issuing a term collateralized loan obligation (CLO) transaction. Subordinated financing is provided during the warehouse phase by one or more third-party equity investors. We act as the arranger and placement agent for the term CLO transaction. Proceeds from the sale of the term CLO are used to repay our senior warehouse financing, at which point we have no further involvement with the transaction. We do not consolidate these CLO structures as we do not have decision making power over the relevant activities of the entity, which include the initial selection and subsequent management of the underlying debt portfolio.

Non-RBC managed investment funds

We enter into fee-based equity derivative transactions with third parties including mutual funds, unit investment trusts and other investment funds. These transactions provide their investors with the desired exposure to a reference fund, and we economically hedge our exposure to these derivatives by investing in those reference funds. We also act as custodian or administrator for several funds. We do not consolidate those reference funds that are managed by third parties as we do not have power to direct their investing activities.

We provide liquidity facilities to certain third-party investment funds. The funds issue unsecured variable-rate preferred shares and invest in portfolios of tax-exempt municipal bonds. Undrawn liquidity commitments expose us to the liquidity risk of the preferred shares and drawn commitments expose us to the credit risk of the underlying municipal bonds. We do not consolidate these third-party managed funds as we do not have power to direct their investing activities.

RBC managed investment funds

We are sponsors and investment managers of mutual and pooled funds, which gives us the ability to direct the investment decisions of the funds. We do not consolidate those mutual and pooled funds if we exercise our decision making power as an agent on behalf of other unit holders.

Third-party securitization vehicles
We hold interests in securitization vehicles that provide funding to certain third parties on whose behalf the entities were created. The activities of these entities are limited to the purchase and sale of specified assets from the sponsor and the issuance of asset-backed notes collateralized by those assets. The underlying assets are typically receivables, including auto loans and leases. We, as well as other financial institutions, are obligated to provide funding up to our maximum commitment level and are exposed to credit losses on the underlying assets after various credit enhancements. Enhancements can take various forms, including but not limited to overcollateralization, excess spread, subordinated classes of financial assets, guarantees or letters of credit. The amount of this enhancement varies but is generally sized to cover a multiple of loss experience. We do not consolidate these entities as we do not have decision making power over the relevant activities, including the entities' investing and financing activities.

Other
Other structured entities include credit investment products and tax credit funds.

We use structured entities to generally transform credit derivatives into cash instruments, to distribute credit risk and to create customized credit products to meet investors' specific requirements. We enter into derivative contracts, including credit derivatives, to purchase protection from these entities (credit protection) and convert various risk factors such as yield, currency or credit risk of underlying assets to meet the needs of the investors. We act as sole arranger and swap provider for certain entities and, in some cases, fulfill other administrative functions for the entities. We do not consolidate these credit investment product entities as we do not have decision making power over the relevant activities, which include selection of the collateral and reference portfolio, and are not exposed to a majority of the benefits or risks of the entities.

We created certain funds to pass through tax credits received from underlying low-income housing, historic rehabilitation real estate projects to third parties, or new market tax credits (tax credit funds). We are sponsors of the tax credit funds as a result of our responsibility to manage the funds, arrange the financing, and perform the administrative duties of these tax credit funds. We do not consolidate the tax credit funds as the third-party investors in these funds have the decision making power to select the underlying investments and are exposed to the majority of the residual ownership and tax risks of the funds.

We also purchase passive interests in renewable energy tax credit entities created and controlled by third parties. We do not consolidate these third party funds as we do not have decision making power over the relevant activities and our investments are managed as part of larger portfolios which are held for trading purposes.

Other interests in unconsolidated structured entities
In the normal course of business, we buy and sell passive interests in certain third-party structured entities, including mutual funds, exchange traded funds, and government-sponsored asset backed securities vehicles. Our investments in these entities are managed as part of larger portfolios which are held for trading, liquidity or hedging purposes. We did not create or sponsor these entities and do not have any decision making power over their ongoing activities. Our maximum exposure to loss is limited to our on-balance sheet investments in these entities, which are not included in the table above. As at October 31, 2017, $63.3 billion (October 31, 2016 – $50.8 billion) of investments in these entities were included in Trading and AFS securities on our Consolidated Balance Sheet. Refer to Note 3 and Note 4 for further details on our investment securities.

Sponsored entities
We are a sponsor of certain structured entities in which we have interests but do not consolidate. In determining whether we are a sponsor of a structured entity, we consider both qualitative and quantitative factors, including the purpose and nature of the entity, our initial and continuing involvement and whether we hold subordinated interests in the entity. We are considered to be the sponsor of certain credit investment products, tax credit entities, RBC managed mutual funds and a commercial mortgage securitization vehicle. During the year ended October 31, 2017, we transferred commercial mortgages with a carrying amount of $407 million (October 31, 2016 – $660 million) to a sponsored securitization vehicle in which we did not have any interests as at the end of the reporting period.

Financial support provided to structured entities
During the years ended October 31, 2017 and 2016, we have not provided any financial or non-financial support to any consolidated or unconsolidated structured entities when we were not contractually obligated to do so. Furthermore, we have no intention to provide such support in the future.

Note 8 Derivative financial instruments and hedging activities

Derivative instruments are categorized as either financial or non-financial derivatives. Financial derivatives are financial contracts whose value is derived from an underlying interest rate, foreign exchange rate, credit risk, and equity or equity index. Non-financial derivatives are contracts whose value is derived from a precious metal, commodity instrument or index. The notional amount of derivatives represents the contract amount used as a reference point to calculate payments. Notional amounts are generally not exchanged by counterparties, and do not reflect our exposure at default.

Financial derivatives
Forwards and futures
Forward contracts are non-standardized agreements that are transacted between counterparties in the OTC market, whereas futures are standardized contracts with respect to amounts and settlement dates, and are traded on regular futures exchanges. Examples of forwards and futures are described below.

Interest rate forwards (forward rate agreements) and futures are contractual obligations to buy or sell an interest-rate sensitive financial instrument on a predetermined future date at a specified price.

Foreign exchange forwards and futures are contractual obligations to exchange one currency for another at a specified price for settlement at a predetermined future date.

Equity forwards and futures are contractual obligations to buy or sell at a fixed value (the specified price) of an equity index, a basket of stocks or a single stock at a predetermined future date.

Swaps
Swaps are OTC contracts in which two counterparties exchange a series of cash flows based on agreed upon rates applied to a notional amount. Examples of swap agreements are described below.

Interest rate swaps are agreements where two counterparties exchange a series of payments based on different interest rates applied to a notional amount in a single currency. Cross currency swaps involve the exchange of fixed payments in one currency for the receipt of fixed payments in another currency. Cross currency interest rate swaps involve the exchange of both interest and notional amounts in two different currencies.

Equity swaps are contracts in which one counterparty agrees to pay or receive from the other cash flows based on changes in the value of an equity index, a basket of stocks or a single stock.

Options

Options are contractual agreements under which the seller (writer) grants the purchaser the right, but not the obligation, either to buy (call option) or sell (put option) a security, exchange rate, interest rate, or other financial instrument or commodity at a specified price, at or by a predetermined future date. The seller (writer) of an option can also settle the contract by paying the cash settlement value of the purchaser's right. The seller (writer) receives a premium from the purchaser for this right. The various option agreements that we enter into include but are not limited to interest rate options, foreign currency options, equity options and index options.

Credit derivatives

Credit derivatives are OTC contracts that transfer credit risk related to an underlying financial instrument (referenced asset) from one counterparty to another. Credit derivatives include credit default swaps, credit default baskets and total return swaps.

Credit default swaps provide protection against the decline in the value of the referenced asset as a result of specified credit events such as default or bankruptcy. They are similar in structure to an option, whereby the purchaser pays a premium to the seller of the credit default swap in return for payment contingent on a credit event affecting the referenced asset.

Credit default baskets are similar to credit default swaps except that the underlying referenced financial instrument is a group of assets instead of a single asset.

Total return swaps are contracts where one counterparty agrees to pay or receive from the other cash amounts based on changes in the value of a referenced asset or group of assets, including any returns such as interest earned on these assets, in exchange for amounts that are based on prevailing market funding rates.

Other derivative products

Other contracts are stable value and equity derivative contracts.

Non-financial derivatives

Other contracts also include non-financial derivative products such as precious metal and commodity derivative contracts in both the OTC and exchange markets.

Derivatives issued for trading purposes

Most of our derivative transactions relate to client-driven sales and trading activities, and associated market risk hedging. Sales activities include the structuring and marketing of derivative products to clients, enabling them to modify or reduce risks. Trading involves market-making, positioning and arbitrage activities. Market-making involves quoting bid and offer prices to other market participants with the intention of generating revenue based on spread and volume. Positioning involves the active management of derivative transactions with the expectation of profiting from favourable movements in prices, rates, or indices. Arbitrage activities involve identifying and profiting from price differentials between markets and product types. Any realized and unrealized gains or losses on derivatives used for trading purposes are recognized immediately in Non-interest income – Trading revenue.

Derivatives issued for other-than-trading purposes

We also use derivatives for purposes other than trading, primarily for hedging, in conjunction with the management of interest rate, credit, equity and foreign exchange risk related to our funding, lending, investment activities and asset/liability management.

Interest rate swaps are used to manage our exposure to interest rate risk by modifying the repricing or maturity characteristics of existing and/or forecasted assets and liabilities, including funding and investment activities. Purchased options are used to hedge redeemable deposits and other options embedded in consumer products. We manage our exposure to foreign currency risk with cross currency swaps and foreign exchange forward contracts. We predominantly use credit derivatives to manage our credit exposures. We mitigate industry sector concentrations and single-name exposures related to our credit portfolio by purchasing credit derivatives to transfer credit risk to third parties.

Certain derivatives and cash instruments are specifically designated and qualify for hedge accounting. We apply hedge accounting to minimize volatility in earnings and capital caused by changes in interest rates or foreign exchange rates. Interest rate and currency fluctuations will either cause assets and liabilities to appreciate or depreciate in market value or cause variability in forecasted cash flows. When a hedging relationship is effective, gains, losses, revenue and expenses of the hedging instrument will offset the gains, losses, revenue and expenses of the hedged item. We assess and measure the effectiveness of a hedging relationship based on the change in the fair value or cash flows of the derivative hedging instrument relative to the change in the fair value or cash flows of the hedged item attributable to the hedged risk. When cash instruments are designated as hedges of foreign exchange risks, only changes in their value due to foreign exchange risk are included in the assessment and measurement of hedge effectiveness.

From time to time, we also enter into derivative transactions to economically hedge certain exposures that do not otherwise qualify for hedge accounting, or where hedge accounting is not considered economically feasible to implement. In such circumstances, changes in fair value are reflected in Non-interest income.

Before- and after-tax unrealized gain relating to de-designated hedges of $67 million and $49 million, respectively (October 31, 2016 – unrealized losses of $95 million and $70 million, respectively) included in Other components of equity as at October 31, 2017, are expected to be reclassified to Net interest income within the next 12 months.

The following table presents the fair values of the derivative and non-derivative instruments categorized by their hedging relationships, as well as derivatives that are not designated in hedging relationships.

Derivatives and non-derivative instruments

	As at							
	October 31, 2017				October 31, 2016			
	Designated as hedging instruments in hedging relationships				Designated as hedging instruments in hedging relationships			
(Millions of Canadian dollars)	Fair value hedges	Cash flow hedges	Net investment hedges	Not designated in a hedging relationship	Fair value hedges	Cash flow hedges	Net investment hedges	Not designated in a hedging relationship
Assets								
Derivative instruments	$ 736	$ 482	$ 41	$ 93,764	$ 1,686	$ 546	$ 183	$ 116,529
Liabilities								
Derivative instruments	740	499	246	90,642	430	1,266	113	114,741
Non-derivative instruments	–	–	19,950	n.a.	–	–	19,982	n.a.

n.a. not applicable

Results of hedge activities recorded in Net income and Other comprehensive income

	For the year ended	
(Millions of Canadian dollars)	October 31 2017	October 31 2016
Fair value hedges		
Gains (losses) on hedging instruments (1)	$ (1,076)	$ (235)
Gains (losses) on hedged items attributable to the hedged risk (1)	991	135
Ineffective portion (1) (2)	(85)	(100)
Cash flow hedges		
Ineffective portion (1)	(1)	1
Effective portion (3)	622	(35)
Reclassified to income during the period (4)	95	(71)
Net investment hedges		
Ineffective portion (1)	–	–
Foreign currency gains (losses) (3)	(1,570)	147
Gains (losses) from hedges (3)	438	113

(1) Amounts are recorded in Non-interest income.
(2) Amounts include losses of $82 million (October 31, 2016 – $97 million) that are excluded from the assessment of hedge effectiveness and are offset by economic hedges.
(3) Amounts are included in OCI, net of taxes.
(4) After-tax gains of $70 million were reclassified from Other components of equity to Net-interest income during the year ended October 31, 2017 (October 31, 2016 – $52 million after-tax losses).

Notional amount of derivatives by term to maturity (absolute amounts)

(Millions of Canadian dollars)	As at October 31, 2017					
	Term to maturity					
	Within 1 year	1 to 5 years	Over 5 years (1)	Total	Trading	Other than Trading
Over-the-counter contracts						
Interest rate contracts						
Forward rate agreements	$ 1,156,843	$ 31,989	$ –	$ 1,188,832	$ 1,188,832	$ –
Swaps	2,570,180	3,450,280	2,331,289	8,351,749	7,854,309	497,440
Options purchased	77,953	124,083	59,435	261,471	261,471	–
Options written	61,765	106,887	63,685	232,337	232,337	–
Foreign exchange contracts						
Forward contracts	1,326,223	33,543	623	1,360,389	1,343,196	17,193
Cross currency swaps	80,436	35,662	39,440	155,538	149,254	6,284
Cross currency interest rate swaps	281,590	551,576	268,119	1,101,285	1,048,891	52,394
Options purchased	55,851	13,913	3,386	73,150	73,150	–
Options written	55,922	9,187	2,829	67,938	67,938	–
Credit derivatives (2)	1,975	7,686	3,814	13,475	13,330	145
Other contracts	56,166	49,652	19,241	125,059	120,737	4,322
Exchange-traded contracts						
Interest rate contracts						
Futures – long positions	33,195	19,688	55	52,938	52,938	–
Futures – short positions	35,726	23,478	9	59,213	59,213	–
Options purchased	8,274	695	–	8,969	8,969	–
Options written	10,872	317	–	11,189	11,189	–
Foreign exchange contracts						
Futures – long positions	83	–	–	83	83	–
Futures – short positions	291	142	–	433	433	–
Other contracts	198,360	44,858	528	243,746	243,607	139
	$ 6,011,705	$ 4,503,636	$ 2,792,453	$ 13,307,794	$ 12,729,877	$ 577,917

(Millions of Canadian dollars)	As at October 31, 2016					
	Term to maturity					
	Within 1 year	1 to 5 years	Over 5 years (1)	Total	Trading	Other than Trading
Over-the-counter contracts						
Interest rate contracts						
Forward rate agreements	$ 522,944	$ 9,121	$ –	$ 532,065	$ 532,065	$ –
Swaps	1,991,365	3,485,607	2,285,420	7,762,392	7,464,144	298,248
Options purchased	114,519	161,584	70,160	346,263	346,263	–
Options written	97,283	182,233	71,503	351,019	351,019	–
Foreign exchange contracts						
Forward contracts	1,288,656	44,980	939	1,334,575	1,314,103	20,472
Cross currency swaps	8,869	34,931	30,866	74,666	69,626	5,040
Cross currency interest rate swaps	272,029	544,195	251,371	1,067,595	1,013,958	53,637
Options purchased	28,601	16,538	4,619	49,758	49,758	–
Options written	28,676	14,723	4,924	48,323	48,323	–
Credit derivatives (2)	1,581	10,314	4,306	16,201	15,842	359
Other contracts	58,863	59,133	22,355	140,351	136,205	4,146
Exchange-traded contracts						
Interest rate contracts						
Futures – long positions	26,076	14,496	3	40,575	40,575	–
Futures – short positions	35,269	19,551	–	54,820	54,820	–
Options purchased	18,196	165	–	18,361	18,361	–
Options written	10,978	–	–	10,978	10,978	–
Foreign exchange contracts						
Futures – long positions	312	–	–	312	312	–
Futures – short positions	423	3	–	426	426	–
Other contracts	178,615	55,820	617	235,052	235,052	–
	$ 4,683,255	$ 4,653,394	$ 2,747,083	$ 12,083,732	$ 11,701,830	$ 381,902

(1) Includes contracts maturing in over 10 years with a notional value of $899 billion (October 31, 2016 – $883 billion). The related gross positive replacement cost is $58 billion (October 31, 2016 – $79 billion).

(2) Credit derivatives with a notional value of $0.1 billion (October 31, 2016 – $0.4 billion) are economic hedges. Trading credit derivatives comprise protection purchased of $8.5 billion (October 31, 2016 – $10.1 billion) and protection sold of $4.8 billion (October 31, 2016 – $5.7 billion).

The following tables indicate the periods when the cash flows from hedged items are expected to affect profit or loss for cash flow hedges.

(Millions of Canadian dollars)	As at October 31, 2017					
	Within 1 year	1 to 2 years	2 to 3 years	3 to 5 years	Over 5 years	Total
Cash inflows from assets	$ 938	$ 243	$ 151	$ 59	$ 98	$ 1,489
Cash outflows from liabilities	(1,070)	(939)	(3,501)	(476)	(71)	(6,057)
Net cash flows	$ (132)	$ (696)	$ (3,350)	$ (417)	$ 27	$ (4,568)

(Millions of Canadian dollars)	As at October 31, 2016					
	Within 1 year	1 to 2 years	2 to 3 years	3 to 5 years	Over 5 years	Total
Cash inflows from assets	$ 192	$ 175	$ 122	$ 90	$ 39	$ 618
Cash outflows from liabilities	(387)	(789)	(559)	(3,136)	(77)	(4,948)
Net cash flows	$ (195)	$ (614)	$ (437)	$ (3,046)	$ (38)	$ (4,330)

Fair value of derivative instruments

	As at			
	October 31, 2017		October 31, 2016	
(Millions of Canadian dollars)	Positive	Negative	Positive	Negative
Held or issued for trading purposes				
Interest rate contracts				
Forward rate agreements	$ 324	$ 319	$ 267	$ 244
Swaps	101,481	96,408	146,464	138,742
Options purchased	3,108	–	4,455	–
Options written	–	3,696	–	5,601
	104,913	100,423	151,186	144,587
Foreign exchange contracts				
Forward contracts	13,643	14,562	18,565	18,853
Cross currency swaps	4,229	3,438	5,423	4,438
Cross currency interest rate swaps	21,740	19,054	27,499	29,165
Options purchased	1,324	–	2,084	–
Options written	–	1,217	–	1,857
	40,936	38,271	53,571	54,313
Credit derivatives	157	246	191	242
Other contracts	13,775	17,183	6,662	8,994
	159,781	156,123	211,610	208,136
Held or issued for other-than-trading purposes				
Interest rate contracts				
Swaps	1,612	1,177	2,588	1,471
Options purchased	–	–	–	–
Options written	–	–	–	–
	1,612	1,177	2,588	1,471
Foreign exchange contracts				
Forward contracts	246	250	257	338
Cross currency swaps	207	318	314	542
Cross currency interest rate swaps	1,545	1,700	2,636	2,286
	1,998	2,268	3,207	3,166
Credit derivatives	–	12	–	21
Other contracts	184	184	113	113
	3,794	3,641	5,908	4,771
Total gross fair values before:	163,575	159,764	217,518	212,907
Valuation adjustments determined on a pooled basis	(725)	68	(1,432)	(126)
Impact of netting agreements that qualify for balance sheet offset	(67,827)	(67,705)	(97,142)	(96,231)
	95,023	92,127	118,944	116,550
Impact of netting agreements that do not qualify for balance sheet offset (1)	(58,804)	(58,804)	(79,296)	(79,296)
	$ 36,219	$ 33,323	$ 39,648	$ 37,254

(1) Additional impact of offsetting credit exposures on contracts that do not qualify for balance sheet offset.

Fair value of derivative instruments by term to maturity

(Millions of Canadian dollars)	As at October 31, 2017 Less than 1 year	1 to 5 years	Over 5 years	Total	As at October 31, 2016 Less than 1 year	1 to 5 years	Over 5 years	Total
Derivative assets	$ 26,292	$ 28,810	$ 39,921	$ 95,023	$ 30,475	$ 39,357	$ 49,112	$ 118,944
Derivative liabilities	26,414	26,334	39,379	92,127	30,962	39,507	46,081	116,550

Derivative-related credit risk

Credit risk from derivative transactions is generated by the potential for the counterparty to default on its contractual obligations when one or more transactions have a positive market value to us. Therefore, derivative-related credit risk is represented by the positive fair value of the instrument and is normally a small fraction of the contract's notional amount.

We subject our derivative transactions to the same credit approval, limit and monitoring standards that we use for managing other transactions that create credit exposure. This includes evaluating the creditworthiness of counterparties, and managing the size, diversification and maturity structure of the portfolio. Credit utilization for all products is compared with established limits on a continual basis and is subject to a standard exception reporting process. We use a single internal rating system for all credit risk exposure. In most cases, these internal ratings approximate the external risk ratings of public rating agencies.

Offsetting is a technique that can reduce credit exposure from derivatives and is generally facilitated through the use of master netting agreements and achieved when specific criteria are met in accordance with our accounting policy in Note 2. A master netting agreement provides for a single net settlement of all financial instruments covered by the agreement in the event of default. However, credit risk is reduced only to the extent that our financial obligations to the same counterparty can be set off against obligations of the counterparty to us. We maximize the use of master netting agreements to reduce derivative-related credit exposure. Our overall exposure to credit risk that is reduced through master netting agreements may change substantially following the reporting date as the exposure is affected by each transaction subject to the agreement as well as by changes in underlying market rates. Measurement of our credit exposure arising out of derivative transactions is reduced to reflect the effects of netting in cases where the enforceability of that netting is supported by appropriate legal analysis as documented in our trading credit risk policies.

The use of collateral is another significant credit mitigation technique for managing derivative-related counterparty credit risk. Mark-to-market provisions in our agreements with some counterparties, typically in the form of a Credit Support Annex, provide us with the right to request that the counterparty pay down or collateralize the current market value of its derivatives positions when the value passes a specified threshold amount.

Replacement cost represents the total fair value of all outstanding contracts in a gain position after factoring in the master netting agreements. The credit equivalent amount is defined as the sum of the replacement cost plus an add-on amount for potential future credit exposure as defined by OSFI. The risk-weighted amount is determined by applying the standard OSFI defined measures of counterparty risk to the credit equivalent amount.

Derivative-related credit risk

(Millions of Canadian dollars)	As at October 31, 2017 (1) Replacement cost	Credit equivalent amount (2)	Risk-weighted equivalent (3)	As at October 31, 2016 (1) Replacement cost	Credit equivalent amount (2)	Risk-weighted equivalent (3)
Over-the-counter contracts						
Interest rate contracts						
Forward rate agreements	$ 264	$ 328	$ 59	$ 232	$ 250	$ 53
Swaps	10,890	24,318	4,187	15,118	27,214	5,429
Options purchased	283	883	527	334	1,092	662
Foreign exchange contracts						
Forward contracts	5,421	11,555	3,634	6,914	12,952	3,896
Swaps	10,476	12,643	4,498	13,763	12,492	3,790
Options purchased	360	1,125	472	416	1,045	456
Credit derivatives (4)	109	936	149	31	920	188
Other contracts	7,750	6,332	2,945	1,409	6,188	3,463
Exchange-traded contracts	1,391	8,340	167	2,933	11,756	235
	$ 36,944	$ 66,460	$ 16,638	$ 41,150	$ 73,909	$ 18,172

(1) The amounts presented are net of master netting agreements in accordance with Basel III.
(2) The total credit equivalent amount includes collateral applied of $18 billion (October 31, 2016 – $21 billion).
(3) The risk-weighted balances are calculated in accordance with Basel III.
(4) Excludes credit derivatives issued for other-than-trading purposes related to bought protection.

Replacement cost of derivative instruments by risk rating and by counterparty type

	As at October 31, 2017								
	Risk rating (1)					Counterparty type (2)			
(Millions of Canadian dollars)	AAA, AA	A	BBB	BB or lower	Total	Banks	OECD governments	Other	Total
Gross positive replacement cost	$ 26,707	$ 108,320	$ 19,672	$ 8,876	$ 163,575	$ 45,723	$ 18,694	$ 99,158	$ 163,575
Impact of master netting agreements	14,468	98,605	10,167	3,391	126,631	38,508	8,342	79,781	126,631
Replacement cost (after netting agreements)	$ 12,239	$ 9,715	$ 9,505	$ 5,485	$ 36,944	$ 7,215	$ 10,352	$ 19,377	$ 36,944

	As at October 31, 2016								
	Risk rating (1)					Counterparty type (2)			
(Millions of Canadian dollars)	AAA, AA	A	BBB	BB or lower	Total	Banks	OECD governments	Other	Total
Gross positive replacement cost	$ 37,119	$ 151,992	$ 20,634	$ 7,773	$ 217,518	$ 62,112	$ 21,824	$ 133,582	$ 217,518
Impact of master netting agreements	20,704	139,912	14,255	1,567	176,438	52,535	9,494	114,409	176,438
Replacement cost (after netting agreements)	$ 16,415	$ 12,080	$ 6,379	$ 6,206	$ 41,080	$ 9,577	$ 12,330	$ 19,173	$ 41,080

(1) Our internal risk ratings for major counterparty types approximate those of public ratings agencies. Ratings of AAA, AA, A and BBB represent investment grade ratings and ratings of BB or lower represent non-investment grade ratings.
(2) Counterparty type is defined in accordance with the capital adequacy requirements of OSFI.

Note 9 Premises and equipment

(Millions of Canadian dollars)	Land	Buildings	Computer equipment	Furniture, fixtures and other equipment	Leasehold improvements	Work in process	Total
Cost							
Balance at October 31, 2016	$ 171	$ 1,379	$ 1,686	$ 1,352	$ 2,566	$ 132	$ 7,286
Additions (1)	–	1	211	25	43	226	506
Acquisitions through business combination	–	–	–	–	–	–	–
Transfers from work in process	–	7	43	37	96	(183)	–
Disposals	(9)	(23)	(90)	(47)	(68)	–	(237)
Foreign exchange translation	(4)	(9)	(11)	(7)	(18)	–	(49)
Other	(1)	8	36	(46)	(33)	(22)	(58)
Balance at October 31, 2017	$ 157	$ 1,363	$ 1,875	$ 1,314	$ 2,586	$ 153	$ 7,448
Accumulated depreciation							
Balance at October 31, 2016	$ –	$ 570	$ 1,209	$ 961	$ 1,710	$ –	$ 4,450
Depreciation	–	74	229	111	186	–	600
Disposals	–	(15)	(89)	(44)	(61)	–	(209)
Foreign exchange translation	–	(2)	(8)	(3)	(12)	–	(25)
Other	–	(19)	26	(41)	(4)	–	(38)
Balance at October 31, 2017	$ –	$ 608	$ 1,367	$ 984	$ 1,819	$ –	$ 4,778
Net carrying amount at October 31, 2017	$ 157	$ 755	$ 508	$ 330	$ 767	$ 153	$ 2,670

(Millions of Canadian dollars)	Land	Buildings	Computer equipment	Furniture, fixtures and other equipment	Leasehold improvements	Work in process	Total
Cost							
Balance at October 31, 2015	$ 123	$ 1,294	$ 1,508	$ 1,292	$ 2,464	$ 168	$ 6,849
Additions (1)	–	1	156	35	46	249	487
Acquisitions through business combination	52	94	55	2	63	51	317
Transfers from work in process	–	14	83	40	137	(274)	–
Disposals	(3)	(15)	(38)	(47)	(111)	–	(214)
Foreign exchange translation	–	1	(17)	(4)	(8)	(1)	(29)
Other	(1)	(10)	(61)	34	(25)	(61)	(124)
Balance at October 31, 2016	$ 171	$ 1,379	$ 1,686	$ 1,352	$ 2,566	$ 132	$ 7,286
Accumulated depreciation							
Balance at October 31, 2015	$ –	$ 534	$ 1,070	$ 875	$ 1,642	$ –	$ 4,121
Depreciation	–	48	219	126	180	–	573
Disposals	–	(4)	(38)	(40)	(107)	–	(189)
Foreign exchange translation	–	(1)	(13)	(8)	(7)	–	(29)
Other	–	(7)	(29)	8	2	–	(26)
Balance at October 31, 2016	$ –	$ 570	$ 1,209	$ 961	$ 1,710	$ –	$ 4,450
Net carrying amount at October 31, 2016	$ 171	$ 809	$ 477	$ 391	$ 856	$ 132	$ 2,836

(1) As at October 31, 2017, we had total contractual commitments of $268 million to acquire premises and equipment (October 31, 2016 – $301 million).

Note 10 Goodwill and other intangible assets

Goodwill

The following table presents changes in the carrying amount of goodwill by CGU for the years ended October 31, 2017 and 2016.

(Millions of Canadian dollars)	Canadian Banking	Caribbean Banking	Canadian Wealth Management	Global Asset Management	U.S. Wealth Management (including City National)	International Wealth Management	Insurance	Investor & Treasury Services	Capital Markets	Total
At October 31, 2015	$ 2,527	$ 1,820	$ 579	$ 2,219	$ 673	$ 142	$ 118	$ 149	$ 1,062	$ 9,289
Acquisition	–	–	–	–	2,113	–	–	–	–	2,113
Dispositions	–	–	–	–	–	–	(6)	(1)	–	(7)
Currency translations	–	(49)	3	(256)	68	(27)	–	–	22	(239)
At October 31, 2016	$ 2,527	$ 1,771	$ 582	$ 1,963	$ 2,854	$ 115	$ 112	$ 148	$ 1,084	$ 11,156
Acquisition	–	–	–	–	–	–	–	–	–	–
Dispositions	–	–	–	–	(2)	–	–	–	–	(2)
Currency translations	–	(77)	(6)	43	(107)	5	–	–	(35)	(177)
At October 31, 2017	$ 2,527	$ 1,694	$ 576	$ 2,006	$ 2,745	$ 120	$ 112	$ 148	$ 1,049	$ 10,977

We perform our annual impairment test by comparing the carrying amount of each CGU to its recoverable amount. The recoverable amount of a CGU is represented by its value in use, except in circumstances where the carrying amount of a CGU exceeds its value in use. In such cases, we determine the CGU's fair value less costs of disposal and its recoverable amount is the greater of its value in use and fair value less costs of disposal. Our annual impairment test is performed as at August 1.

In our 2017 and 2016 annual impairment tests, the recoverable amounts of our Caribbean Banking and International Wealth Management CGUs were based on fair value less costs of disposal. The recoverable amounts of all other CGUs tested were based on value in use.

Value in use

We calculate value in use using a five-year discounted cash flow method, with the exception of our U.S. Wealth Management (including City National) CGU where cash flow projections covering a ten-year period were used, which more closely aligns with the strategic growth plan resulting from the acquisition of City National. Future cash flows are based on financial plans agreed by management, estimated based on forecast results, business initiatives, capital required to support future cash flows and returns to shareholders. Key drivers of future cash flows include net interest margins and average interest-earning assets. The values assigned to these drivers over the forecast period are based on past experience, external and internal economic forecasts, and management's expectations of the impact of economic conditions on our financial results. Beyond the initial cash flow projection period, cash flows are assumed to increase at a constant rate using a nominal long-term growth rate (terminal growth rate). Terminal growth rates are based on the current market assessment of gross domestic product and inflation for the countries within which the CGU operates. The discount rates used to determine the present value of each CGU's projected future cash flows are based on the bank-wide cost of capital, adjusted for the risks to which each CGU is exposed. CGU-specific risks include: country risk, business/operational risk, geographic risk (including political risk, devaluation risk, and government regulation), currency risk, and price risk (including product pricing risk and inflation).

The estimation of value in use involves significant judgment in the determination of inputs to the discounted cash flow model and is most sensitive to changes in future cash flows, discount rates and terminal growth rates applied to cash flows beyond the forecast period. These key inputs and assumptions used to determine the recoverable amount of each CGU using value in use were tested for sensitivity by applying a reasonably possible change to those assumptions. The post-tax discount rates were increased by 1%, terminal growth rates were decreased by 1%, and future cash flows were reduced by 10%. As at August 1, 2017, no reasonably possible change in an individual key input or assumption, as described, would result in a CGU's carrying amount exceeding its recoverable amount based on value in use.

The terminal growth rates and pre-tax discount rates used in our discounted cash flow models are summarized below.

	As at			
	August 1, 2017		August 1, 2016	
	Discount rate (1)	**Terminal growth rate**	Discount rate (1)	Terminal growth rate
Group of cash generating units				
Canadian Banking	**10.1%**	**3.0%**	10.0%	3.0%
Caribbean Banking	**12.0**	**4.3**	12.1	4.3
Canadian Wealth Management	**11.2**	**3.0**	11.2	3.0
Global Asset Management	**11.1**	**3.0**	11.1	3.0
U.S. Wealth Management (including City National)	**13.4**	**3.0**	13.6	3.0
International Wealth Management	**10.5**	**3.0**	9.6	3.0
Insurance	**10.6**	**3.0**	10.9	3.0
Investor & Treasury Services	**11.0**	**3.0**	12.0	3.0
Capital Markets	**15.0**	**3.0**	14.1	3.0

(1) Pre-tax discount rates are determined implicitly based on post-tax discount rates.

Fair value less costs of disposal – Caribbean Banking

For our Caribbean Banking CGU, we calculated fair value less costs of disposal using a discounted cash flow method that projects future cash flows over a 5-year period. Cash flows are based on management forecasts, adjusted to approximate the considerations of a prospective third-party buyer. Cash flows beyond the initial 5-year period are assumed to increase at a constant rate using a nominal long-term growth rate. Future cash flows, terminal growth rates, and discount rates are based on the same factors noted above. This fair value measurement is categorized as level 3 in the fair value hierarchy as certain significant inputs are not observable.

The estimation of fair value less costs of disposal involves significant judgment in the determination of inputs to the discounted cash flow model and is most sensitive to changes in future cash flows, discount rates and terminal growth rates applied to cash flows beyond the forecast period. These key inputs and assumptions were tested for sensitivity by applying a reasonably possible change to those assumptions. As at August 1, 2017, the recoverable amount of our Caribbean Banking CGU, based on fair value less costs of disposal, was 115% of its carrying amount. If the post-tax discount rate was increased by 1%, holding other individual factors constant, the recoverable amount would approximate the carrying amount. No other reasonably possible change in an individual key input or assumption, including decreasing the terminal growth rates by 1% or reducing future cash flows by 10%, would result in the CGU's carrying amount exceeding its recoverable amount based on fair value less costs of disposal.

Fair value less costs of disposal – International Wealth Management

For our International Wealth Management CGU, we calculated fair value less costs of disposal using a multiples-based approach. Each business within the CGU was valued using either a Price-to-assets-under-administration (P/AUA) or Price-to-revenue (P/Rev) multiple, as appropriate, to reflect the considerations of a prospective third-party buyer. In 2017 and 2016, we applied a P/AUA multiple of 2.5% to AUA as at August 1 and a P/Rev multiple of 2.5x to revenue for the 12 months preceding the testing date. These multiples represent our best estimate from a range of reasonably possible inputs based on precedent transactions for comparable businesses. This fair value measurement is categorized as level 3 in the fair value hierarchy as certain significant inputs are not observable.

The estimation of fair value less costs of disposal involves significant judgment in the determination of the appropriate valuation approach and inputs and is most sensitive to changes in the P/AUA and P/Rev multiples. These key inputs were tested for sensitivity by reducing each multiple to the low end of the range of reasonably possible inputs considered. As at August 1, 2017, no reasonably possible change in an individual key input or assumption, as described, would result in the CGU's carrying amount exceeding its recoverable amount based on fair value less costs of disposal.

Other intangible assets

The following table presents the carrying amount of our other intangible assets.

	As at October 31, 2017					
(Millions of Canadian dollars)	Internally generated software	Other software	Core deposit intangibles	Customer list and relationships	In process software	Total
Gross carrying amount						
Balance at October 31, 2016	$ 4,435	$ 1,389	$ 1,784	$ 1,761	$ 778	$ 10,147
Additions	26	70	–	–	896	992
Acquisitions through business combination	–	–	–	–	–	–
Transfers	692	60	–	–	(752)	–
Dispositions	–	(8)	–	–	(2)	(10)
Impairment losses	(2)	(12)	–	–	–	(14)
Currency translations	(22)	(16)	(69)	6	(5)	(106)
Other changes	14	(51)	–	(14)	(23)	(74)
Balance at October 31, 2017	$ 5,143	$ 1,432	$ 1,715	$ 1,753	$ 892	$ 10,935
Accumulated amortization						
Balance at October 31, 2016	$ (3,223)	$ (1,054)	$ (348)	$ (874)	$ –	$ (5,499)
Amortization charge for the year	(595)	(111)	(156)	(153)	–	(1,015)
Dispositions	–	7	–	–	–	7
Impairment losses	–	–	–	–	–	–
Currency translations	15	10	17	(10)	–	32
Other changes	(22)	54	–	15	–	47
Balance at October 31, 2017	$ (3,825)	$ (1,094)	$ (487)	$ (1,022)	$ –	$ (6,428)
Net balance, at October 31, 2017	$ 1,318	$ 338	$ 1,228	$ 731	$ 892	$ 4,507

	As at October 31, 2016					
(Millions of Canadian dollars)	Internally generated software	Other software	Core deposit intangibles	Customer list and relationships	In process software	Total
Gross carrying amount						
Balance at October 31, 2015	$ 3,929	$ 1,193	$ 194	$ 1,538	$ 580	$ 7,434
Additions	11	58	–	–	765	834
Acquisitions through business combinations	23	47	1,558	322	–	1,950
Transfers	569	34	–	–	(603)	–
Dispositions	(10)	(6)	–	–	–	(16)
Impairment losses	–	–	–	–	–	–
Currency translations	(33)	19	32	(99)	(2)	(83)
Other changes	(54)	44	–	–	38	28
Balance at October 31, 2016	$ 4,435	$ 1,389	$ 1,784	$ 1,761	$ 778	$ 10,147
Accumulated amortization						
Balance at October 31, 2015	$ (2,750)	$ (893)	$ (194)	$ (783)	$ –	$ (4,620)
Amortization charge for the year	(560)	(97)	(158)	(155)	–	(970)
Dispositions	7	5	–	–	–	12
Impairment losses	–	–	–	–	–	–
Currency translations	31	(18)	4	64	–	81
Other changes	49	(51)	–	–	–	(2)
Balance at October 31, 2016	$ (3,223)	$ (1,054)	$ (348)	$ (874)	$ –	$ (5,499)
Net balance, at October 31, 2016	$ 1,212	$ 335	$ 1,436	$ 887	$ 778	$ 4,648

Note 11 Significant acquisition and dispositions

Acquisition

Wealth Management

On November 2, 2015, we completed the acquisition of City National. City National's business gives us an expansion platform for long-term growth in the U.S. and the opportunity to enhance and complement our existing U.S. businesses in line with our strategic goals.

Total consideration of $7.1 billion (US$5.5 billion) at the date of close included $3.4 billion (US$2.6 billion) in cash, 41.6 million RBC common shares issued at a price of US$57.16 per share for a total value of $3.1 billion (US$2.4 billion), US$275 million of first preferred shares (Series C-1 and Series C-2), with a fair value of $380 million (US$290 million), as well as share-based compensation amounts of $204 million (US$156 million), including the conversion of 3.8 million stock options with a fair value of $147 million (US$112 million), based on the Black-Scholes model.

Our purchase price allocation assigned $47.8 billion to assets and $44.7 billion to liabilities on the acquisition date. Goodwill of $2.1 billion reflects the expected synergies from the combined U.S. Wealth Management operations, expected growth of the platform, and the ability to cross sell products between segments. Goodwill is not expected to be deductible for tax purposes. In the year of acquisition, City National increased our 2016 consolidated revenue and net income by $1,988 million and $290 million, respectively. All results of operations are included in our Wealth Management segment and goodwill is allocated to our U.S. Wealth Management (including City National) CGU (previously called U.S. Wealth Management).

The following table presents the fair value of the assets acquired and liabilities assumed as at the acquisition date.

(Millions of Canadian dollars, except percentage)	
Percentage of shares acquired	100%
Purchase consideration	$ 7,138
Fair value of identifiable assets acquired	
Cash and due from banks	$ 499
Interest-bearing deposits with banks	2,779
Securities	
Trading	321
Available-for-sale	7,409
Held-to-maturity	4,723
Loans (1)	
Retail	9,597
Wholesale	20,555
Other assets	1,885
Total fair value of identifiable assets acquired	$ 47,768
Fair value of identifiable liabilities assumed	
Deposits	
Personal	10,481
Business and government	31,593
Bank	169
Other liabilities	2,450
Total fair value of identifiable liabilities assumed	$ 44,693
Fair value of identifiable net assets acquired	$ 3,075
Intangible assets (2)	1,950
Goodwill	2,113
Total purchase consideration	$ 7,138

(1) The fair value of loans reflects estimates of incurred and expected future credit losses at the acquisition date and interest rate premiums or discounts relative to prevailing market rates. Gross contractual receivables amount to $30.1 billion.

(2) Intangible assets primarily include core deposits and customer relationships which are amortized on a straight-line basis over an estimated useful life of 10 years.

Dispositions

Wealth Management

On May 12, 2017, we completed the sale of our trust, custody and fund administration business in the Caribbean to SMP Group Limited. The transaction did not have a significant impact on our Consolidated Statements of Income.

Insurance

On July 1, 2016, we completed the sale of RBC General Insurance Company, which included certain home and auto insurance manufacturing businesses, including claims, underwriting and product development capabilities, to Aviva Canada Inc. We also entered into an exclusive 15-year distribution agreement with Aviva Canada Inc. to market and sell a full suite of property and casualty insurance products to our existing and new clients. As a result of the transaction, we recorded a pre-tax gain on disposal of $287 million in Non-interest income – Other ($235 million after-tax).

Investor & Treasury Services

On October 21, 2016, we completed the sale of RBC Investor Services España S.A.U. and its wholly-owned subsidiary to Banco Inversis S.A. The transaction did not have a significant impact on our Consolidated Statements of Income.

Note 12 Joint ventures and associated companies

The following table summarizes the carrying value of our interests in joint ventures and associated companies accounted for under the equity method as well as our share of the income of those entities.

	Joint ventures		Associated companies	
	As at and for the year ended			
(Millions of Canadian dollars)	**October 31 2017**	October 31 2016	**October 31 2017**	October 31 2016
Carrying amount	**$ 164**	$ 151	**$ 526**	$ 465
Share of:				
Net income	**328**	124	**7**	52
Other comprehensive income	**(8)**	(5)	**–**	–
	$ 320	$ 119	**$ 7**	$ 52

We do not have any joint ventures or associated companies that are individually material to our financial results.

On December 21, 2016, our joint venture, Moneris Solutions Corporation (Moneris), completed the sale of its U.S. operations to Vantiv, Inc. for proceeds of $576 million (US$430 million). We have a 50% interest in Moneris and recognized the gain of $212 million (before- and after-tax) as Share of profit in joint ventures and associates in Non-interest income.

During the year ended October 31, 2017, we recognized impairment losses of $4 million with respect to our interests in associated companies (October 31, 2016 – reversal of impairment losses of $8 million) and recognized no gains on sales of associated companies (October 31, 2016 – $nil).

Certain of our subsidiaries, joint ventures and associates are subject to regulatory requirements of the jurisdictions in which they operate. When these subsidiaries, joint ventures and associates are subject to such requirements, they may be restricted from transferring to us our share of their assets in the form of cash dividends, loans or advances. As at October 31, 2017, restricted net assets of these subsidiaries, joint ventures and associates were $29.4 billion (October 31, 2016 – $28.4 billion).

Note 13 Other assets

	As at	
(Millions of Canadian dollars)	**October 31 2017**	October 31 2016
Cash collateral	**$ 13,657**	$ 18,979
Margin deposits	**5,867**	4,308
Receivable from brokers, dealers and clients	**1,870**	2,458
Accounts receivable and prepaids	**3,574**	3,487
Investments in joint ventures and associates	**690**	616
Employee benefit assets	**59**	29
Insurance-related assets		
Collateral loans	**1,103**	1,198
Policy loans	**95**	98
Reinsurance assets	**549**	713
Other	**268**	43
Deferred income tax asset	**1,732**	2,827
Taxes receivable	**3,031**	2,264
Accrued interest receivable	**2,111**	1,870
Precious metals	**1,082**	306
Other	**3,271**	2,875
	$ 38,959	$ 42,071

Note 14 Deposits

The following table details our deposit liabilities.

	As at							
	October 31, 2017				October 31, 2016			
(Millions of Canadian dollars)	Demand (1)	Notice (2)	Term (3)	Total	Demand (1)	Notice (2)	Term (3)	Total
Personal	$ 134,184	$ 47,366	$ 78,663	$ 260,213	$ 128,206	$ 46,096	$ 76,248	$ 250,550
Business and government	229,337	9,520	266,808	505,665	221,506	10,740	255,761	488,007
Bank	8,587	158	15,012	23,757	8,533	49	10,450	19,032
	$ 372,108	$ 57,044	$ 360,483	$ 789,635	$ 358,245	$ 56,885	$ 342,459	$ 757,589
Non-interest-bearing (4)								
Canada	$ 84,498	$ 4,871	$ –	$ 89,369	$ 78,692	$ 4,686	$ –	$ 83,378
United States	34,441	90	–	34,531	34,172	93	–	34,265
Europe (5)	616	–	–	616	1,009	–	–	1,009
Other International	6,059	5	–	6,064	5,753	4	–	5,757
Interest-bearing (4)								
Canada	212,456	14,990	274,934	502,380	200,911	14,979	272,999	488,889
United States	847	32,263	55,840	88,950	999	32,388	41,427	74,814
Europe (5)	30,148	1,585	19,613	51,346	32,864	1,108	17,966	51,938
Other International	3,043	3,240	10,096	16,379	3,845	3,627	10,067	17,539
	$ 372,108	$ 57,044	$ 360,483	$ 789,635	$ 358,245	$ 56,885	$ 342,459	$ 757,589

(1) Demand deposits are deposits for which we do not have the right to require notice of withdrawal, which includes both savings and chequing accounts.
(2) Notice deposits are deposits for which we can legally require notice of withdrawal. These deposits are primarily savings accounts.
(3) Term deposits are deposits payable on a fixed date, and include term deposits, guaranteed investment certificates and similar instruments.
(4) The geographical splits of the deposits are based on the point of origin of the deposits and where the revenue is recognized. As at October 31, 2017, deposits denominated in U.S. dollars, British pounds, Euro and other foreign currencies were $283 billion, $16 billion, $37 billion and $29 billion, respectively (October 31, 2016 – $264 billion, $16 billion, $37 billion and $29 billion).
(5) Europe includes the United Kingdom, Luxembourg and the Channel Islands.

The following table presents the contractual maturities of our term deposit liabilities.

	As at	
(Millions of Canadian dollars)	October 31 2017	October 31 2016
Within 1 year:		
less than 3 months	$ 71,841	$ 72,346
3 to 6 months	41,221	40,487
6 to 12 months	82,588	51,608
1 to 2 years	52,033	50,676
2 to 3 years	40,400	39,499
3 to 4 years	30,062	31,482
4 to 5 years	18,745	29,854
Over 5 years	23,593	26,507
	$ 360,483	$ 342,459
Aggregate amount of term deposits in denominations of one hundred thousand dollars or more	$ 328,000	$ 309,000

The following table presents the average deposit balances and average rates of interest.

	For the year ended			
	October 31, 2017		October 31, 2016	
(Millions of Canadian dollars, except for percentage amounts)	Average balances	Average rates	Average balances	Average rates
Canada	$ 581,059	0.96%	$ 561,711	0.84%
United States	112,551	0.57	113,125	0.37
Europe	53,928	0.25	50,341	0.15
Other International	22,778	1.01	24,454	1.07
	$ 770,316	0.85%	$ 749,631	0.73%

Note 15 Insurance

Risk management

Insurance risk is the risk of fluctuations in the timing, frequency or severity of insured events, relative to our expectations at the time of underwriting. We do not have a high degree of concentration risk due to our geographic diversity and business mix. Concentration risk is not a major concern for the life and health insurance business as it does not have a material level of regional specific characteristics like those exhibited in the property and casualty insurance business. Exposure to concentrations of insurance risks for the property and casualty business, up to the sale of certain home and auto insurance manufacturing businesses to Aviva Canada Inc. on July 1, 2016, was primarily mitigated through prudent underwriting practices and diversification by product offerings and geographical areas. Reinsurance is also used for all insurance businesses to lower our risk profile and limit the liability on a single claim. We manage underwriting and pricing risk through the use of underwriting guidelines which detail the class, nature and type of business that may be accepted, pricing policies by product line and centralized control of policy wordings. The risk that claims are handled or paid inappropriately is mitigated by using a range of IT system controls and manual processes conducted by experienced staff. These, together with a range of detailed policies and procedures, ensure that all claims are handled in a timely, appropriate and accurate manner.

Reinsurance

In the ordinary course of business, our insurance operations reinsure risks to other insurance and reinsurance companies in order to lower our risk profile, limit loss exposure to large risks, and provide additional capacity for future growth. These ceding reinsurance arrangements do not relieve our insurance subsidiaries from their direct obligations to the insured. We evaluate the financial condition of the reinsurers and monitor our concentrations of credit risks to minimize our exposure to losses from reinsurer insolvency. Reinsurance amounts (ceded premiums) included in Non-interest income are shown in the table below.

Net premiums and claims

	For the year ended	
(Millions of Canadian dollars)	**October 31 2017**	October 31 2016
Gross premiums	**$ 4,215**	$ 4,335
Premiums ceded to reinsurers	**(340)**	(1,160)
Net premiums	**$ 3,875**	$ 3,175
Gross claims and benefits	**$ 2,840**	$ 3,754
Reinsurers' share of claims and benefits	**(53)**	(546)
Net claims	**$ 2,787**	$ 3,208

Insurance claims and policy benefit liabilities

All actuarial assumptions are set in conjunction with Canadian Institute of Actuaries Standards of Practice and OSFI requirements. The assumptions that have the greatest effect on the measurement of insurance liabilities, the processes used to determine them and the assumptions used as at October 31, 2017 are as follows:

Life insurance

Mortality and morbidity – Mortality estimates are based on standard industry insured mortality tables, adjusted where appropriate to reflect our own experience. Morbidity assumptions are made with respect to the rates of claim incidence and claim termination for health insurance policies and are based on a combination of industry and our own experience.

Future investment yield – Assumptions are based on the current yield rate, a reinvestment assumption and an allowance for future credit losses for each line of business, and are developed using interest rate scenario testing, including prescribed scenarios for determination of minimum liabilities as set out in the actuarial standards.

Policyholder behaviour – Under certain policies, the policyholder has a contractual right to change benefits and premiums, as well as convert policies to permanent forms of insurance. All policyholders have the right to terminate their policies through lapse. Lapses represent the termination of policies due to non-payment of premiums. Lapse assumptions are primarily based on our recent experience adjusted for emerging industry experience where applicable.

Significant insurance assumptions

	As at	
	October 31 2017	October 31 2016
Life Insurance		
Canadian Insurance		
Mortality rates (1)	**0.11%**	0.13%
Morbidity rates (2)	**1.74**	1.68
Reinvestment yield (3)	**3.90**	4.00
Lapse rates (4)	**0.50**	0.50
International Insurance		
Mortality rates (1)	**0.47**	0.43
Reinvestment yield (3)	**3.14**	2.75

(1) Average annual death rate for the largest portfolio of insured policies.
(2) Average net settlement rate for the individual and group disability insurance portfolio.
(3) Ultimate reinvestment rate of the insurance operations.
(4) Ultimate policy termination rate (lapse rate) for the largest permanent life insurance portfolio that relies on higher termination rate to maintain its profitability (lapse-supported policies).

Insurance claims and policy benefit liabilities

The following table summarizes our gross and reinsurers' share of insurance liabilities at the end of the year.

	As at					
	October 31, 2017			October 31, 2016		
(Millions of Canadian dollars)	**Gross**	**Ceded**	**Net**	Gross	Ceded	Net
Life insurance policyholder liabilities						
Life, health and annuity	**$ 9,653**	**$ 393**	**$ 9,260**	$ 9,137	$ 545	$ 8,592
Investment contracts (1)	**34**	**–**	**34**	22	–	22
	$ 9,687	**$ 393**	**$ 9,294**	$ 9,159	$ 545	$ 8,614
Non-life insurance policyholder liabilities						
Unearned premium provision (1)	**$ 23**	**$ –**	**$ 23**	$ 23	$ –	$ 23
Unpaid claims provision	**23**	**2**	**21**	27	4	23
	$ 46	**$ 2**	**$ 44**	$ 50	$ 4	$ 46
	$ 9,733	**$ 395**	**$ 9,338**	$ 9,209	$ 549	$ 8,660

(1) Insurance liabilities for investment contracts and unearned premium provision are reported in Other liabilities on the Consolidated Balance Sheets.

Reconciliation of life insurance policyholder liabilities

	October 31, 2017			October 31, 2016		
(Millions of Canadian dollars)	**Gross**	**Ceded**	**Net**	Gross	Ceded	Net
Balances, beginning of the year	**$ 9,159**	**$ 545**	**$ 8,614**	$ 8,094	$ 519	$ 7,575
New and in-force policies	**865**	**53**	**812**	1,132	26	1,106
Changes in assumption and methodology	**(349)**	**(205)**	**(144)**	(78)	–	(78)
Net change in investment contracts	**12**	**–**	**12**	11	–	11
Balances, end of the year	**$ 9,687**	**$ 393**	**$ 9,294**	$ 9,159	$ 545	$ 8,614

Reconciliation of non-life insurance policyholder liabilities

	October 31, 2017			October 31, 2016		
(Millions of Canadian dollars)	**Gross**	**Ceded**	**Net**	Gross	Ceded	Net
Balances, beginning of the year	**$ 50**	**$ 4**	**$ 46**	$ 1,476	$ 38	$ 1,438
Changes in unearned premiums provision						
Written premiums	**119**	**1**	**118**	665	19	646
Less: Net premiums earned	**(119)**	**(1)**	**(118)**	(665)	(21)	(644)
Less: Disposal (1)	**–**	**–**	**–**	(429)	–	(429)
Changes in unpaid claims provision and adjustment expenses						
Incurred claims	**64**	**(2)**	**66**	482	18	464
Less: Claims paid	**(68)**	**–**	**(68)**	(439)	(4)	(435)
Less: Disposal (1)	**–**	**–**	**–**	(1,040)	(46)	(994)
Balances, end of the year	**$ 46**	**$ 2**	**$ 44**	$ 50	$ 4	$ 46

(1) RBC General Insurance Company was sold to Aviva Canada Inc. in 2016, which includes certain home and auto insurance manufacturing businesses. Refer to Note 11.

The net increase in Insurance claims and policy benefit liabilities over the prior year was comprised of the net increase in life and health liabilities and reinsurance attributable to business growth partially offset by market movements on assets backing life and health liabilities. During the year, we reviewed all key actuarial methods and assumptions which are used in determining the policy benefit liabilities resulting in a $144 million net decrease to insurance liabilities comprised of: (i) a decrease of $87 million for assumption updates due to reduced provisions for credit and interest rate risk; (ii) a decrease of $64 million arising from insurance risk related assumption updates largely due to mortality, morbidity, maintenance, property and casualty margin for adverse deviation and expense assumptions, impacting both gross and ceded insurance policyholder liabilities; offset by an increase of $7 million due to valuation system and data changes.

Sensitivity analysis

The following table presents the sensitivity of the level of insurance policyholder liabilities disclosed in this note to reasonably possible changes in the actuarial assumptions used to calculate them. The percentage change in each variable is applied to a range of existing actuarial modelling assumptions to derive the possible impact on net income. The analyses are performed where a single assumption is changed while holding other assumptions constant, which is unlikely to occur in practice.

		Net income impact for year ended	
(Millions of Canadian dollars, except for percentage amounts)	Change in variable	**October 31 2017**	October 31 2016
Increase in market interest rates (1)	1%	**$ (1)**	$ (2)
Decrease in market interest rates (1)	1	**3**	7
Increase in equity market values (2)	10	**3**	4
Decrease in equity market values (2)	10	**(4)**	(4)
Increase in maintenance expenses (3)	5	**(29)**	(30)
Life Insurance (3)			
Adverse change in annuitant mortality rates	2	**(117)**	(129)
Adverse change in assurance mortality rates	2	**(60)**	(46)
Adverse change in morbidity rates	5	**(183)**	(183)
Adverse change in lapse rates	10	**(220)**	(229)

(1) Sensitivities for market interest rates include the expected current period earnings impact of a 100 basis points shift in the yield curve by increasing the current reinvestment rates while holding the assumed ultimate rates constant. The sensitivity consists of both the impact on assumed reinvestment rates in the actuarial liabilities and any changes in fair value of assets and liabilities from the yield curve shift.

(2) Sensitivities to changes in equity market values are composed of the expected current period earnings impact from differences in the changes in fair value of the equity asset holdings and the partially offsetting impact on the actuarial liabilities.

(3) Sensitivities to changes in maintenance expenses and life insurance actuarial assumptions include the expected current period earnings impact from recognition of increased liabilities due to an adverse change in the given assumption over the lifetime of all inforce policies.

Note 16 Segregated funds

We offer certain individual variable insurance contracts that allow policyholders to invest in segregated funds. The investment returns on these funds are passed directly to the policyholders. Amounts invested are at the policyholders' risk, except where the policyholders have selected options providing maturity and death benefit guarantees. A liability for the guarantees is recorded in Insurance claims and policy benefit liabilities.

Segregated funds net assets are recorded at fair value. All of our segregated funds net assets are categorized as Level 1 in the fair value hierarchy. The fair value of the segregated funds liabilities is equal to the fair value of the segregated funds net assets. Segregated funds net assets and segregated funds liabilities are presented on separate lines on the Consolidated Balance Sheets. The following tables present the composition of net assets and the changes in net assets for the year.

Segregated funds net assets

	As at	
(Millions of Canadian dollars)	**October 31 2017**	October 31 2016
Cash	**$ 1**	$ 1
Investment in mutual funds	**1,217**	981
Other liabilities, net	**(2)**	(1)
	$ 1,216	$ 981

Changes in net assets

	For the year ended	
(Millions of Canadian dollars)	**October 31 2017**	October 31 2016
Net assets, beginning of year	**$ 981**	$ 830
Additions (deductions):		
Deposits from policyholders	**430**	330
Net realized and unrealized gains	**87**	41
Interest and dividends	**26**	25
Payment to policyholders	**(279)**	(221)
Management and administrative fees	**(29)**	(24)
Net assets, end of year	**$ 1,216**	$ 981

Note 17 Employee benefits – Pension and other post-employment benefits

Plan characteristics

We sponsor a number of programs that provide pension and post-employment benefits to eligible employees. The majority of beneficiaries of the pension plans are located in Canada and other beneficiaries of the pension plans are primarily located in the U.S., the U.K. and the Caribbean. The pension arrangements including investment, plan benefits and funding decisions are governed by local pension committees or trustees, who are legally segregated from the Bank, or management. Significant plan changes require the approval of the Board of Directors.

Our defined benefit pension plans provide pension benefits based on years of service, contributions and average earnings at retirement. Our primary defined benefit pension plans are closed to new members. New employees are generally eligible to join defined contribution pension plans. The specific features of these plans vary by location. We also provide supplemental non-registered (non-qualified) pension plans for certain executives and senior management that are typically unfunded or partially funded.

Our defined contribution pension plans provide pension benefits based on accumulated employee and Bank contributions. The Bank contributions are based on a percentage of an employee's annual earnings and a portion of the Bank contribution may be dependent on the amount being contributed by the employee and their years of service.

Our primary other post-employment benefit plans provide health, dental, disability and life insurance coverage and cover a number of current and retired employees who are mainly located in Canada. These plans are unfunded unless required by legislation.

We measure our benefit obligations and pension assets as at October 31 each year. All plans are valued using the projected unit-credit method. We fund our registered defined benefit pension plans in accordance with actuarially determined amounts required to satisfy employee benefit obligations under current pension regulations. For our principal pension plan, the most recent funding actuarial valuation was completed on January 1, 2017, and the next valuation will be completed on January 1, 2018.

For the year ended October 31, 2017, total contributions to our pension plans (defined benefit and defined contribution plans) and other post-employment benefit plans were $612 million and $62 million (October 31, 2016 – $409 million and $49 million), respectively. For 2018, total contributions to our pension plans and other post-employment benefit plans are expected to be $616 million and $78 million, respectively.

Risks

By their design, the defined benefit pension and other post-employment benefit plans expose the Bank to various risks such as investment performance, reductions in discount rates used to value the obligations, increased longevity of plan members, future inflation levels impacting future salary increases as well as future increases in healthcare costs. These risks will reduce over time due to the membership closure of our primary defined benefit pension plans and migration to defined contribution pension plans.

The following table presents the financial position related to all of our material pension and other post-employment benefit plans worldwide, including executive retirement arrangements.

	As at			
	October 31, 2017		October 31, 2016	
(Millions of Canadian dollars)	**Defined benefit pension plans**	**Other post-employment benefit plans**	Defined benefit pension plans	Other post-employment benefit plans
Canada				
Fair value of plan assets	**$ 12,505**	**$ 1**	$ 11,416	$ 1
Present value of defined benefit obligation	**12,834**	**1,714**	12,680	1,760
Net (deficit)	**$ (329)**	**$ (1,713)**	$ (1,264)	$ (1,759)
International				
Fair value of plan assets	**$ 1,068**	**$ –**	$ 1,043	$ –
Present value of defined benefit obligation	**1,171**	**131**	1,199	134
Net (deficit)	**$ (103)**	**$ (131)**	$ (156)	$ (134)
Total				
Fair value of plan assets	**$ 13,573**	**$ 1**	$ 12,459	$ 1
Present value of defined benefit obligation	**14,005**	**1,845**	13,879	1,894
Total net (deficit)	**$ (432)**	**$ (1,844)**	$ (1,420)	$ (1,893)
Effect of asset ceiling	**(1)**	**–**	(3)	–
Total net (deficit), net of effect of asset ceiling	**$ (433)**	**$ (1,844)**	$ (1,423)	$ (1,893)
Amounts recognized in our Consolidated Balance Sheets				
Employee benefit assets	**$ 59**	**$ –**	$ 29	$ –
Employee benefit liabilities	**(492)**	**(1,844)**	(1,452)	(1,893)
Total net (deficit), net of effect of asset ceiling	**$ (433)**	**$ (1,844)**	$ (1,423)	$ (1,893)

The following table presents an analysis of the movement in the financial position related to all of our material pension and other post-employment benefit plans worldwide, including executive retirement arrangements.

(Millions of Canadian dollars)	As at or for the year ended October 31, 2017 Defined benefit pension plans (1)	October 31, 2017 Other post-employment benefit plans	October 31, 2016 Defined benefit pension plans (1)	October 31, 2016 Other post-employment benefit plans
Change in fair value of plan assets				
Opening fair value of plan assets	**$ 12,459**	**$ 1**	$ 11,896	$ 11
Interest income	**426**	**–**	498	–
Remeasurements				
Return on plan assets (excluding interest income)	**749**	**1**	447	2
Change in foreign currency exchange rate	**25**	**–**	(138)	–
Contributions – Employer	**444**	**62**	257	49
Contributions – Plan participant	**50**	**19**	52	18
Payments	**(566)**	**(82)**	(536)	(79)
Payments – amount paid in respect of any settlements	**–**	**–**	(4)	–
Other	**(14)**	**–**	(13)	–
Closing fair value of plan assets	**$ 13,573**	**$ 1**	$ 12,459	$ 1
Change in present value of benefit obligation				
Opening benefit obligation	**$ 13,879**	**$ 1,894**	$ 11,974	$ 1,657
Current service costs	**380**	**40**	313	36
Past service costs	**(2)**	**–**	(5)	(3)
Interest expense	**468**	**68**	496	71
Remeasurements				
Actuarial losses (gains) from demographic assumptions	**(2)**	**(36)**	(5)	(17)
Actuarial losses (gains) from financial assumptions	**(188)**	**3**	1,644	194
Actuarial losses (gains) from experience adjustments	**(31)**	**(59)**	79	17
Change in foreign currency exchange rate	**18**	**(2)**	(128)	–
Contributions – Plan participant	**50**	**19**	52	18
Payments	**(566)**	**(82)**	(536)	(79)
Payments – amount paid in respect of any settlements	**–**	**–**	(4)	–
Other	**(1)**	**–**	(1)	–
Closing benefit obligation	**$ 14,005**	**$ 1,845**	$ 13,879	$ 1,894
Unfunded obligation	**$ 30**	**$ 1,694**	$ 33	$ 1,732
Wholly or partly funded obligation	**13,975**	**151**	13,846	162
Total benefit obligation	**$ 14,005**	**$ 1,845**	$ 13,879	$ 1,894

(1) For pension plans with funding deficits, the benefit obligations and fair value of plan assets as at October 31, 2017 were $12,824 million and $12,332 million, respectively (October 31, 2016 – $12,705 million and $11,267 million, respectively).

Pension and other post-employment benefit expense

The following table presents the composition of our pension and other post-employment benefit expense related to our material pension and other post-employment benefit plans worldwide.

(Millions of Canadian dollars)	For the year ended Pension plans October 31 2017	Pension plans October 31 2016	Other post-employment benefit plans October 31 2017	Other post-employment benefit plans October 31 2016
Current service costs	**$ 380**	$ 313	**$ 40**	$ 36
Past service costs	**(2)**	(5)	**–**	(3)
Net interest expense (income)	**42**	(2)	**68**	71
Remeasurements of other long term benefits	**–**	–	**(2)**	16
Administrative expense	**14**	13	**–**	–
Defined benefit pension expense	**$ 434**	$ 319	**$ 106**	$ 120
Defined contribution pension expense	**168**	152	**–**	–
	$ 602	$ 471	**$ 106**	$ 120

Service costs for the year ended October 31, 2017 totalled $370 million (October 31, 2016 – $300 million) for pension plans in Canada and $8 million (October 31, 2016 – $8 million) for International plans. Net interest expense (income) for the year ended October 31, 2017 totalled $37 million (October 31, 2016 – $(6) million) for pension plans in Canada and $5 million (October 31, 2016 – $4 million) for International plans.

Pension and other post-employment benefit remeasurements

The following table presents the composition of our remeasurements recorded in OCI related to our material pension and other post-employment benefit plans worldwide.

	For the year ended			
	Defined benefit pension plans		Other post-employment benefit plans	
(Millions of Canadian dollars)	**October 31 2017**	October 31 2016	**October 31 2017**	October 31 2016
Actuarial (gains) losses:				
Changes in demographic assumptions	**$ (2)**	$ (5)	**$ (34)**	$ (20)
Changes in financial assumptions	**(188)**	1,644	**6**	186
Experience adjustments	**(31)**	79	**(62)**	12
Return on plan assets (excluding interest based on discount rate)	**(749)**	(447)	**(1)**	(2)
Change in asset ceiling (excluding interest income)	**(2)**	3	**–**	–
	$ (972)	$ 1,274	**$ (91)**	$ 176

Remeasurements recorded in OCI for the year ended October 31, 2017 were gains of $963 million (October 31, 2016 – losses of $1,180 million) for pension plans in Canada and gains of $9 million (October 31, 2016 – losses of $94 million) for International plans.

Investment policy and strategies

Defined benefit pension plan assets are invested prudently in order to meet our longer-term pension obligations. The pension plan's investment strategy is to hold a diversified mix of investments by asset class and geographic location in order to reduce investment-specific risk to the funded status while maximizing the expected returns to meet pension obligations. Investment of the plan's assets is conducted with careful consideration of the pension obligation's sensitivity to interest rates and credit spreads which are key risk factors impacting the obligation's value. The asset mix policy is therefore consistent with an asset/liability framework. Factors taken into consideration in developing our asset mix include but are not limited to the following:

(i) the nature of the underlying benefit obligations, including the duration and term profile of the liabilities;
(ii) the member demographics, including expectations for normal retirements, terminations, and deaths;
(iii) the financial position of the pension plans;
(iv) the diversification benefits obtained by the inclusion of multiple asset classes; and
(v) expected asset returns, including asset and liability volatility and correlations.

To implement our asset mix policy, we may invest in debt securities, equity securities, alternative investments and derivative instruments. Our holdings in certain investments, including common shares, debt securities rated lower than BBB and residential and commercial mortgages, cannot exceed a defined percentage of the market value of our defined benefit pension plan assets. We may use derivative instruments as either a synthetic investment to more efficiently replicate the performance of an underlying security, or as a hedge against financial risks within the plan. To manage our credit risk exposure, where derivatives instruments are not centrally cleared, counterparties are required to meet minimum credit ratings and enter into collateral agreements.

Our defined benefit pension plan assets are primarily comprised of debt and equity securities and alternative investments. Our equity securities generally have unadjusted quoted market prices in an active market (Level 1) and our debt securities generally have quoted market prices for similar assets in an active market (Level 2). Alternative investments and other includes cash, hedge funds, and private fund investments including infrastructure, real estate leases, private equity and debt. In the case of private fund investments, no quoted market prices are usually available (Level 2 or Level 3). These fund assets are either valued by an independent valuator or priced using observable market inputs.

During the year ended October 31, 2017, investment management focused on fund opportunities and optimizing mix to increase diversification and improve expected returns within the plan's alternative and equity asset classes. Over time, an increasing allocation to debt securities is being used to reduce asset/liability duration mismatch and hence variability of the plan's funded status due to interest rate movement. Longer maturity debt securities, given their price sensitivity to movements in interest rates, are considered to be a good economic hedge to risk associated with the plan's liabilities, which are discounted using predominantly long maturity bond interest rates as inputs.

Asset allocation of defined benefit pension plans (1)

	As at					
	October 31, 2017			October 31, 2016		
(Millions of Canadian dollars, except percentages)	**Fair value**	**Percentage of total plan assets**	**Quoted in active market** (2)	Fair value	Percentage of total plan assets	Quoted in active market (2)
Equity securities						
Domestic	**$ 1,752**	**13%**	**100%**	$ 1,487	12%	100%
Foreign	**3,314**	**25**	**100**	2,971	24	89
Debt securities						
Domestic government bonds	**2,502**	**18**	**–**	2,536	20	–
Foreign government bonds	**387**	**3**	**–**	533	4	–
Corporate and other bonds	**2,896**	**21**	**–**	2,648	21	–
Alternative investments and other	**2,722**	**20**	**16**	2,284	19	24
	$ 13,573	**100%**	**41%**	$ 12,459	100%	38%

(1) The asset allocation is based on the underlying investments held directly and indirectly through the funds as this is how we manage our investment policy and strategies.
(2) If our assessment of whether or not an asset was quoted in an active market was based on direct investments, 45% of our total plan assets would be classified as quoted in an active market (October 31, 2016 – 42%).

The allocation to equity securities of our pension plans in Canada is 38% (October 31, 2016 – 37%) and that of our International plans is 22% (October 31, 2016 – 17%). The allocation to debt securities of our pension plans in Canada is 42% (October 31, 2016 – 45%) and that of our International plans is 42% (October 31, 2016 – 60%). The allocation to alternative investments and other in our pension plans in Canada is 20% (October 31, 2016 – 18%) and that of our International plans is 36% (October 31, 2016 – 23%).

As at October 31, 2017, the plan assets include 1 million (October 31, 2016 – 1 million) of our common shares with a fair value of $121 million (October 31, 2016 – $99 million) and $41 million (October 31, 2016 – $62 million) of our debt securities. For the year ended October 31, 2017, dividends received on our common shares held in the plan assets were $4 million (October 31, 2016 – $4 million).

Maturity profile

The following table presents the maturity profile of our defined benefit pension plan obligation.

	As at		
	October 31, 2017		
(Millions of Canadian dollars, except participants and years)	Canada	International	Total
Number of plan participants	71,267	8,447	79,714
Actual benefit payments 2017	$ 496	$ 70	$ 566
Benefits expected to be paid 2018	575	53	628
Benefits expected to be paid 2019	600	53	653
Benefits expected to be paid 2020	623	59	682
Benefits expected to be paid 2021	645	62	707
Benefits expected to be paid 2022	665	66	731
Benefits expected to be paid 2023-2027	3,572	369	3,941
Weighted average duration of defined benefit payments	15.2 years	19.6 years	15.6 years

Significant assumptions

Our methodologies to determine significant assumptions used in calculating the defined benefit pension and other post-employment benefit expense are as follows:

Discount rate

For the Canadian pension and other post-employment benefit plans, all future expected benefit payments at each measurement date are discounted at spot rates from a derived Canadian AA corporate bond yield curve. The derived curve is based on actual short and mid-maturity corporate AA rates and extrapolated longer term rates. The extrapolated corporate AA rates are derived from observed corporate A, corporate AA and provincial AA yields. For the International pension and other post-employment benefit plans, all future expected benefit payments at each measurement date are discounted at spot rates from a local AA corporate bond yield curve. Spot rates beyond 30 years are set to equal the 30-year spot rate. The discount rate is the equivalent single rate that produces the same discounted value as that determined using the entire discount curve. This valuation methodology does not rely on assumptions regarding reinvestment returns.

Rate of increase in future compensation

The assumptions for increases in future compensation are developed separately for each plan, where relevant. Each assumption is set based on the price inflation assumption and compensation policies in each market, as well as relevant local statutory and plan-specific requirements.

Healthcare cost trend rates

Healthcare cost calculations are based on both short and long term trend assumptions established using the plan's recent experience as well as market expectations.

Weighted average assumptions to determine benefit obligation

	As at			
	Defined benefit pension plans		Other post-employment benefit plans	
	October 31 2017	October 31 2016	October 31 2017	October 31 2016
Discount rate	3.50%	3.50%	3.70%	3.60%
Rate of increase in future compensation	3.30%	3.30%	n.a.	n.a.
Healthcare cost trend rates (1)				
– Medical	n.a.	n.a.	4.00%	4.10%
– Dental	n.a.	n.a.	3.90%	4.00%

(1) For our other post-employment benefit plans, the assumed trend rates used to measure the expected benefit costs of the defined benefit obligations are also the ultimate trend rates.
n.a. not applicable

Note 17 Employee benefits – Pension and other post-employment benefits (continued)

Mortality assumptions

Mortality assumptions are significant in measuring our obligations under the defined benefit pension plans. These assumptions have been set based on country specific statistics. Future longevity improvements have been considered and included where appropriate. The following table summarizes the mortality assumptions used for material plans.

	As at							
	October 31, 2017				October 31, 2016			
	Life expectancy at 65 for a member currently at				Life expectancy at 65 for a member currently at			
	Age 65		**Age 45**		Age 65		Age 45	
(In years)	**Male**	**Female**	**Male**	**Female**	Male	Female	Male	Female
Country								
Canada	**23.2**	**23.7**	**24.2**	**24.6**	23.1	23.6	24.1	24.6
United States	**20.7**	**22.7**	**22.3**	**24.2**	20.8	22.8	20.5	22.9
United Kingdom	**24.1**	**26.2**	**26.2**	**28.4**	24.0	26.0	26.1	28.3

Sensitivity analysis

Assumptions adopted can have a significant effect on the obligations for defined benefit pension and other post-employment benefit plans. The increase (decrease) in obligation in the following table has been determined assuming all other assumptions are held constant. In practice, this is unlikely to occur, as changes in some of the assumptions may be correlated. The following table presents the sensitivity analysis of key assumptions for 2017.

	Increase (decrease) in obligation	
(Millions of Canadian dollars)	**Defined benefit pension plans**	**Other post-employment benefit plans**
Discount rate		
Impact of 50bps increase in discount rate	**$ (1,033)**	**$ (127)**
Impact of 50bps decrease in discount rate	**1,152**	**142**
Rate of increase in future compensation		
Impact of 50bps increase in rate of increase in future compensation	**61**	**1**
Impact of 50bps decrease in rate of increase in future compensation	**(61)**	**(1)**
Mortality rate		
Impact of an increase in longevity by one additional year	**340**	**39**
Healthcare cost trend rate		
Impact of 100bps increase in healthcare cost trend rate	**n.a.**	**94**
Impact of 100bps decrease in healthcare cost trend rate	**n.a.**	**(78)**

n.a. not applicable

Note 18 Other liabilities

	As at	
(Millions of Canadian dollars)	**October 31 2017**	October 31 2016
Cash collateral	**$ 15,422**	$ 14,545
Accounts payable and accrued expenses	**1,293**	1,191
Payroll and related compensation	**7,192**	6,448
Payable to brokers, dealers and clients	**2,932**	2,919
Negotiable instruments	**2,080**	2,277
Accrued interest payable	**1,781**	1,630
Deferred income	**2,079**	1,971
Taxes payable	**2,342**	2,730
Precious metals certificates	**387**	485
Dividends payable	**1,394**	1,309
Insurance related liabilities	**334**	328
Deferred income taxes	**97**	989
Provisions	**460**	485
Employee benefit liabilities	**2,336**	3,345
Other	**6,826**	7,295
	$ 46,955	$ 47,947

Note 19 Subordinated debentures

The debentures are unsecured obligations and are subordinated in right of payment to the claims of depositors and certain other creditors. The amounts presented below are net of our own holdings in these debentures, and include the impact of fair value hedges used for managing interest rate risk.

(Millions of Canadian dollars, except percentage and foreign currency)				As at	
Maturity	Earliest par value redemption date	Interest rate	Denominated in foreign currency (millions)	**October 31 2017**	October 31 2016
August 12, 2019		9.00%	US$75	**$ 106**	$ 115
November 2, 2020	November 2, 2015 (1)	3.18%		**–**	–
July 15, 2022		5.38%	US$150	**207**	218
June 8, 2023		9.30%		**110**	110
July 17, 2024 (2)	July 17, 2019	3.04% (3)		**1,002**	1,014
December 6, 2024	December 6, 2019	2.99% (4)		**2,003**	2,055
June 4, 2025 (2)	June 4, 2020	2.48% (5)		**992**	1,003
January 20, 2026 (2)	January 20, 2021	3.31% (6)		**1,456**	1,496
January 27, 2026 (2)		4.65%	US$1,500	**1,882**	2,057
September 29, 2026 (2)	September 29, 2021	3.45% (7)		**1,014**	1,061
November 1, 2027	November 1, 2022	4.75%	TT$300	**57**	60
June 26, 2037	June 26, 2017 (8)	2.86%	JPY 10,000	**–**	131
October 1, 2083	Any interest payment date	(9)		**224**	224
June 29, 2085	Any interest payment date	(10)	US$174	**224**	233
				$ 9,277	$ 9,777
Deferred financing costs				**(12)**	(15)
				$ 9,265	$ 9,762

The terms and conditions of the debentures are as follows:

(1) All $1.5 billion outstanding subordinated debentures were redeemed on November 2, 2015 for 100% of their principal amount plus accrued interest to the redemption date.

(2) The notes include non-viability contingency capital (NVCC) provisions, necessary for the notes to qualify as Tier 2 regulatory capital under Basel III. NVCC provisions require the conversion of the instrument into a variable number of common shares in the event that OSFI deems the Bank non-viable or a federal or provincial government in Canada publicly announces that the Bank has accepted or agreed to accept a capital injection. In such an event, each note is convertible into common shares pursuant to an automatic conversion formula with a multiplier of 1.5 and a conversion price based on the greater of: (i) a floor price of $5.00 and (ii) the current market price of our common shares based on the volume weighted average trading price of our common shares on the Toronto Stock Exchange. The number of shares issued is determined by dividing the par value of the note (including accrued and unpaid interest on such note) by the conversion price and then times the multiplier.

(3) Interest at stated interest rate until earliest par value redemption date, and thereafter at a rate of 1.08% above the 90-day Bankers' Acceptance rate.

(4) Interest at stated interest rate until earliest par value redemption date, and thereafter at a rate of 1.10% above the 90-day Bankers' Acceptance rate.

(5) Interest at stated interest rate until earliest par value redemption date, and thereafter at a rate of 1.10% above the 90-day Bankers' Acceptance rate.

(6) Interest at stated interest rate until earliest par value redemption date, and thereafter at a rate of 2.35% above the 90-day Bankers' Acceptance rate.

(7) Interest at stated interest rate until earliest par value redemption date, and thereafter at a rate of 1.12% above the 90-day Bankers' Acceptance rate.

(8) All ¥10,000 million outstanding subordinated debentures were redeemed on June 26, 2017 for 100% of their principal amount plus accrued interest to the redemption date.

(9) Interest at a rate of 40 basis points above the 30-day Bankers' Acceptance rate.

(10) Interest at a rate of 25 basis points above the U.S. dollar 3-month London Interbank Mean Rate (LIMEAN). In the event of a reduction of the annual dividend we declare on our common shares, the interest payable on the debentures is reduced pro rata to the dividend reduction and the interest reduction is payable with the proceeds from the sale of newly issued common shares.

All redemptions, cancellations and exchanges of subordinated debentures are subject to the consent and approval of OSFI, except for the debentures maturing August 12, 2019 and July 15, 2022.

Maturity schedule

The aggregate maturities of subordinated debentures, based on the maturity dates under the terms of issue, are as follows:

(Millions of Canadian dollars)	**October 31 2017**
1 to 5 years	**$ 313**
5 to 10 years	**8,459**
Thereafter	**505**
	$ 9,277

Note 20 Trust capital securities

We issued innovative capital instruments, RBC Trust Capital Securities (RBC TruCS), through the structured entity RBC Capital Trust (Trust).

The Trust has issued non-voting RBC TruCS Series 2010, 2011, 2015 and 2008-1 (RBC TruCS 2010, 2011, 2015 and 2008-1). RBC TruCS 2010 and 2011 were redeemed in 2010 and 2011, respectively. On December 31, 2015, the Trust redeemed all issued and outstanding RBC TruCS 2015 for cash at a redemption price of $1,000 per unit.

The holders of the remaining outstanding RBC TruCS do not have any conversion rights or any other redemption rights. As a result, upon consolidation of the Trust, RBC TruCS are classified as non-controlling interests. Holders of RBC TruCS 2008-1 are eligible to receive semi-annual non-cumulative fixed cash distributions until June 30, 2018, and floating-rate cash distributions thereafter.

No cash distributions will be payable by the Trust on RBC TruCS if we fail to declare regular dividends (i) on our preferred shares, or (ii) on our common shares if no preferred shares are then outstanding. In this case, the net distributable funds of the Trust will be distributed to us as holders of residual interest in the Trust. Should the Trust fail to pay the semi-annual distributions in full, we will not declare dividends of any kind on any of our preferred or common shares for a specified period of time.

The table below presents the significant terms and conditions of RBC TruCS.

Significant terms and conditions of RBC Trust Capital Securities

					As at	
				Earliest redemption date	**October 31 2017**	October 31 2016
(Millions of Canadian dollars, except for percentage amounts)	Issuance date	Distribution dates	Annual yield	At the option of the issuer	**Principal amount**	Principal amount
RBC Capital Trust (1) (2) (3) (4) (5)						
Included in Non-controlling interests						
1,200,000 Trust Capital Securities – Series 2015	October 28, 2005	June 30, December 31	4.87% (6)	December 31, 2010	**$ –**	$ –
500,000 Trust Capital Securities – Series 2008-1	April 28, 2008	June 30, December 31	6.82% (6)	June 30, 2013	**500**	500

The significant terms and conditions of the RBC TruCS are as follows:

(1) Subject to the approval of OSFI, the Trust may, on the earliest redemption date specified above, and on any distribution date thereafter, redeem in whole (but not in part) RBC TruCS 2008-1, without the consent of the holders.

(2) Issuer Redemption Price: RBC TruCS 2008-1 may be redeemed for cash equivalent to (i) the Early Redemption Price, if the redemption occurs prior to June 30, 2018 or (ii) the Redemption Price, if the redemption occurs on or after June 30, 2018. Redemption Price refers to an amount equal to $1,000 plus the unpaid distributions to the redemption date. Early Redemption Price refers to an amount equal to the greater of (i) the Redemption Price and (ii) the price calculated to provide an annual yield, equal to the yield on a Government of Canada bond issued on the redemption date with a maturity date of June 30, 2018, plus 77 basis points.

(3) Automatic Exchange Event: Without the consent of the holders, each RBC TruCS 2008-1 will be exchanged automatically for 40 of our non-cumulative redeemable First Preferred Shares Series AI, upon occurrence of any of the following events: (i) proceedings are commenced for our winding-up; (ii) OSFI takes control of us; (iii) we have a Tier 1 capital ratio of less than 5% or Total capital ratio of less than 8%; or (iv) OSFI has directed us to increase our capital or provide additional liquidity and we elect such automatic exchange or we fail to comply with such direction. The First Preferred Shares Series AI pay semi-annual non-cumulative cash dividends.

(4) From time to time, we purchase some of the innovative capital instruments and hold them temporarily. As at October 31, 2017, we held $0.2 million RBC TruCS 2008-1 (October 31, 2016 – $nil) as treasury holdings. Treasury holdings are deducted from regulatory capital.

(5) Regulatory capital: In accordance with OSFI Capital Adequacy Requirements, effective January 2013, RBC TruCS no longer qualify as additional Tier 1 capital due to their lack of non-viability contingent capital terms and conditions. As such, outstanding RBC TruCS are being phased out of regulatory capital in accordance with OSFI guidelines.

(6) The non-cumulative cash distribution on the RBC TruCS 2015 was 4.87% paid semi-annually until December 31, 2015. The non-cumulative cash distribution on the RBC TruCS 2008-1 is 6.82% paid semi-annually until June 30, 2018, and one half of the sum of the 180-day Bankers' Acceptance rate plus 3.5% thereafter.

Note 21 Equity

Share capital

Authorized share capital

Preferred – An unlimited number of First Preferred Shares and Second Preferred Shares without nominal or par value, issuable in series; the aggregate consideration for which all the First Preferred Shares and all the Second Preferred Shares that may be issued may not exceed $20 billion and $5 billion, respectively.

Common – An unlimited number of shares without nominal or par value may be issued.

Outstanding share capital

The following table details our common and preferred shares outstanding.

	As at					
	October 31, 2017			October 31, 2016		
(Millions of Canadian dollars, except the number of shares and dividends per share)	Number of shares (thousands)	Amount	Dividends declared per share	Number of shares (thousands)	Amount	Dividends declared per share
Preferred shares						
First preferred (1)						
Non-cumulative, fixed rate						
Series W	12,000	$ 300	$ 1.23	12,000	$ 300	$ 1.23
Series AA	12,000	300	1.11	12,000	300	1.11
Series AB (2)	–	–	0.99	12,000	300	1.18
Series AC	8,000	200	1.15	8,000	200	1.15
Series AD	10,000	250	1.13	10,000	250	1.13
Series AE	10,000	250	1.13	10,000	250	1.13
Series AF	8,000	200	1.11	8,000	200	1.11
Series AG	10,000	250	1.13	10,000	250	1.13
Series BH	6,000	150	1.23	6,000	150	1.23
Series BI	6,000	150	1.23	6,000	150	1.23
Series BJ	6,000	150	1.31	6,000	150	1.51
Series C-1 (3)	82	107	US$ 55.00	82	107	US$ 55.00
Non-cumulative, 5-Year Rate Reset						
Series AJ	13,579	339	0.88	13,579	339	0.88
Series AL	12,000	300	1.07	12,000	300	1.07
Series AZ	20,000	500	1.00	20,000	500	1.00
Series BB	20,000	500	0.98	20,000	500	0.98
Series BD	24,000	600	0.90	24,000	600	0.90
Series BF	12,000	300	0.90	12,000	300	0.90
Series BK (4)	29,000	725	1.38	29,000	725	1.29
Series BM (5)	30,000	750	1.38	30,000	750	0.98
Non-cumulative, floating rate						
Series AK	2,421	61	0.62	2,421	61	0.60
Non-cumulative, fixed rate/floating rate						
Series C-2 (6)	20	31	US$ 67.50	20	31	US$ 67.50
		$ 6,413			$ 6,713	
Common shares						
Balance at beginning of year	1,485,394	$ 17,939		1,443,423	$ 14,573	
Issued in connection with the acquisition of City National	–	–		41,619	3,115	
Issued in connection with share-based compensation plans (7)	3,477	227		4,981	307	
Purchased for cancellation (8)	(35,973)	(436)		(4,629)	(56)	
Balance at end of year	1,452,898	$ 17,730	$ 3.48	1,485,394	$ 17,939	$ 3.24
Treasury shares – Preferred shares						
Balance at beginning of year	31	$ –		(63)	$ (2)	
Sales	5,286	130		7,267	172	
Purchases	(5,311)	(130)		(7,173)	(170)	
Balance at end of year	6	$ –		31	$ –	
Treasury shares – Common shares						
Balance at beginning of year	(1,159)	$ (80)		532	$ 38	
Sales	46,862	4,414		64,678	4,973	
Purchases	(46,066)	(4,361)		(66,369)	(5,091)	
Balance at end of year	(363)	$ (27)		(1,159)	$ (80)	

(1) First Preferred Shares were issued at $25 per share with the exception of Non-Cumulative Perpetual First Preferred Shares, Series C-1 (Series C-1) and Non-Cumulative Fixed Rate/Floating Rate First Preferred Shares, Series C-2 (Series C-2) which were issued at US$1,000 per share (equivalent to US$25 per depositary share).

(2) On September 27, 2017, we redeemed all 12 million issued and outstanding Non-Cumulative First Preferred Shares, Series AB, for cash at a redemption price of $25 per share.

(3) On November 2, 2015, we issued 175 thousand Series C-1, totalling $227 million, in connection with the acquisition of City National. On February 24, 2016, we purchased for cash 3,717,969 depositary shares, each representing a one-fortieth interest in a share of Series C-1. The purchased depositary and underlying Series C-1 shares were subsequently cancelled. On November 13, 2017, we redeemed all remaining Non-Cumulative Perpetual First Preferred Shares Series C-1 (82 thousand shares) for cash at a redemption price of US$1,000 per share (equivalent to US$25 per related depositary share).

(4) On December 16, 2015, we issued 27 million Non-Cumulative 5-Year Rate Reset First Preferred Shares, Series BK (Series BK) and on December 31, 2015, we issued an additional 2 million Series BK, totalling $725 million.

(5) On March 7, 2016, we issued 30 million Non-Cumulative 5-year Rate Reset First Preferred Shares, Series BM, totalling $750 million.

(6) On November 2, 2015, we issued 100 thousand Series C-2, totalling $153 million, in connection with the acquisition of City National. On February 24, 2016, we purchased for cash 3,184,562 depositary shares, each representing a one-fortieth interest in a share of Series C-2. The purchased depositary and underlying Series C-2 shares were subsequently cancelled.

(7) Includes fair value adjustments to stock options of $46 million (2016 – $60 million).

(8) During the year ended October 31, 2017, we purchased common shares for cancellation at an average cost of $86.47 per share with a book value of $12.15 per share. During the year ended October 31, 2016, we purchased common shares for cancellation at an average cost of $78.10 per share with a book value of $12.03 per share.

Significant terms and conditions of preferred shares

As at October 31, 2017	Initial Period Annual Yield	Premium	Current Dividend per share (1)	Earliest redemption date (2)	Issue Date	Redemption price (2) (3)
Preferred shares						
First preferred						
Non-cumulative, fixed rate						
Series W (4)	4.90%		$ .306250	February 24, 2010	January 31, 2005	$ 25.00
Series AA	4.45%		.278125	May 24, 2011	April 4, 2006	25.00
Series AC	4.60%		.287500	November 24, 2011	November 1, 2006	25.00
Series AD	4.50%		.281250	February 24, 2012	December 13, 2006	25.00
Series AE	4.50%		.281250	February 24, 2012	January 19, 2007	25.00
Series AF	4.45%		.278125	May 24, 2012	March 14, 2007	25.00
Series AG	4.50%		.281250	May 24, 2012	April 26, 2007	25.00
Series BH (5)	4.90%		.306250	November 24, 2020	June 5, 2015	26.00
Series BI (5)	4.90%		.306250	November 24, 2020	July 22, 2015	26.00
Series BJ (5)	5.25%		.328125	February 24, 2021	October 2, 2015	26.00
Series C-1 (6)	5.50%		US$ 13.750000	November 13, 2017	November 2, 2015	US$ 1,000.00
Non-cumulative, 5-Year Rate Reset (7)						
Series AJ	5.00%	1.93%	.220000	February 24, 2014	September 16, 2008	25.00
Series AL	5.60%	2.67%	.266250	February 24, 2014	November 3, 2008	25.00
Series AZ (5)	4.00%	2.21%	.250000	May 24, 2019	January 30, 2014	25.00
Series BB (5)	3.90%	2.26%	.243750	August 24, 2019	June 3, 2014	25.00
Series BD (5)	3.60%	2.74%	.225000	May 24, 2020	January 30, 2015	25.00
Series BF (5)	3.60%	2.62%	.225000	November 24, 2020	March 13, 2015	25.00
Series BK (5)	5.50%	4.53%	.343750	May 24, 2021	December 16, 2015	25.00
Series BM (5)	5.50%	4.80%	.343750	August 24, 2021	March 7, 2016	25.00
Non-cumulative, floating rate						
Series AK (8)		1.93%	.169192	February 24, 2019	February 24, 2014	25.00
Non-cumulative, fixed rate/floating rate						
Series C-2 (9)	6.75%	4.052%	US$ 16.875000	November 7, 2023	November 2, 2015	US$ 1,000.00

(1) Non-cumulative preferential dividends of each Series are payable quarterly, as and when declared by the Board of Directors, on or about the 24th day (13th and 7th day for Series C-1 and Series C-2, respectively) of February, May, August and November.

(2) Subject to the consent of OSFI and the requirements of the *Bank Act* (Canada), we may, on or after the dates specified above, redeem First Preferred Shares. In the case of Series AJ, AL, AZ, BB, BD, BF, BK, BM and AK, these may be redeemed for cash at a price per share of $25 if redeemed on the earliest redemption date and on the same date every fifth year thereafter. In the case of Series W, AA, AC, AD, AE, AF, AG, BH, BI and BJ, these may be redeemed for cash at a price per share of $26 if redeemed during the 12 months commencing on the earliest redemption date and decreasing by $0.25 each 12-month period thereafter to a price per share of $25 if redeemed four years from the earliest redemption date or thereafter. Series C-1 and Series C-2 may be redeemed at a price of US$1,000 on the earliest redemption date and any dividend payment date thereafter.

(3) Subject to the consent of OSFI and the requirements of the *Bank Act* (Canada), we may purchase the First Preferred Shares of each Series for cancellation at the lowest price or prices at which, in the opinion of the Board of Directors, such shares are obtainable.

(4) Subject to the approval of the Toronto Stock Exchange, we may, on or after February 24, 2010, convert First Preferred Shares Series W into our common shares. First Preferred Shares Series W may be converted into that number of common shares determined by dividing the current redemption price by the greater of $2.50 and 95% of the weighted average trading price of common shares at such time.

(5) The preferred shares include non-viability contingency capital (NVCC) provisions, necessary for the shares to qualify as Tier 1 regulatory capital under Basel III. NVCC provisions require the conversion of the instrument into a variable number of common shares in the event that OSFI deems the Bank non-viable or a federal or provincial government in Canada publicly announces that the Bank has accepted or agreed to accept a capital injection. In such an event, each preferred share is convertible into common shares pursuant to an automatic conversion formula with a multiplier of 1 and with a conversion price based on the greater of: (i) a floor price of $5 and (ii) the current market price of our common shares based on the volume weighted average trading price of our common shares on the Toronto Stock Exchange. The number of shares issued is determined by dividing the preferred share value ($25 plus declared and unpaid dividends) by the conversion price.

(6) Series C-1 do not qualify as Tier 1 regulatory capital. On November 13, 2017, we redeemed all issued and outstanding Non-Cumulative Perpetual First Preferred Shares Series C-1 (82 thousand shares) for cash at a redemption price of US$1,000 per share (equivalent to US$25 per related depositary share).

(7) The dividend rate will reset on the earliest redemption date and every fifth year thereafter at a rate equal to the 5-year Government of Canada bond yield plus the premium indicated. The holders have the option to convert their shares into non-cumulative floating rate First Preferred Shares subject to certain conditions on the earliest redemption date and every fifth year thereafter at a rate equal to the three-month Government of Canada Treasury Bill rate plus the premium indicated.

(8) The dividend rate is equal to the three-month Government of Canada Treasury Bill rate plus the premium indicated. The holders have the option to convert their shares into non-cumulative First Preferred Shares, Series AJ subject to certain conditions on February 24, 2019 and every fifth year thereafter.

(9) The dividend rate will change on the earliest redemption date at a rate equal to the 3-month LIBOR plus the premium indicated. Series C-2 do not qualify as Tier 1 regulatory capital.

Restrictions on the payment of dividends

We are prohibited by the *Bank Act* (Canada) from declaring any dividends on our preferred or common shares when we are, or would be placed as a result of the declaration, in contravention of the capital adequacy and liquidity regulations or any regulatory directives issued under the Act. We may not pay dividends on our common shares at any time unless all dividends to which preferred shareholders are then entitled have been declared and paid or set apart for payment. We have agreed that if the Trust fails to pay any required distribution on the trust capital securities in full, we will not declare dividends of any kind on any of our preferred or common shares. Refer to Note 20.

Currently, these limitations do not restrict the payment of dividends on our preferred or common shares.

Dividend reinvestment plan

Our dividend reinvestment plan (DRIP) provides common and preferred shareholders with a means to receive additional common shares rather than cash dividends. The plan is only open to shareholders residing in Canada or the United States. The requirements of our DRIP are satisfied through either open market share purchases or shares issued from treasury. During 2017 and 2016, the requirements of our DRIP were satisfied through open market share purchases.

Shares available for future issuances
As at October 31, 2017, 43.8 million common shares are available for future issue relating to our DRIP and potential exercise of stock options outstanding. In addition, we may issue up to 38.9 million common shares from treasury under the RBC Umbrella Savings and Securities Purchase Plan that was approved by shareholders on February 26, 2009.

Non-controlling interests

(Millions of Canadian dollars)	As at October 31 2017	As at October 31 2016
RBC Trust Capital Securities (1)		
Series 2008-1	$ 511	$ 511
Other	88	84
	$ 599	$ 595

(1) As at October 31, 2017, RBC TruCS Series 2008-1 includes $11 million of accrued interest (October 31, 2016 – $11 million), net of $0.2 million treasury holdings (October 31, 2016 – $nil).

Note 22 Share-based compensation

Stock option plans
We have stock option plans for certain key employees. Under the plans, options are periodically granted to purchase common shares. The exercise price for the majority of the grants is determined as the higher of the volume-weighted average of the trading prices per board lot (100 shares) of our common shares on the Toronto Stock Exchange (i) on the day preceding the day of grant; and (ii) the five consecutive trading days immediately preceding the day of grant. The exercise price for the remaining grants is the closing market share price of our common shares on the New York Stock Exchange on the date of grant. All options vest over a four-year period, and are exercisable for a period not exceeding 10 years from the grant date.

The compensation expense recorded for the year ended October 31, 2017, in respect of the stock option plans was $8 million (October 31, 2016 – $8 million). The compensation expense related to non-vested options was $5 million at October 31, 2017 (October 31, 2016 – $4 million), to be recognized over the weighted average period of 1.5 years (October 31, 2016 – 1.9 years).

Analysis of the movement in the number and weighted average exercise price of options is set out below:

A summary of our stock option activity and related information

(Canadian dollars per share except share amounts)	October 31, 2017 Number of options (thousands)	October 31, 2017 Weighted average exercise price (4)	October 31, 2016 Number of options (thousands)	October 31, 2016 Weighted average exercise price (4)
Outstanding at beginning of year	10,650	$ 57.64	8,182	$ 55.78
Granted (1)	1,509	90.23	7,403	55.74
Exercised (2) (3)	(3,477)	51.14	(4,825)	50.97
Forfeited in the year	(116)	75.96	(110)	69.79
Outstanding at end of year	8,566	$ 64.96	10,650	$ 57.64
Exercisable at end of year	4,337	$ 50.04	6,909	$ 49.47

(1) During 2016, total consideration in our acquisition of City National included share-based compensation amounts of US$156 million, including the conversion of 3.8 million stock options with a fair value of US$112 million, based on the Black-Scholes model. Refer to Note 11 for details on this acquisition.
(2) Cash received for options exercised during the year was $178 million (October 31, 2016 – $246 million) and the weighted average share price at the date of exercise was $93.48 (October 31, 2016 – $76.90).
(3) New shares were issued for all stock options exercised in 2017 and 2016.
(4) The weighted average exercise prices reflect the conversion of foreign currency-denominated options at the exchange rates as of October 31, 2017 and October 31, 2016. For foreign currency-denominated options exercised during the year, the weighted average exercise prices are translated using exchange rates as at the settlement date.

Options outstanding as at October 31, 2017 by range of exercise price

(Canadian dollars per share except share amounts and years)	Options outstanding Number outstanding (thousands)	Options outstanding Weighted average exercise price (1)	Options outstanding Weighted average remaining contractual life (years)	Options exercisable Number exercisable (thousands)	Options exercisable Weighted average exercise price (1)
$19.40 – $45.64	1,655	$ 38.46	3.01	1,655	$ 38.46
$46.14 – $55.04	1,479	51.96	2.98	1,479	51.96
$58.65 – $72.77	1,375	63.67	5.86	1,030	61.82
$73.14 – $74.39	1,786	74.28	7.89	172	74.08
$75.12 – $90.23	2,271	86.17	8.35	1	75.12
	8,566	$ 64.96	5.90	4,337	$ 50.04

(1) The weighted average exercise prices reflect the conversion of foreign currency-denominated options at the exchange rate as of October 31, 2017.

The weighted average fair value of options granted during the year ended October 31, 2017 was estimated at $5.28 (October 31, 2016 – $4.83). This was determined by applying the Black-Scholes model on the date of grant, taking into account the specific terms and conditions under which the options are granted, such as the vesting period and expected share price volatility estimated by considering both historic average share price volatility and implied volatility derived from traded options over our common shares of similar maturity to those of the employee options. The following assumptions were used to determine the fair value of options granted:

Weighted average assumptions

	For the year ended	
(Canadian dollars per share except percentages and years)	**October 31 2017**	October 31 2016
Share price at grant date	**$ 90.30**	$ 72.49
Risk-free interest rate	**1.27%**	0.94%
Expected dividend yield	**4.14%**	4.07%
Expected share price volatility	**14%**	16%
Expected life of option	**6 years**	6 years

Employee savings and share ownership plans

We offer many employees an opportunity to own our common shares through savings and share ownership plans. Under these plans, the employees can generally contribute between 1% and 10% of their annual salary or benefit base for commission-based employees. For each contribution between 1% and 6%, we will match 50% of the employee contributions in our common shares. For the RBC Dominion Securities Savings Plan, our maximum annual contribution is $4,500 per employee. For the RBC U.K. Share Incentive Plan, our maximum annual contribution is £1,500 per employee. For the year ended October 31, 2017, we contributed $92 million (October 31, 2016 – $91 million), under the terms of these plans, towards the purchase of our common shares. As at October 31, 2017, an aggregate of 36 million common shares were held under these plans (October 31, 2016 – 37 million common shares).

Deferred share and other plans

We offer deferred share unit plans to executives, certain key employees and non-employee directors of RBC. Under these plans, participants may choose to receive all or a percentage of their annual variable short-term incentive bonus or directors' fee in the form of deferred share units (DSUs). The participants must elect to participate in the plan prior to the beginning of the year. DSUs earn dividend equivalents in the form of additional DSUs at the same rate as dividends on common shares. The participant is not allowed to convert the DSUs until retirement or termination of employment/directorship. The cash value of the DSUs is equivalent to the market value of common shares when conversion takes place.

We have a deferred bonus plan for certain key employees within Capital Markets. The deferred bonus is invested as RBC share units and a specified percentage vests on each of the three anniversary dates following the grant date. Each vested amount is paid in cash and is based on the original number of RBC share units plus accumulated dividends valued using the average closing price of RBC common shares during the five trading days immediately preceding the vesting date.

We offer performance deferred share award plans to certain key employees, all of which vest at the end of three years. Upon vesting, the award is paid in cash and is based on the original number of RBC share units granted plus accumulated dividends valued using the average closing price of RBC common shares during the five trading days immediately preceding the vesting date. A portion of the award under certain plans may be increased or decreased up to 25%, depending on our total shareholder return compared to a defined peer group of global financial institutions.

We maintain non-qualified deferred compensation plans for certain key employees in the United States. These plans allow eligible employees to defer a portion of their annual income and a variety of productivity and recruitment bonuses and allocate the deferrals among specified fund choices, including a RBC Share Accounted fund that tracks the value of our common shares.

The following table presents the units granted under the deferred share and other plans for the year.

Units granted under deferred share and other plans

	For the year ended			
	October 31, 2017		October 31, 2016	
(Units and per unit amounts)	**Units granted (thousands)**	**Weighted average fair value per unit**	Units granted (thousands)	Weighted average fair value per unit
Deferred share unit plans	**343**	**$ 91.87**	388	$ 74.89
Deferred bonus plan	**4,347**	**100.30**	4,545	83.30
Performance deferred share award plans	**2,185**	**88.79**	2,656	74.49
Deferred compensation plans	**99**	**91.49**	124	72.52
Other share-based plans	**794**	**90.68**	1,394	76.04
	7,768	**$ 93.24**	9,107	$ 79.11

Our liabilities for the awards granted under the deferred share and other plans are measured at fair value, determined based on the quoted market price of our common shares and specified fund choices as applicable. Annually, our obligation is increased by additional units earned by plan participants, and is offset by forfeitures, cancellations, and the settlement of vested units. In addition, our obligation is impacted by fluctuations in the market price of our common shares and specified fund units. For performance deferred share award plans, the estimated outcome of meeting the performance conditions also impacts our obligation.

The following tables present the units that have been earned by the participants, our obligations for these earned units under the deferred share and other plans, and the related compensation expenses (recoveries) recognized for the year.

Obligations under deferred share and other plans

	As at			
	October 31, 2017		October 31, 2016	
(Millions of Canadian dollars except units)	**Units (thousands)**	**Carrying amount**	Units (thousands)	Carrying amount
Deferred share unit plans	**4,642**	**$ 468**	4,490	$ 376
Deferred bonus plan	**12,021**	**1,213**	14,644	1,444
Performance deferred share award plans	**5,924**	**597**	5,999	502
Deferred compensation plans (1)	**3,651**	**368**	3,972	333
Other share-based plans	**2,021**	**201**	1,898	157
	28,259	**$ 2,847**	31,003	$ 2,812

(1) Excludes obligations not determined based on the quoted market price of our common shares.

Compensation expenses recognized under deferred share and other plans

	For the year ended	
(Millions of Canadian dollars)	**October 31 2017**	October 31 2016
Deferred share unit plans	**$ 96**	$ 62
Deferred bonus plan	**343**	195
Performance deferred share award plans	**312**	246
Deferred compensation plans	**342**	134
Other share-based plans	**108**	91
	$ 1,201	$ 728

Note 23 Income taxes

The components of tax expense are as follows.

	For the year ended	
(Millions of Canadian dollars)	**October 31 2017**	October 31 2016
Income taxes (recoveries) in Consolidated Statements of Income		
Current tax		
Tax expense for current year	**$ 3,261**	$ 3,012
Adjustments for prior years	**(22)**	(26)
Recoveries arising from previously unrecognized tax loss, tax credit or temporary difference of a prior period	**–**	(61)
	3,239	2,925
Deferred tax		
Origination and reversal of temporary difference	**(32)**	(111)
Effects of changes in tax rates	**(8)**	(3)
Adjustments for prior years	**5**	27
Write-down (reversal of a previous write-down)	**(1)**	3
	(36)	(84)
	3,203	2,841
Income taxes (recoveries) in Consolidated Statements of Comprehensive Income and Changes in Equity		
Other comprehensive income		
Net unrealized gains (losses) on available-for-sale securities	**62**	29
Reclassification of net losses (gains) on available-for-sale securities to income	**(38)**	(20)
Unrealized foreign currency translation gains (losses)	**(3)**	3
Net foreign currency translation gains (losses) from hedging activities	**142**	51
Net gains (losses) on derivatives designated as cash flow hedges	**195**	(13)
Reclassification of losses (gains) on derivatives designated as cash flow hedges to income	**(3)**	19
Remeasurements of employee benefit plans	**273**	(373)
Net fair value change due to credit risk on financial liabilities designated as at fair value through profit or loss	**(124)**	(118)
Issuance costs	**–**	(6)
Share-based compensation awards	**(35)**	(10)
	469	(438)
Total income taxes	**$ 3,672**	$ 2,403

Our effective tax rate changed from 21.4% for 2016 to 21.8% for 2017, principally due to lower tax exempt income and the impact from the gain on sale of RBC General Insurance Company in 2016. These factors were partially offset by our share of a gain related to the sale of our U.S. operations of Moneris in the current year.

The following is an analysis of the differences between the income tax expense reflected in the Consolidated Statements of Income and the amounts calculated at the Canadian statutory rate.

Reconciliation to statutory tax rate

	For the year ended			
(Millions of Canadian dollars, except for percentage amounts)	**October 31, 2017**		October 31, 2016	
Income taxes at Canadian statutory tax rate	**$ 3,888**	**26.5%**	$ 3,524	26.5%
Increase (decrease) in income taxes resulting from				
Lower average tax rate applicable to subsidiaries	**(518)**	**(3.5)**	(340)	(2.6)
Tax-exempt income from securities	**(293)**	**(2.0)**	(410)	(3.1)
Tax rate change	**(8)**	**(0.1)**	(3)	–
Effect of previously unrecognized tax loss, tax credit or temporary differences	**–**	**–**	(61)	(0.4)
Other	**134**	**0.9**	131	1.0
Income taxes in Consolidated Statements of Income / effective tax rate	**$ 3,203**	**21.8%**	$ 2,841	21.4%

Deferred tax assets and liabilities result from tax loss carryforwards and temporary differences between the tax basis of assets and liabilities and their carrying amounts on our Consolidated Balance Sheets.

Significant components of deferred tax assets and liabilities

	As at October 31, 2017					
(Millions of Canadian dollars)	**Net Asset November 1, 2016**	**Change through equity**	**Change through profit or loss**	**Exchange rate differences**	**Acquisitions/ disposals**	**Net Asset October 31, 2017**
Net deferred tax asset/(liability)						
Allowance for credit losses	**$ 484**	**$ –**	**$ 9**	**$ (7)**	**$ –**	**$ 486**
Deferred compensation	**1,558**	**35**	**(65)**	**(37)**	**–**	**1,491**
Business realignment charges	**8**	**–**	**3**	**–**	**–**	**11**
Tax loss carryforwards	**32**	**–**	**(12)**	**(1)**	**–**	**19**
Deferred income	**95**	**–**	**(105)**	**(1)**	**–**	**(11)**
Available-for-sale securities	**10**	**47**	**(5)**	**(3)**	**–**	**49**
Premises and equipment and intangibles	**(1,081)**	**(1)**	**66**	**13**	**–**	**(1,003)**
Deferred expense	**(60)**	**–**	**135**	**1**	**–**	**76**
Pension and post-employment related	**825**	**(273)**	**23**	**(4)**	**–**	**571**
Other	**(33)**	**(12)**	**(13)**	**4**	**–**	**(54)**
	$ 1,838	**$ (204)**	**$ 36**	**$ (35)**	**$ –**	**$ 1,635**
Comprising						
Deferred tax assets	**$ 2,827**					**$ 1,732**
Deferred tax liabilities	**(989)**					**(97)**
	$ 1,838					**$ 1,635**

	As at October 31, 2016					
(Millions of Canadian dollars)	Net Asset November 1, 2015	Change through equity	Change through profit or loss	Exchange rate differences	Acquisitions/ disposals	Net Asset October 31, 2016
Net deferred tax asset/(liability)						
Allowance for credit losses	$ 372	$ –	$ 90	$ 2	$ 20	$ 484
Deferred compensation	1,296	10	40	23	189	1,558
Business realignment charges	6	–	2	–	–	8
Tax loss carryforwards	54	(1)	(19)	(2)	–	32
Deferred income	147	–	(32)	1	(21)	95
Available-for-sale securities	12	(12)	1	4	5	10
Premises and equipment and intangibles	(539)	–	62	(10)	(594)	(1,081)
Deferred expense	(86)	8	5	–	13	(60)
Pension and post-employment related	412	373	39	1	–	825
Other	197	8	(104)	(7)	(127)	(33)
	$ 1,871	$ 386	$ 84	$ 12	$ (515)	$ 1,838
Comprising						
Deferred tax assets	$ 2,072					$ 2,827
Deferred tax liabilities	(201)					(989)
	$ 1,871					$ 1,838

The tax loss carryforwards amount of deferred tax assets relates to losses in our Caribbean, Canadian and Japanese operations. Deferred tax assets of $19 million were recognized at October 31, 2017 (October 31, 2016 – $32 million) in respect of tax losses incurred in current or preceding years for which recognition is dependent on the projection of future taxable profits. Management's forecasts support the assumption that it is probable that the results of future operations will generate sufficient taxable income to utilize the deferred tax assets. The forecasts rely on continued liquidity and capital support to our business operations, including tax planning strategies implemented in relation to such support.

As at October 31, 2017, unused tax losses, tax credits and deductible temporary differences of $387 million, $582 million and $40 million (October 31, 2016 – $372 million, $541 million and $3 million) available to be offset against potential tax adjustments or future taxable income were not recognized as deferred tax assets. This amount includes unused tax losses of $2 million which expire within one year (October 31, 2016 – $26 million), $4 million which expire in two to four years (October 31, 2016 – $3 million) and $381 million which expire after four years (October 31, 2016 – $343 million). There are $7 million of tax credits that will expire in one year (October 31, 2016 - $nil), $92 million that will expire in two to four years (October 31, 2016 – $73 million) and $483 million that will expire after four years (October 31, 2016 – $468 million). In addition, there are deductible temporary differences of $1 million that will expire in two to four years (October 31, 2016 – $nil) and $39 million that will expire after four years (October 31, 2016 – $3 million).

The amount of temporary differences associated with investments in subsidiaries, branches and associates and interests in joint ventures for which deferred tax liabilities have not been recognized in the parent bank is $13.5 billion as at October 31, 2017 (October 31, 2016 – $11.7 billion).

Tax examinations and assessments

During the year, we received proposal letters (the Proposals) from the Canada Revenue Agency (CRA), in respect of the 2012 taxation year, which suggest that Royal Bank of Canada owes additional income taxes of approximately $250 million, excluding interest, as the tax deductibility of certain dividends was denied on the basis that they were part of a "dividend rental arrangement". This Proposal is consistent with reassessments also received during the year for approximately $209 million of additional income tax and interest for taxation year 2011 and approximately $225 million of tax and interest reassessments received last year for taxation years 2010 and 2009 in respect of the same matter.

The dividends to which the Proposals and reassessments relate were received in transactions similar to those addressed in the 2015 Canadian Federal Budget, which disallowed deduction of these dividends from similar arrangements with prospective application effective May 1, 2017. It is possible that the CRA will reassess us for significant additional income tax for subsequent years on the same basis. We are confident that our tax filing position was appropriate and intend to defend ourselves vigorously.

Note 24 Earnings per share

	For the year ended	
(Millions of Canadian dollars, except share and per share amounts)	**October 31 2017**	October 31 2016
Basic earnings per share		
Net Income	**$ 11,469**	$ 10,458
Preferred share dividends	**(300)**	(294)
Net income attributable to non-controlling interest	**(41)**	(53)
Net income available to common shareholders	**11,128**	10,111
Weighted average number of common shares (in thousands)	**1,466,988**	1,485,876
Basic earnings per share (in dollars)	**$ 7.59**	$ 6.80
Diluted earnings per share		
Net income available to common shareholders	**$ 11,128**	$ 10,111
Dilutive impact of exchangeable shares	**15**	15
Net income available to common shareholders including dilutive impact of exchangeable shares	**11,143**	10,126
Weighted average number of common shares (in thousands)	**1,466,988**	1,485,876
Stock options (1)	**3,273**	3,329
Issuable under other share-based compensation plans	**744**	731
Exchangeable shares (2)	**3,416**	4,201
Average number of diluted common shares (in thousands)	**1,474,421**	1,494,137
Diluted earnings per share (in dollars)	**$ 7.56**	$ 6.78

(1) The dilutive effect of stock options was calculated using the treasury stock method. When the exercise price of options outstanding is greater than the average market price of our common shares, the options are excluded from the calculation of diluted earnings per share. For the year ended October 31, 2017, no outstanding options were excluded from the calculation of diluted earnings per share. For the year ended October 31, 2016, an average of 802,371 outstanding options with an average exercise price of $78.58 were excluded from the calculation of diluted earnings per share.

(2) Includes exchangeable preferred shares and trust capital securities.

Note 25 Guarantees, commitments, pledged assets and contingencies

Guarantees and commitments

We use guarantees and other off-balance sheet credit instruments to meet the financing needs of our clients.

The table below summarizes our maximum exposure to credit losses related to our guarantees and commitments provided to third parties. The maximum exposure to credit risk relating to a guarantee is the maximum risk of loss if there was a total default by the guaranteed parties, without consideration of possible recoveries under recourse provisions, insurance policies or from collateral held or pledged. The maximum exposure to credit risk relating to a commitment to extend credit is the full amount of the commitment. In both cases, the maximum risk exposure is significantly greater than the amount recognized as a liability in our Consolidated Balance Sheets.

	Maximum exposure to credit losses	
	As at	
(Millions of Canadian dollars)	**October 31 2017**	October 31 2016
Financial guarantees		
Financial standby letters of credit	**$ 18,746**	$ 18,886
Commitments to extend credit		
Backstop liquidity facilities	**38,939**	38,910
Credit enhancements	**2,261**	2,598
Documentary and commercial letters of credit	**286**	232
Other commitments to extend credit	**186,971**	181,491
Other credit-related commitments		
Securities lending indemnifications	**101,844**	90,230
Performance guarantees	**6,579**	6,844
Other	**154**	50

Our credit review process, our policy for requiring collateral security, and the types of collateral security held are generally the same for guarantees and commitments as for loans. Our clients generally have the right to request settlement of, or draw on, our guarantees and commitments within one year. However, certain guarantees can only be drawn if specified conditions are met. These conditions, along with collateral requirements, are described below. We believe that it is highly unlikely that all or substantially all of the guarantees and commitments will be drawn or settled within one year, and contracts may expire without being drawn or settled.

Financial guarantees

Financial standby letters of credit

Financial standby letters of credit represent irrevocable assurances that we will make payments in the event that a client cannot meet its payment obligations to the third party. For certain guarantees, the guaranteed party can request payment from us even though the client has not defaulted on its obligations. The term of these guarantees generally have a term of 8 years.

Our policy for requiring collateral security with respect to these instruments and the types of collateral security held is generally the same as for loans. When collateral security is taken, it is determined on an account-by-account basis according to the risk of the borrower and the specifics of the transaction. Collateral security may include cash, securities and other assets pledged.

Commitments to extend credit

Backstop liquidity facilities

Backstop liquidity facilities are provided to ABCP conduit programs administered by us and third parties as an alternative source of financing in the event that such programs are unable to access commercial paper markets, or in limited circumstances, when predetermined performance measures of the financial assets owned by these programs are not met. The average remaining term of these liquidity facilities is approximately four years.

Backstop liquidity facilities are also provided to non-asset backed programs such as variable rate demand notes issued by third parties. These standby facilities provide liquidity support to the issuer to buy the notes if the issuer is unable to remarket the notes, as long as the instrument and/or the issuer maintains the investment grade rating.

The terms of the backstop liquidity facilities do not require us to advance money to these programs in the event of bankruptcy or insolvency and generally do not require us to purchase non-performing or defaulted assets.

Credit enhancements

We provide partial credit enhancement to multi-seller ABCP programs administered by us to protect commercial paper investors in the event that the collections on the underlying assets together with the transaction-specific credit enhancements or the liquidity facilities prove to be insufficient to pay for maturing commercial paper. Each of the asset pools is structured to achieve a high investment-grade credit profile through credit enhancements from us and other third parties related to each transaction. The average remaining term of these credit facilities is approximately three years.

Documentary and commercial letters of credit

Documentary and commercial letters of credit, which are written undertakings by us on behalf of a client authorizing a third party to draw drafts on us up to a stipulated amount under specific terms and conditions, where some are collateralized based on the underlying agreement with the client and others are collateralized by cash deposits or other assets of the third party which may include the underlying shipment of goods to which they relate.

Other commitments to extend credit

Commitments to extend credit represent unused portions of authorizations to extend credit in the form of loans, bankers' acceptances or letters of credit where we do not have the ability to unilaterally withdraw the credit extended to the borrower.

Other credit-related commitments

Securities lending indemnifications

In securities lending transactions, we act as an agent for the owner of a security, who agrees to lend the security to a borrower for a fee, under the terms of a pre-arranged contract. The borrower must fully collateralize the security loaned at all times. As part of this custodial business, an indemnification may be provided to securities lending customers to ensure that the fair value of securities loaned will be returned in the event that the borrower fails to return the borrowed securities and the collateral held is insufficient to cover the fair value of those securities. These indemnifications normally terminate without being drawn upon. The term of these indemnifications varies, as the securities loaned are recallable on demand. Collateral held for our securities lending transactions typically includes cash, securities that are issued or guaranteed by the Canadian government, U.S. government or other OECD countries or high quality debt or equity instruments.

Performance guarantees

Performance guarantees represent irrevocable assurances that we will make payments to third-party beneficiaries in the event that a client fails to perform under a specified non-financial contractual obligation. Such obligations typically include works and service contracts, performance bonds, and warranties related to international trade. The term of these guarantees can range up to eight years.

Our policy for requiring collateral security with respect to these instruments and the types of collateral security held is generally the same as for loans. When collateral security is taken, it is determined on an account-by-account basis according to the risk of the borrower and the specifics of the transaction. Collateral security may include cash, securities and other assets pledged.

Indemnifications

In the normal course of our operations, we provide indemnifications which are often standard contractual terms to counterparties in transactions such as purchase and sale contracts, fiduciary, agency, licensing, custodial and service agreements, clearing system arrangements, participation as a member of exchanges, director/officer contracts and leasing transactions. These indemnification agreements may require us to compensate the counterparties for costs incurred as a result of changes in laws and regulations (including tax legislation) or as a result of litigation claims or statutory sanctions that may be suffered by the counterparty as a consequence of the transaction. The terms of these indemnification agreements vary based on the contract. The nature of the indemnification agreements prevents us from making a reasonable estimate of the maximum potential amount we could be required to pay to counterparties. Historically, we have not made any significant payments under such indemnifications.

Uncommitted amounts

Uncommitted amounts represent undrawn credit facilities for which we have the ability to unilaterally withdraw the credit extended to the borrower. These include both retail and commercial commitments. As at October 31, 2017, the total balance of uncommitted amounts was $260 billion (October 31, 2016 – $271 billion[1]).

Other commitments

We act as underwriter for certain new issuances under which we alone or together with a syndicate of financial institutions purchase the new issue for resale to investors. In connection with these activities, our commitments were $38 million as at October 31, 2017, (October 31, 2016 – $540 million).

We invest in private companies, directly or through third party investment funds, including Small Business Investment Companies, real estate funds and Low Income Housing Tax Credit funds. These funds are generally structured as closed-end limited partnerships wherein we hold a limited partner interest. For the year ended October 31, 2017, we have unfunded commitments of CAD $937 million (October 31, 2016 – $898 million) representing the aggregate amount of cash we are obligated to be contributed as capital to these partnerships under the terms of the relevant contracts.

Pledged assets and collateral

In the ordinary course of business, we pledge assets and enter in collateral agreements with terms and conditions that are usual and customary to our regular lending, borrowing and trading activities recorded on our Consolidated Balance Sheets. The following are examples of our general terms and conditions on pledged assets and collateral:

- The risks and rewards of the pledged assets reside with the pledgor.
- The pledged asset is returned to the pledgor when the necessary conditions have been satisfied.
- The right of the pledgee to sell or re-pledge the asset is dependent on the specific agreement under which the collateral is pledged.
- If there is no default, the pledgee must return the comparable asset to the pledgor upon satisfaction of the obligation.

We are also required to provide intraday pledges to the Bank of Canada when we use the Large Value Transfer System (LVTS), which is a real-time electronic wire transfer system that continuously processes all Canadian dollar large-value or time-critical payments throughout the day. The pledged assets earmarked for LVTS activities are normally released back to us at the end of the settlement cycle each day. Therefore, the pledged assets amount is not included in the table below. For the year ended October 31, 2017, we had on average $3.7 billion of assets pledged intraday to the Bank of Canada on a daily basis (October 31, 2016 – $3.4 billion). There are infrequent occasions where we are required to take an overnight advance from the Bank of Canada to cover a settlement requirement, in which case an equivalent value of the pledged assets would be used to secure the advance. There were no overnight advances taken on October 31, 2017 and October 31, 2016.

(1) Amounts have been revised from those previously presented.

Details of assets pledged against liabilities and collateral assets held or re-pledged are shown in the following tables:

(Millions of Canadian dollars)	As at October 31 2017	As at October 31 2016
Sources of pledged assets and collateral		
Bank assets		
Cash and due from banks	**$ 6**	$ –
Loans	**83,141**	85,351
Securities	**60,708**	55,479
Other assets	**19,520**	23,307
	163,375	164,137
Client assets (1)		
Collateral received and available for sale or re-pledging (2)	**298,470**	250,181
Less: not sold or re-pledged (2)	**(82,522)**	(69,631)
	215,948	180,550
	$ 379,323	$ 344,687
Uses of pledged assets and collateral		
Securities lent (2)	**$ 31,635**	$ 25,187
Securities borrowed (2)	**48,929**	34,817
Obligations related to securities sold short	**30,008**	50,369
Obligations related to securities lent or sold under repurchase agreements (2)	**139,536**	102,229
Securitization	**43,346**	43,502
Covered bonds	**38,504**	40,293
Derivative transactions	**22,134**	29,183
Foreign governments and central banks	**3,298**	1,574
Clearing systems, payment systems and depositories	**2,916**	3,521
Other	**19,017**	14,012
	$ 379,323	$ 344,687

(1) Primarily relates to Obligations related to securities lent or sold under repurchase agreements, Securities lent and Derivative transactions.
(2) Amounts have been revised from those previously presented.

Lease commitments

Finance lease commitments

We lease computer equipment from third parties under finance lease arrangements. The leases have various terms, escalation and renewal rights. The future minimum lease payments under the finance leases are as follows:

(Millions of Canadian dollars)	As at October 31, 2017 Total future minimum lease payments	Future interest charges	Present value of finance lease commitments	As at October 31, 2016 Total future minimum lease payments	Future interest charges	Present value of finance lease commitments
Future minimum lease payments						
No later than one year	**$ 17**	**$ (2)**	**$ 15**	$ 21	$ (2)	$ 19
Later than one year and no later than five years	**21**	**(2)**	**19**	20	(2)	18
	$ 38	**$ (4)**	**$ 34**	$ 41	$ (4)	$ 37

The net carrying amount of computer equipment held under finance lease as at October 31, 2017 was $44 million (October 31, 2016 – $47 million).

Operating lease commitments

We are obligated under a number of non-cancellable operating leases for premises and equipment. These leases have various terms, escalation and renewal rights. The lease agreements do not include any clauses that impose any restriction on our ability to pay dividends, engage in debt financing transactions, or enter into further lease agreements. The minimum future lease payments under non-cancellable operating leases are as follows.

	As at			
	October 31, 2017		October 31, 2016	
(Millions of Canadian dollars)	Land and buildings	Equipment	Land and buildings	Equipment
Future minimum lease payments				
No later than one year	$ 643	$ 94	$ 662	$ 70
Later than one year and no later than five years	2,006	192	1,993	206
Later than five years	2,868	–	2,140	–
	5,517	286	4,795	276
Less: Future minimum sublease payments to be received	(21)	–	(24)	–
Net future minimum lease payments	$ 5,496	$ 286	$ 4,771	$ 276

Note 26 Legal and regulatory matters

We are a large global institution that is subject to many different complex legal and regulatory requirements that continue to evolve. We are and have been subject to a variety of legal proceedings, including civil claims and lawsuits, regulatory examinations, investigations, audits and requests for information by various governmental regulatory agencies and law enforcement authorities in various jurisdictions. Some of these matters may involve novel legal theories and interpretations and may be advanced under criminal as well as civil statutes, and some proceedings could result in the imposition of civil, regulatory enforcement or criminal penalties. We review the status of all proceedings on an ongoing basis and will exercise judgment in resolving them in such manner as we believe to be in our best interest. This is an area of significant judgment and uncertainty and the extent of our financial and other exposure to these proceedings after taking into account current accruals could be material to our results of operations in any particular period. The following is a description of our significant legal proceedings.

LIBOR regulatory investigations and litigation

Various regulators and competition and enforcement authorities around the world, including in Canada, the United Kingdom, and the U.S., are conducting investigations related to certain past submissions made by panel banks in connection with the setting of the U.S. dollar London interbank offered rate (LIBOR). These investigations focus on allegations of collusion between the banks that were on the panel to make submissions for certain LIBOR rates. Royal Bank of Canada is a member of certain LIBOR panels, including the U.S. dollar LIBOR panel, and has in the past been the subject of regulatory requests for information. In addition, Royal Bank of Canada and other U.S. dollar panel banks have been named as defendants in private lawsuits filed in the U.S. with respect to the setting of LIBOR including a number of class action lawsuits which have been consolidated before the U.S. District Court for the Southern District of New York. The complaints in those private lawsuits assert claims against us and other panel banks under various U.S. laws, including U.S. antitrust laws, the U.S. Commodity Exchange Act, and state law. On December 20, 2016, the U.S. District Court for the Southern District of New York dismissed a substantial portion of the consolidated LIBOR class action on jurisdictional grounds and lack of standing. Based on the facts currently known, it is not possible at this time for us to predict the ultimate outcome of these investigations or proceedings or the timing of their resolution.

Royal Bank of Canada Trust Company (Bahamas) Limited proceedings

On April 13, 2015, a French investigating judge notified Royal Bank of Canada Trust Company (Bahamas) Limited (RBC Bahamas) of the issuance of an *ordonnance de renvoi* referring RBC Bahamas and other unrelated persons to the French *tribunal correctionnel* to face the charge of complicity in estate tax fraud relating to actions taken relating to a trust for which RBC Bahamas serves as trustee. RBC Bahamas believes that its actions did not violate French law and contested the charge in the French court. On January 12, 2017, the French court acquitted all parties including RBC Bahamas. The French prosecutor's office has appealed. The appeal is currently scheduled to be heard commencing on March 2, 2018.

On October 28, 2016, Royal Bank of Canada was granted an exemption by the U.S. Department of Labor that will allow Royal Bank of Canada and its current and future affiliates to continue to qualify for the Qualified Professional Asset Manager exemption under the Employee Retirement Income Security Act despite any potential conviction of RBC Bahamas in the French proceeding for a temporary one year period from the date of conviction. An application to grant more lengthy exemptive relief is pending.

RBC Bahamas continues to review the trustee's and the trust's legal obligations, including liabilities and potential liabilities under applicable tax and other laws. Based on the facts currently known, it is not possible at this time to predict the ultimate outcome of these matters; however, we believe that the ultimate resolution will not have a material effect on our consolidated financial position, although it may be material to our results of operations in the period it occurs.

Interchange fees litigation

Since 2011, seven proposed class actions have been commenced in Canada: *Bancroft-Snell v. Visa Canada Corporation, et al., 9085-4886 Quebec Inc. v. Visa Canada Corporation, et al., Coburn and Watson's Metropolitan Home v. Bank of America Corporation, et al. (Watson), Macaronies Hair Club and Laser Centre Inc. v. BofA Canada Bank, et al., 1023926 Alberta Ltd. v. Bank of America Corporation, et al., The Crown & Hand Pub Ltd. v. Bank of America Corporation, et al., and Hello Baby Equipment Inc. v. BofA Canada Bank, et al.* The defendants in each action are VISA Canada Corporation (Visa), MasterCard International Incorporated (MasterCard), Royal Bank of Canada and other financial institutions. The plaintiff class members are Canadian merchants who accept Visa and/or MasterCard branded credit cards for payment. The actions allege, among other things, that from March 2001 to the present, Visa and MasterCard conspired with their issuing banks and acquirers to set default interchange rates and merchant discount fees and that certain rules (Honour All Cards and No Surcharge) have the effect of increasing the merchant discount fees. The actions include claims of civil conspiracy, breach of the *Competition Act*, interference with economic relations and unjust enrichment. The claims seek unspecified general and punitive damages. In *Watson*, a decision to partially certify the action as a class proceeding was released on March 27, 2014, and was appealed. On August 19, 2015, the British Columbia Court of Appeal struck the plaintiff class representative's cause of action under section 45 of the *Competition Act* and reinstated the plaintiff class representative's cause of action

in civil conspiracy by unlawful means, among other rulings. In October 2016, the trial court in *Watson* denied a motion by the plaintiff to revive the stricken section 45 *Competition Act* claim, and also denied the plaintiff's motion to add new causes of action. The plaintiff class representative has now appealed that decision. The *Watson* proceeding has been set down for trial commencing September 2018. Based on the facts currently known, it is not possible at this time for us to predict the ultimate outcome of this proceeding or the timing of its resolution.

Foreign exchange matters

Various regulators are conducting inquiries regarding potential violations of antitrust law by a number of banks, including Royal Bank of Canada, regarding foreign exchange trading. On March 3, 2017, the Brazilian civil antitrust authority Administrative Council for Economic Defense (CADE) initiated a civil administrative proceeding against the Royal Bank of Canada and certain other financial institutions and individuals.

Beginning in 2015, putative class actions were brought against Royal Bank of Canada and/or RBC Capital Markets, LLC in the United States and Canada. These actions were each brought against multiple foreign exchange dealers and allege, among other things, collusive behaviour in global foreign exchange trading. In September 2017, the US District Court entered an order preliminarily approving RBC Capital Market's pending settlement with class plaintiffs. A hearing on the fairness of the proposed settlements is currently scheduled by the US District Court for May 2018. RBC denies liability in connection with the proposed settlement. The Canadian class actions and one other US action that is purportedly brought on behalf of different classes of plaintiffs remain pending.

In its discretion RBC may choose to resolve claims, litigations, or similar matters at any time. Based on the facts currently known, it is not possible at this time to predict the ultimate outcome of the Foreign Exchange Matters or the timing of their ultimate resolution.

Panama Papers inquiries

Following media reports on the contents of files misappropriated from a Panamanian-based law firm, Mossack Fonseca & Co about special purpose entities associated with that firm, regulatory, tax and enforcement authorities are conducting inquiries. The inquiries focus on, among other issues, the potential use of such entities by third parties to avoid tax and disclosure obligations. Royal Bank of Canada has received, and is responding to, information and document requests by a number of such authorities.

Inquiries on sales practices

We have received inquiries about our sales practices and related compensation arrangements. In addition, in March 2017, the Financial Consumer Agency of Canada announced that it will begin a review of sales practices in the Canadian federally regulated financial sector. The Office of the Superintendent of Financial Institutions is also involved in conducting this joint sales practices review.

Other matters

We are a defendant in a number of other actions alleging that certain of our practices and actions were improper. The lawsuits involve a variety of complex issues and the timing of their resolution is varied and uncertain. Management believes that we will ultimately be successful in resolving these lawsuits, to the extent that we are able to assess them, without material financial impact to the Bank. This is, however, an area of significant judgment and the potential liability resulting from these lawsuits could be material to our results of operations in any particular period.

Various other legal proceedings are pending that challenge certain of our other practices or actions. While this is an area of significant judgment and some matters are currently inestimable, we consider that the aggregate liability, to the extent that we are able to assess it, resulting from these other proceedings will not be material to our consolidated financial position or results of operations.

Note 27 Contractual repricing and maturity schedule

The following table details our exposure to interest rate risk. The carrying amounts of financial assets and financial liabilities are reported below based on the earlier of their contractual repricing date or maturity date.

The following table does not incorporate management's expectation of future events where expected repricing or maturity dates differ significantly from the contractual dates. We incorporate these assumptions in the management of interest rate risk exposure. These assumptions include expected repricing of trading instruments and certain loans and deposits. Taking into account these assumptions on the consolidated contractual repricing and maturity schedule at October 31, 2017, would result in a change in the under-one-year gap from $7.0 billion to $84.4 billion.

	As at October 31, 2017							
(Millions of Canadian dollars)	Immediately interest rate-sensitive	Under 3 months	3 to 6 months	6 to 12 months	1 to 5 years	Over 5 years	Non-rate-sensitive	Total
Assets								
Cash and deposits with banks	$ 13,422	$ 42,857	$ 34	$ 59	$ 471	$ 30	$ 4,196	$ 61,069
Trading securities	1	27,713	6,751	12,393	17,966	31,429	31,404	127,657
Available-for-sale securities	–	29,494	3,084	2,302	27,510	27,116	1,216	90,722
Assets purchased under reverse repurchase agreements and securities borrowed	2,351	192,206	19,017	4,712	1,938	–	753	220,977
Loans (net of allowance for loan losses)	133,500	128,786	21,921	41,583	193,244	17,701	5,882	542,617
Derivatives	95,023	–	–	–	–	–	–	95,023
Segregated fund net assets	–	–	–	–	–	–	1,216	1,216
Other assets	3	19,477	–	–	–	95	53,997	73,572
	$ 244,300	$ 440,533	$ 50,807	$ 61,049	$ 241,129	$ 76,371	$ 98,664	$ 1,212,853
Liabilities								
Deposits	$ 300,077	$ 155,964	$ 23,745	$ 53,600	$ 108,687	$ 16,785	$ 130,777	$ 789,635
Obligations related to assets sold under repurchase agreements and securities loaned	3,381	133,809	4,366	–	–	–	1,528	143,084
Obligations related to securities sold short	–	2,227	1,164	966	8,288	13,813	3,550	30,008
Derivatives	92,127	–	–	–	–	–	–	92,127
Segregated fund net liabilities	–	–	–	–	–	–	1,216	1,216
Other liabilities	68	15,374	23	71	1,928	7,617	48,009	73,090
Subordinated debentures	–	224	224	–	6,776	2,041	–	9,265
Non-controlling interests	–	–	–	511	–	–	88	599
Shareholders' equity	–	200	800	750	4,525	–	67,554	73,829
	$ 395,653	$ 307,798	$ 30,322	$ 55,898	$ 130,204	$ 40,256	$ 252,722	$ 1,212,853
Total gap	$ (151,353)	$ 132,735	$ 20,485	$ 5,151	$ 110,925	$ 36,115	$ (154,058)	$ –
Canadian dollar	$ (77,711)	$ 28,201	$ 6,076	$ 10,636	$ 130,947	$ (2,071)	$ (96,078)	$ –
Foreign currency	(73,642)	104,534	14,409	(5,485)	(20,022)	38,186	(57,980)	–
Total gap	$ (151,353)	$ 132,735	$ 20,485	$ 5,151	$ 110,925	$ 36,115	$ (154,058)	$ –

Note 28 Related party transactions

Related parties

Related parties include associated companies, post-employment benefit plans for the benefit of our employees, key management personnel (KMP), the Board of Directors (Directors), close family members of KMP and Directors, and entities which are, directly or indirectly, controlled by, jointly controlled by or significantly influenced by KMP, Directors or their close family members.

Key management personnel and Directors

KMP are defined as those persons having authority and responsibility for planning, directing and controlling our activities, directly or indirectly. They include the senior members of our organization called the Group Executive. The Group Executive is comprised of the President and Chief Executive Officer and individuals that report directly to him, including the Chief Administrative Officer, Chief Financial Officer, Chief Human Resources Officer, Group Chief Risk Officer, Chief Strategy & Corporate Development Officer, and Group Heads for Wealth Management and Insurance, Capital Markets and Investor & Treasury Services, Technology & Operations, and Personal & Commercial Banking. The Directors do not plan, direct, or control the activities of the entity; they oversee the management of the business and provide stewardship.

Compensation of key management personnel and Directors

	For the year ended	
(Millions of Canadian dollars)	October 31 2017	October 31 2016
Salaries and other short-term employee benefits (1)	$ 33	$ 26
Post-employment benefits (2)	2	2
Share-based payments	37	41
	$ 72	$ 69

(1) Includes the portion of the annual variable short-term incentive bonus that certain executives elected to receive in the form of DSUs. Refer to Note 22 for further details. Directors receive retainers but do not receive salaries and other short-term employee benefits.

(2) Directors do not receive post-employment benefits.

Note 28 Related party transactions (continued)

Stock options, stock awards and shares held by key management personnel, Directors and their close family members

(Millions of Canadian dollars, except number of units)	As at October 31, 2017 No. of units held	October 31, 2017 Value	As at October 31, 2016 No. of units held	October 31, 2016 Value
Stock options (1)	2,174,841	$ 60	2,110,038	$ 42
Other non-option stock based awards (1)	1,371,104	138	1,703,221	143
RBC common and preferred shares	632,631	64	789,295	66
	4,178,576	$ 262	4,602,554	$ 251

(1) Directors do not receive stock options or any other non-option stock based awards.

Transactions, arrangements and agreements involving key management personnel, Directors and their close family members

In the normal course of business, we provide certain banking services to KMP, Directors, and their close family members. These transactions were made on substantially the same terms, including interest rates and security, as for comparable transactions with persons of a similar standing and did not involve more than the normal risk of repayment or present other unfavourable features.

As at October 31, 2017, total loans to KMP, Directors and their close family members were $10 million (October 31, 2016 – $10 million). We have no allowance or provision for credit losses relating to these loans as at and for the years ended October 31, 2017 and October 31, 2016. No guarantees, pledges or commitments have been given to KMP, Directors or their close family members.

Joint ventures and associates

In the normal course of business, we provide certain banking and financial services to our joint ventures and associates, including loans, interest and non-interest bearing deposits. These transactions meet the definition of related party transactions and were made on substantially the same terms as for comparable transactions with third parties.

As at October 31, 2017, loans to joint ventures and associates were $200 million (October 31, 2016 – $71 million) and deposits from joint ventures and associates were $123 million (October 31, 2016 – $25 million). We have no allowance or provision for credit losses relating to loans to joint ventures and associates as at and for the years ended October 31, 2017 and October 31, 2016. $1 million of guarantees have been given to joint ventures and associates for the year ended October 31, 2017 (October 31, 2016 – $nil).

Other transactions, arrangements or agreements involving joint ventures and associates

(Millions of Canadian dollars)	As at or for the year ended October 31 2017	October 31 2016
Commitments and other contingencies	$ 870	$ 554
Other fees received for services rendered	40	40
Other fees paid for services received	182	189

Note 29 Results by business segment

Composition of business segments

For management purposes, based on the products and services offered, we are organized into five business segments: Personal & Commercial Banking, Wealth Management, Insurance, Investor & Treasury Services and Capital Markets.

Personal & Commercial Banking is comprised of our personal and business banking operations, and our auto financing and retail investment businesses including our online discount brokerage channel and operates through four business lines: Personal Financial Services, Business Financial Services, Cards and Payment Solutions (Canadian Banking), and Caribbean & U.S. Banking. In Canada, we provide a broad suite of financial products and services through our extensive branch, automated teller machines, online, mobile and telephone banking networks, as well as through a large number of proprietary sales professionals. In the Caribbean, we offer a broad range of financial products and services to individuals, business clients and public institutions in targeted markets. In the U.S., we serve the cross-border banking needs of Canadian clients within the U.S. through online channels.

Wealth Management is comprised of Canadian Wealth Management, U.S. Wealth Management (including City National), International Wealth Management and Global Asset Management. We serve affluent, high net worth (HNW) and ultra-high net worth clients (UHNW) in key financial centres mainly in Canada, the U.S., the U.K., the Channel Islands and Asia with a comprehensive suite of investment, trust, banking, credit and other wealth management solutions. We also provide asset management products and services directly to institutional and individual clients through our distribution channels and third-party distributors.

Insurance is comprised of our insurance operations in Canada and globally and operates under two business lines: Canadian Insurance and International Insurance, providing a wide range of life, health, home, auto, travel, wealth, group and reinsurance products and solutions. In Canada, we offer our products and services through our proprietary distribution channels, comprised of the field sales force which includes retail insurance branches, our field sales representatives, advice centers and online, as well as through independent insurance advisors and affinity relationships. Outside Canada, we operate in reinsurance markets globally offering life, accident and annuity reinsurance products.

Investor & Treasury Services is a specialist provider of asset services, custody, payments and treasury services for financial and other institutional investors worldwide. We also provide Canadian dollar cash management, correspondent banking and trade finance for financial institutions globally and short-term funding and liquidity management for RBC.

Capital Markets provides public and private companies, institutional investors, governments and central banks globally with a wide range of capital markets products and services across our two main business lines: Corporate and Investment Banking and Global Markets. In North America, we offer a full suite of products and services which include corporate and investment banking, equity and debt origination and distribution, and structuring and trading. Outside North America, we have a select presence in the U.K., Europe, and Other International, where

we offer a diversified set of capabilities in our key sectors of expertise such as energy, mining and infrastructure and we have a growing presence in industrial, consumer and health care in Europe.

All other enterprise level activities that are not allocated to these five business segments, such as enterprise funding, securitizations, net charges associated with unattributed capital, and consolidation adjustments, including the elimination of the Taxable equivalent basis (Teb) gross-up amounts, are included in Corporate Support. Teb adjustments gross up income from certain tax-advantaged sources from Canadian taxable corporate dividends and U.S. tax credit investments recorded in Capital Markets to their effective tax equivalent value with the corresponding offset recorded in the provision for income taxes. Management believes that these Teb adjustments are necessary for Capital Markets to reflect how it is managed and enhances the comparability of revenue across our taxable and tax-advantaged sources. Our use of Teb adjustments may not be comparable to similarly adjusted amounts at other financial institutions. The Teb adjustment for the year ended October 31, 2017 was $548 million (October 31, 2016 – $736 million).

Geographic segments

For geographic reporting, our segments are grouped into Canada, United States and Other International. Transactions are primarily recorded in the location that best reflects the risk due to negative changes in economic conditions and prospects for growth due to positive economic changes. This location frequently corresponds with the location of the legal entity through which the business is conducted and the location of our clients. Transactions are recorded in the local currency and are subject to foreign exchange rate fluctuations with respect to the movement in the Canadian dollar.

Management reporting framework

Our management reporting framework is intended to measure the performance of each business segment as if it were a stand-alone business and reflects the way our business segments are managed. This approach is intended to ensure that our business segment results reflect all relevant revenue and expenses associated with the conduct of each business. We regularly monitor these segment results for the purpose of making decisions about resource allocation and performance assessment. These items do not impact our consolidated results.

The expenses in each business segment may include costs or services directly incurred or provided on their behalf at the enterprise level. For other costs not directly attributable to one of our business segments, we use a management reporting framework that uses assumptions, estimates and methodologies for allocating overhead costs and indirect expenses to our business segments and that assists in the attribution of capital and the transfer pricing of funds to our business segments in a manner that fairly and consistently measures and aligns the economic costs with the underlying benefits and risks of that specific business segment. Activities and business conducted between our business segments are generally at market rates. All other enterprise level activities that are not allocated to our five business segments are reported under Corporate Support.

Our assumptions and methodologies used in our management reporting framework are periodically reviewed by us to ensure that they remain valid. The capital attribution methodologies involve a number of assumptions and estimates that are revised periodically.

Note 29 Results by business segment (continued)

(Millions of Canadian dollars)	Personal & Commercial Banking	Wealth Management (1)	Insurance	Investor & Treasury Services	Capital Markets (2)	Corporate Support (2)	Total	Canada	United States	Other International
	For the year ended October 31, 2017									
Net interest income (3) (4)	$ 10,787	$ 2,248	$ –	$ 679	$ 3,565	$ (139)	$ 17,140	$ 11,965	$ 3,572	$ 1,603
Non-interest income (3) (5)	5,076	7,827	4,566	1,756	4,617	(313)	23,529	12,701	5,606	5,222
Total revenue (5)	15,863	10,075	4,566	2,435	8,182	(452)	40,669	24,666	9,178	6,825
Provision for credit losses	1,054	34	–	–	62	–	1,150	951	107	92
Insurance policyholder benefits, claims and acquisition expense	–	–	3,053	–	–	–	3,053	1,793	–	1,260
Non-interest expense (5)	7,176	7,611	584	1,466	4,719	238	21,794	11,219	6,889	3,686
Net income (loss) before income taxes	7,633	2,430	929	969	3,401	(690)	14,672	10,703	2,182	1,787
Income taxes (recoveries)	1,878	592	203	228	876	(574)	3,203	2,472	468	263
Net income	$ 5,755	$ 1,838	$ 726	$ 741	$ 2,525	$ (116)	$ 11,469	$ 8,231	$ 1,714	$ 1,524
Non-interest expense includes:										
Depreciation and amortization	$ 582	$ 526	$ 33	$ 105	$ 352	$ 17	$ 1,615	$ 959	$ 465	$ 191
Impairment of other intangibles	–	–	–	–	–	2	2	2	–	–
Restructuring provisions	–	–	–	–	–	–	–	–	–	–
Total assets	$ 433,532	$ 89,493	$ 15,122	$ 133,126	$ 506,118	$ 35,462	$ 1,212,853	$ 644,292	$ 323,895	$ 244,666
Total assets include:										
Additions to premises and equipment and intangibles	$ 331	$ 269	$ 43	$ 74	$ 296	$ 485	$ 1,498	$ 1,021	$ 321	$ 156
Total liabilities	$ 433,554	$ 89,571	$ 15,172	$ 132,987	$ 505,952	$ (38,811)	$ 1,138,425	$ 569,889	$ 323,911	$ 244,625

(Millions of Canadian dollars)	Personal & Commercial Banking	Wealth Management (1)	Insurance	Investor & Treasury Services	Capital Markets (2)	Corporate Support (2)	Total	Canada	United States	Other International
	For the year ended October 31, 2016									
Net interest income (3) (4)	$ 10,337	$ 1,955	$ –	$ 825	$ 3,804	$ (390)	$ 16,531	$ 11,685	$ 3,241	$ 1,605
Non-interest income (3) (5)	4,675	7,048	5,151	1,446	4,146	(202)	22,264	12,357	5,045	4,862
Total revenue (5)	15,012	9,003	5,151	2,271	7,950	(592)	38,795	24,042	8,286	6,467
Provision for credit losses	1,122	48	1	(3)	327	51	1,546	1,231	254	61
Insurance policyholder benefits, claims and acquisition expense	–	–	3,424	–	–	–	3,424	2,304	–	1,120
Non-interest expense (5)	6,933	7,015	622	1,460	4,466	30	20,526	10,532	6,204	3,790
Net income (loss) before income taxes	6,957	1,940	1,104	814	3,157	(673)	13,299	9,975	1,828	1,496
Income taxes (recoveries)	1,773	467	204	201	887	(691)	2,841	2,158	397	286
Net income	$ 5,184	$ 1,473	$ 900	$ 613	$ 2,270	$ 18	$ 10,458	$ 7,817	$ 1,431	$ 1,210
Non-interest expense includes:										
Depreciation and amortization (6)	$ 547	$ 505	$ 31	$ 101	$ 348	$ 11	$ 1,543	$ 903	$ 455	$ 185
Impairment of other intangibles	–	–	–	–	–	3	3	3	–	–
Restructuring provisions	–	10	–	–	–	–	10	1	4	5
Total assets	$ 411,251	$ 91,901	$ 14,245	$ 139,701	$ 492,899	$ 30,261	$ 1,180,258	$ 614,834	$ 328,088	$ 237,336
Total assets include:										
Additions to premises and equipment and intangibles	$ 302	$ 2,532	$ 27	$ 63	$ 278	$ 386	$ 3,588	$ 849	$ 2,585	$ 154
Total liabilities	$ 411,320	$ 91,908	$ 14,281	$ 139,608	$ 493,044	$ (41,515)	$ 1,108,646	$ 543,072	$ 328,205	$ 237,369

(1) In Q1 2016, we changed the organizational structure of our Wealth Management operations resulting in a new operating segment, U.S. Wealth Management (including City National), representing our legacy U.S. Wealth Management operations and City National. This new operating segment is combined with our other Wealth Management operations as a single reportable segment because they have comparable products, regulatory frameworks, processes, customers and distribution channels, and show similar economic characteristics (such as pre-tax margin).

(2) Taxable equivalent basis.

(3) Inter-segment revenue and share of profits in joint ventures and associates are not material except as disclosed in Note 12.

(4) Interest revenue is reported net of interest expense as we rely primarily on net interest income as a performance measure.

(5) Effective Q4 2017, service fees and other costs incurred in association with certain commissions and fees earned are presented on a gross basis in non-interest expense. Comparative amounts have been reclassified to conform with this presentation.

(6) Amounts have been revised from those previously presented.

Note 30 Nature and extent of risks arising from financial instruments

We are exposed to credit, market and liquidity and funding risks as a result of holding financial instruments. Our risk measurement and objectives, policies and methodologies for managing these risks are disclosed in the shaded text along with those tables specifically marked with an asterisk (*) on pages 57 to 84 of the Management's Discussion and Analysis. These shaded text and tables are an integral part of these Consolidated Financial Statements.

Concentrations of credit risk exist if a number of our counterparties are engaged in similar activities, are located in the same geographic region or have comparable economic characteristics such that their ability to meet contractual obligations would be similarly affected by changes in economic, political or other conditions.

Concentrations of credit risk indicate the relative sensitivity of our performance to developments affecting a particular industry or geographic location. The amounts of credit exposure associated with certain of our on- and off-balance sheet financial instruments are summarized in the following table.

	As at October 31, 2017								
(Millions of Canadian dollars, except percentage amounts)	Canada	%	United States	%	Europe	%	Other International	%	Total
On-balance sheet assets other than derivatives (1)	$ 531,294	68%	$ 145,824	19%	$ 55,265	7%	$ 49,829	6%	$ 782,212
Derivatives before master netting agreements (2) (3)	14,915	9	24,530	15	118,469	72	5,661	4	163,575
	$ 546,209	58%	$ 170,354	18%	$ 173,734	18%	$ 55,490	6%	$ 945,787
Off-balance sheet credit instruments (4)									
Committed and uncommitted (5)	$ 297,690	61%	$ 136,465	28%	$ 32,934	7%	$ 21,729	4%	$ 488,818
Other	72,876	57	19,541	15	33,970	27	936	1	127,323
	$ 370,566	60%	$ 156,006	25%	$ 66,904	11%	$ 22,665	4%	$ 616,141

	As at October 31, 2016								
(Millions of Canadian dollars, except percentage amounts)	Canada	%	United States	%	Europe	%	Other International	%	Total
On-balance sheet assets other than derivatives (1)	$ 485,575	67%	$ 141,703	20%	$ 55,610	8%	$ 40,096	5%	$ 722,984
Derivatives before master netting agreements (2) (3)	19,393	9	23,091	11	167,084	76	7,950	4	217,518
	$ 504,968	54%	$ 164,794	17%	$ 222,694	24%	$ 48,046	5%	$ 940,502
Off-balance sheet credit instruments (4)									
Committed and uncommitted (5) (6)	$ 301,490	61%	$ 149,036	30%	$ 30,575	6%	$ 12,947	3%	$ 494,048
Other	62,725	54	18,236	16	34,032	29	1,017	1	116,010
	$ 364,215	60%	$ 167,272	27%	$ 64,607	11%	$ 13,964	2%	$ 610,058

(1) Includes assets purchased under reverse repurchase agreements and securities borrowed, loans and customers' liability under acceptances. The largest concentrations in Canada are Ontario at 50% (October 31, 2016 – 49%), the Prairies at 19% (October 31, 2016 – 20%), British Columbia and the territories at 15% (October 31, 2016 – 15%) and Quebec at 11% (October 31, 2016 – 11%). No industry accounts for more than 42% (October 31, 2016 – 36%) of total on-balance sheet credit instruments.

(2) A further breakdown of our derivative exposures by risk rating and counterparty type is provided in Note 8.

(3) Excludes credit derivatives classified as other than trading.

(4) Balances presented are contractual amounts representing our maximum exposure to credit risk.

(5) Represents our maximum exposure to credit risk. Retail and wholesale commitments respectively comprise 39% and 61% of our total commitments (October 31, 2016 – 42% and 58%). The largest concentrations in the wholesale portfolio relate to Financing products at 13% (October 31, 2016 – 14%), Sovereign at 10% (October 31, 2016 – 6%), Non-bank financial services at 9% (October 31, 2016 – 9%), Real estate & related at 9% (October 31, 2016 – 9%), and Utilities at 9% (October 31, 2016 – 8%).

(6) Amounts have been revised from those previously presented.

Note 31 Capital management

Regulatory capital and capital ratios

OSFI formally establishes risk-based capital and leverage targets for deposit-taking institutions in Canada. We are required to calculate our capital ratios using the Basel III framework. Under Basel III, regulatory capital includes Common Equity Tier 1 (CET1), Tier 1 and Tier 2 capital. CET1 capital mainly consists of common shares, retained earnings and other components of equity. Regulatory adjustments under Basel III include deductions of goodwill and other intangibles, certain deferred tax assets, defined benefit pension fund assets, investments in banking, financial and insurance entities, and the shortfall of provisions to expected losses. Tier 1 capital comprises predominantly CET1, with additional items that consist of capital instruments such as certain preferred shares, and certain non-controlling interests in subsidiaries. Tier 2 capital includes subordinated debentures that meet certain criteria and certain loan loss allowances. Total capital is the sum of CET1, additional Tier 1 capital and Tier 2 capital.

Regulatory capital ratios are calculated by dividing CET1, Tier 1 and Total capital by risk-weighted assets. The leverage ratio is calculated by dividing Tier 1 capital by an exposure measure. The exposure measure consists of total assets (excluding items deducted from Tier 1 capital) and certain off-balance sheet items converted into credit exposure equivalents. Adjustments are also made to derivatives and secured financing transactions to reflect credit and other risks.

Note 31 Capital management (continued)

During 2017, we complied with all capital and leverage requirements imposed by OSFI.

(Millions of Canadian dollars, except Capital ratios and leverage ratios)	As at October 31 2017	October 31 2016
Capital (1)		
Common Equity Tier 1 capital	$ 51,572	$ 48,181
Tier 1 capital	58,361	55,270
Total capital	67,556	64,950
Risk-weighted assets used in calculation of capital ratios (1) (2)		
Common Equity Tier 1 capital ratio	474,478	447,436
Tier 1 capital ratio	474,478	448,662
Total capital ratio	474,478	449,712
Total capital risk-weighted assets (1)		
Credit risk	376,519	369,751
Market risk	27,618	23,964
Operational risk	59,203	55,997
Regulatory floor adjustment (3)	11,138	–
	$ 474,478	$ 449,712
Capital ratios and leverage ratios (1) (4)		
Common Equity Tier 1 capital ratio	10.9%	10.8%
Tier 1 capital ratio	12.3%	12.3%
Total capital ratio	14.2%	14.4%
Leverage ratio	4.4%	4.4%
Leverage ratio exposure (billions)	$ 1,315.5	$ 1,265.1

(1) Capital, RWA, and capital ratios are calculated using OSFI Capital Adequacy Requirements based on the Basel III framework ("all-in" basis). The leverage ratio is calculated using OSFI Leverage Requirements Guideline based on the Basel III framework.

(2) In 2016, the CVA scalars of 64%, 71% and 77% were applied to CET1, Tier 1 and Total capital, respectively. In fiscal 2017, the scalars were 72%, 77% and 81%, respectively. In 2018, the scalars will be 80%, 83% and 86%, respectively.

(3) Before any capital floor requirement as applicable, there are three different levels of RWAs for the calculation of the CET1, Tier 1, and Total capital ratios arising from the option we have chosen for the phase-in of the CVA capital charge. Since the introduction of Basel II in 2008, OSFI has prescribed a capital floor requirement for institutions that use the advanced internal ratings-based (AIRB) approach for credit risk. The capital floor is determined by comparing a capital requirement under Basel I and Basel III, as specified by OSFI. If the capital requirement under the Basel III standards is less than 90% of the capital requirements as calculated under the Basel I standards, the difference is added to the RWAs.

(4) To enhance comparability among other global financial institutions, our transitional CET1, Tier 1, Total capital and leverage ratios as at October 31, 2017 were 11.3%, 12.3%, 14.1%, and 4.5%, respectively. Transitional is defined as capital calculated according to the current year's phase-in of regulatory adjustments and phase-out of non-qualifying capital instruments.

Note 32 Offsetting financial assets and financial liabilities

Offsetting within our Consolidated Balance Sheets may be achieved where financial assets and liabilities are subject to master netting arrangements that provide the currently enforceable right of offset and where there is an intention to settle on a net basis, or realize the assets and settle the liabilities simultaneously. For derivative contracts and repurchase and reverse repurchase arrangements, this is generally achieved when there is a market mechanism for settlement (e.g. central counterparty exchange or clearing house) which provides daily net settlement of cash flows arising from these contracts. Margin receivables and margin payables are generally offset as they settle simultaneously through a market settlement mechanism. These are generally presented in Other assets or Other liabilities.

Amounts that do not qualify for offsetting include master netting arrangements that only permit outstanding transactions with the same counterparty to be offset in an event of default or occurrence of other predetermined events. Such master netting arrangements include the ISDA Master Agreement or certain derivative exchange or clearing counterparty agreements for derivative contracts, global master repurchase agreement and global master securities lending agreements for repurchase, reverse repurchase and other similar secured lending and borrowing arrangements.

The amount of financial collateral received or pledged subject to master netting arrangements or similar agreements but do not qualify for offsetting refers to the collateral received or pledged to cover the net exposure between counterparties by enabling the collateral to be realized in an event of default or the occurrence of other predetermined events. Certain amounts of collateral are restricted from being sold or re-pledged unless there is an event of default or the occurrence of other predetermined events.

The tables below provide the amount of financial instruments that have been offset on the Consolidated Balance Sheets and the amounts that do not qualify for offsetting but are subject to enforceable master netting arrangements or similar agreements. The amounts presented are not intended to represent our actual exposure to credit risk.

Financial assets subject to offsetting, enforceable master netting arrangements or similar agreements

	As at October 31, 2017							
	Amounts subject to offsetting and enforceable netting arrangements							
				Amounts subject to master netting arrangements or similar agreements but do not qualify for offsetting on the balance sheet (1)				
(Millions of Canadian dollars)	Gross amounts of financial assets before balance sheet offsetting	Amounts of financial liabilities offset on the balance sheet	Net amount of financial assets presented on the balance sheet	Impact of master netting agreements	Financial collateral received (2)	Net amount	Amounts not subject to enforceable netting arrangements	Total amount recognized on the balance sheet
Assets purchased under reverse repurchase agreements and securities borrowed	$ 239,944	$ 20,470	$ 219,474	$ 24	$ 218,970	$ 480	$ 1,503	$ 220,977
Derivative assets (3)	151,451	67,827	83,624	58,804	16,357	8,463	11,399	95,023
Other financial assets	2,593	1,050	1,543	–	78	1,465	62	1,605
	$ 393,988	$ 89,347	$ 304,641	$ 58,828	$ 235,405	$ 10,408	$ 12,964	$ 317,605

	As at October 31, 2016							
	Amounts subject to offsetting and enforceable netting arrangements							
				Amounts subject to master netting arrangements or similar agreements but do not qualify for offsetting on the balance sheet (1)				
(Millions of Canadian dollars)	Gross amounts of financial assets before balance sheet offsetting	Amounts of financial liabilities offset on the balance sheet	Net amount of financial assets presented on the balance sheet	Impact of master netting agreements	Financial collateral received (2)	Net amount	Amounts not subject to enforceable netting arrangements	Total amount recognized on the balance sheet
Assets purchased under reverse repurchase agreements and securities borrowed	$ 199,586	$ 14,290	$ 185,296	$ 422	$ 184,359	$ 515	$ 1,006	$ 186,302
Derivative assets (3)	208,936	97,142	111,794	79,296	17,249	15,249	7,150	118,944
Other financial assets	1,244	803	441	–	46	395	91	532
	$ 409,766	$ 112,235	$ 297,531	$ 79,718	$ 201,654	$ 16,159	$ 8,247	$ 305,778

(1) Financial collateral is reflected at fair value. The amount of financial instruments and financial collateral disclosed is limited to the net balance sheet exposure, and any over-collateralization is excluded from the table.
(2) Includes cash collateral of $12 billion (October 31, 2016 – $11 billion) and non-cash collateral of $224 billion (October 31, 2016 – $191 billion).
(3) Includes cash margin of $0.6 billion (October 31, 2016 – $2.2 billion) which offset against the derivative balance on the balance sheet.

Financial liabilities subject to offsetting, enforceable master netting arrangements or similar agreements

	As at October 31, 2017							
	Amounts subject to offsetting and enforceable netting arrangements							
				Amounts subject to master netting arrangements or similar agreements but do not qualify for offsetting on the balance sheet (1)				
(Millions of Canadian dollars)	Gross amounts of financial liabilities before balance sheet offsetting	Amounts of financial assets offset on the balance sheet	Net amount of financial liabilities presented on the balance sheet	Impact of master netting agreements	Financial collateral pledged (2)	Net amount	Amounts not subject to enforceable netting arrangements	Total amount recognized on the balance sheet
Obligations related to assets sold under repurchase agreements and securities loaned	$ 161,883	$ 20,470	$ 141,413	$ 24	$ 141,256	$ 133	$ 1,671	$ 143,084
Derivative liabilities (3)	145,855	67,705	78,150	58,804	10,697	8,649	13,977	92,127
Other financial liabilities	3,027	1,364	1,663	–	444	1,219	5	1,668
	$ 310,765	$ 89,539	$ 221,226	$ 58,828	$ 152,397	$ 10,001	$ 15,653	$ 236,879

	As at October 31, 2016							
	Amounts subject to offsetting and enforceable netting arrangements							
				Amounts subject to master netting arrangements or similar agreements but do not qualify for offsetting on the balance sheet (1)				
(Millions of Canadian dollars)	Gross amounts of financial liabilities before balance sheet offsetting	Amounts of financial assets offset on the balance sheet	Net amount of financial liabilities presented on the balance sheet	Impact of master netting agreements	Financial collateral pledged (2)	Net amount	Amounts not subject to enforceable netting arrangements	Total amount recognized on the balance sheet
Obligations related to assets sold under repurchase agreements and securities loaned	$ 117,031	$ 14,290	$ 102,741	$ 422	$ 102,029	$ 290	$ 700	$ 103,441
Derivative liabilities (3)	203,874	96,231	107,643	79,296	15,993	12,354	8,907	116,550
Other financial liabilities	3,271	2,231	1,040	–	514	526	15	1,055
	$ 324,176	$ 112,752	$ 211,424	$ 79,718	$ 118,536	$ 13,170	$ 9,622	$ 221,046

(1) Financial collateral is reflected at fair value. The amount of financial instruments and financial collateral disclosed is limited to the net balance sheet exposure, and any over-collateralization is excluded from the table.
(2) Includes cash collateral of $10 billion (October 31, 2016 – $14 billion) and non-cash collateral of $142 billion (October 31, 2016 – $105 billion).
(3) Includes cash margin of $0.3 billion (October 31, 2016 – $0.8 billion) which offset against the derivative balance on the balance sheet.

Note 33 Recovery and settlement of on-balance sheet assets and liabilities

The table below presents an analysis of assets and liabilities recorded on our Consolidated Balance Sheets by amounts to be recovered or settled within one year and after one year, as at the balance sheet date, based on contractual maturities and certain other assumptions outlined in the footnotes below. As warranted, we manage the liquidity risk of various products based on historical behavioural patterns that are often not aligned with contractual maturities. Amounts to be recovered or settled within one year, as presented below, may not be reflective of our long-term view of the liquidity profile of certain balance sheet categories.

	As at					
	October 31, 2017			October 31, 2016		
(Millions of Canadian dollars)	Within one year	After one year	Total	Within one year	After one year	Total
Assets						
Cash and due from banks (1)	$ 26,695	$ 1,712	$ 28,407	$ 12,049	$ 2,880	$ 14,929
Interest-bearing deposits with banks	32,662	–	32,662	27,850	1	27,851
Securities						
Trading (2)	116,841	10,816	127,657	142,045	9,247	151,292
Available-for-sale	15,930	74,792	90,722	12,153	72,648	84,801
Assets purchased under reverse repurchase agreements and securities borrowed	214,353	6,624	220,977	182,618	3,684	186,302
Loans						
Retail	97,784	287,386	385,170	81,683	287,787	369,470
Wholesale	38,573	121,033	159,606	34,887	119,482	154,369
Allowance for loan losses			(2,159)			(2,235)
Segregated fund net assets	–	1,216	1,216	–	981	981
Other						
Customers' liability under acceptances	16,443	16	16,459	12,841	2	12,843
Derivatives (2)	92,606	2,417	95,023	116,533	2,411	118,944
Premises and equipment, net	–	2,670	2,670	–	2,836	2,836
Goodwill	–	10,977	10,977	–	11,156	11,156
Other intangibles	–	4,507	4,507	–	4,648	4,648
Other assets	30,738	8,221	38,959	33,754	8,317	42,071
	$ 682,625	$ 532,387	$ 1,212,853	$ 656,413	$ 526,080	$ 1,180,258
Liabilities						
Deposits (3)	$ 624,802	$ 164,833	$ 789,635	$ 579,571	$ 178,018	$ 757,589
Segregated fund net liabilities	–	1,216	1,216	–	981	981
Other						
Acceptances	16,443	16	16,459	12,841	2	12,843
Obligations related to securities sold short	28,041	1,967	30,008	41,927	8,442	50,369
Obligations related to assets sold under repurchase agreements and securities loaned	143,072	12	143,084	103,412	29	103,441
Derivatives (2)	90,156	1,971	92,127	114,321	2,229	116,550
Insurance claims and policy benefit liabilities	131	9,545	9,676	118	9,046	9,164
Other liabilities	34,980	11,975	46,955	33,314	14,633	47,947
Subordinated debentures	–	9,265	9,265	–	9,762	9,762
	$ 937,625	$ 200,800	$ 1,138,425	$ 885,504	$ 223,142	$ 1,108,646

(1) Cash and due from banks are assumed to be recovered within one year, except for cash balances not available for use by the Bank.

(2) Trading securities classified as at FVTPL and trading derivatives not designated in hedging relationships are presented as within one year as this best represents in most instances the short-term nature of our trading activities. Non-trading derivatives designated in hedging relationships are presented according to the recovery or settlement of the related hedged item.

(3) Demand deposits of $372 billion (October 31, 2016 – $358 billion) are presented as within one year due to their being repayable on demand or at short notice on a contractual basis. In practice, these deposits relate to a broad range of individuals and customer-types which form a stable base for our operations and liquidity needs.

Note 34 Parent company information

The following table presents information regarding the legal entity of Royal Bank of Canada with its subsidiaries presented on an equity accounted basis.

Condensed Balance Sheets

(Millions of Canadian dollars)	As at October 31 2017	October 31 2016
Assets		
Cash and due from banks	$ 12,901	$ 3,164
Interest-bearing deposits with banks	20,864	16,126
Securities	109,082	132,100
Investments in bank subsidiaries and associated corporations (1)	31,302	30,248
Investments in other subsidiaries and associated corporations	65,576	61,705
Assets purchased under reverse repurchase agreements and securities borrowed	49,615	25,129
Loans, net of allowance for loan losses	474,052	458,675
Net balances due from bank subsidiaries (1)	20,579	5,437
Other assets	136,069	162,790
	$ 920,040	$ 895,374
Liabilities and shareholders' equity		
Deposits	$ 605,849	$ 573,933
Net balances due to other subsidiaries	58,598	55,473
Other liabilities	172,869	185,583
	837,316	814,989
Subordinated debentures	8,895	9,368
Shareholders' equity	73,829	71,017
	$ 920,040	$ 895,374

(1) Bank refers primarily to regulated deposit-taking institutions and securities firms.

Condensed Statements of Income and Comprehensive Income

(Millions of Canadian dollars)	For the year ended October 31 2017	October 31 2016
Interest income (1)	$ 18,419	$ 17,542
Interest expense	6,556	5,486
Net interest income	11,863	12,056
Non-interest income (2) (3)	4,476	4,072
Total revenue (3)	16,339	16,128
Provision for credit losses	1,033	1,456
Non-interest expense (3)	8,631	8,190
Income before income taxes	6,675	6,482
Income taxes	1,601	1,544
Net income before equity in undistributed income of subsidiaries	5,074	4,938
Equity in undistributed income of subsidiaries	6,395	5,520
Net income	$ 11,469	$ 10,458
Other comprehensive loss, net of taxes	(107)	(1,097)
Total comprehensive income	$ 11,362	$ 9,361

(1) Includes dividend income from investments in subsidiaries and associated corporations of $25 million (October 31, 2016 – $23 million).
(2) Includes share of profit from associated corporations of $12 million (October 31, 2016 – $19 million).
(3) Effective Q4 2017, service fees and other costs incurred in association with certain commissions and fees earned are presented on a gross basis in non-interest expense. Comparative amounts have been reclassified to conform with this presentation.

Note 34 Parent company information (continued)

Condensed Statements of Cash Flows

(Millions of Canadian dollars)	For the year ended October 31 2017	October 31 2016
Cash flows from operating activities		
Net income	**$ 11,469**	$ 10,458
Adjustments to determine net cash from operating activities:		
Change in undistributed earnings of subsidiaries	**(6,395)**	(5,520)
Change in deposits, net of securitizations	**33,166**	7,030
Change in loans, net of securitizations	**(14,025)**	(14,488)
Change in trading securities	**24,671**	9,004
Change in obligations related to assets sold under repurchase agreements and securities loaned	**14,018**	8,511
Change in assets purchased under reverse repurchase agreements and securities borrowed	**(24,486)**	(1,711)
Change in obligations related to securities sold short	**(4,809)**	3,145
Other operating activities, net	**6,059**	(2,736)
Net cash from (used in) operating activities	**39,668**	13,693
Cash flows from investing activities		
Change in interest-bearing deposits with banks	**(4,738)**	(288)
Proceeds from sale of available-for-sale securities	**5,823**	2,868
Proceeds from maturity of available-for-sale securities	**25,599**	20,802
Purchases of available-for-sale securities	**(34,903)**	(33,668)
Net acquisitions of premises and equipment and other intangibles	**(938)**	(750)
Change in cash invested in subsidiaries	**(116)**	(3,140)
Change in net funding provided to subsidiaries	**(12,018)**	2,275
Net cash from (used in) investing activities	**(21,291)**	(11,901)
Cash flows from financing activities		
Issue of subordinated debentures	**–**	3,606
Repayment of subordinated debentures	**(119)**	(1,500)
Issue of common shares	**199**	307
Common shares purchased for cancellation	**(3,110)**	(362)
Issue of preferred shares	**–**	1,475
Redemption of preferred shares	**(300)**	–
Preferred shares purchased for cancellation	**–**	(264)
Dividends paid	**(5,309)**	(4,997)
Issuance costs	**(1)**	(16)
Net cash from (used in) financing activities	**(8,640)**	(1,751)
Net change in cash and due from banks	**9,737**	41
Cash and due from banks at beginning of year	**3,164**	3,123
Cash and due from banks at end of year	**$ 12,901**	$ 3,164
Supplemental disclosure of cash flow information		
Amount of interest paid	**$ 6,286**	$ 5,331
Amount of interest received	**18,128**	17,411
Amount of dividends received	**40**	30
Amount of income taxes paid	**1,656**	736

Note 35 Subsequent events

On November 13, 2017, we redeemed all 82,000 outstanding Non-Cumulative Perpetual First Preferred Shares Series C-1 for cash at a redemption price of US$1,000 per share (equivalent to US$25.00 per related depositary share).

Condensed Balance Sheet

(Millions of Canadian dollars)	IFRS 2017	2016	2015	2014	2013	2012	2011	CGAAP 2011	2010	2009	2008
Assets											
Cash and due from banks	$ 28,407	$ 14,929	$ 12,452	$ 17,421	$ 15,550	$ 12,428	$ 12,428	$ 13,247	$ 8,440	$ 7,584	$ 11,086
Interest-bearing deposits with banks	32,662	27,851	22,690	8,399	9,039	10,246	6,460	12,181	13,254	8,919	20,041
Securities	218,379	236,093	215,508	199,148	182,710	161,602	167,022	179,558	183,519	177,298	171,134
Assets purchased under reverse repurchase agreements and securities borrowed	220,977	186,302	174,723	135,580	117,517	112,257	84,947	84,947	72,698	41,580	44,818
Loans net of allowance	542,617	521,604	472,223	435,229	408,850	378,241	347,530	296,284	273,006	258,395	289,540
Other	169,811	193,479	176,612	144,773	126,079	149,180	175,446	165,485	175,289	161,213	187,240
Total Assets	$ 1,212,853	$ 1,180,258	$ 1,074,208	$ 940,550	$ 859,745	$ 823,954	$ 793,833	$ 751,702	$ 726,206	$ 654,989	$ 723,859
Liabilities											
Deposits	$ 789,635	$ 757,589	$ 697,227	$ 614,100	$ 563,079	$ 512,244	$ 479,102	$ 444,181	$ 414,561	$ 378,457	$ 438,575
Other	339,525	341,295	305,675	264,088	239,763	259,174	263,625	256,124	263,030	229,699	242,744
Subordinated debentures	9,265	9,762	7,362	7,859	7,443	7,615	8,749	7,749	6,681	6,461	8,131
Trust capital securities	–	–	–	–	–	–	894	–	727	1,395	1,400
Non-controlling interest in subsidiaries	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1,941	2,256	2,071	2,371
Total Liabilities	$ 1,138,425	$ 1,108,646	$ 1,010,264	$ 886,047	$ 810,285	$ 779,033	$ 752,370	$ 709,995	$ 687,255	$ 618,083	$ 693,221
Equity attributable to shareholders	73,829	71,017	62,146	52,690	47,665	43,160	39,702	41,707	38,951	36,906	30,638
Non-controlling interest	599	595	1,798	1,813	1,795	1,761	1,761	n.a.	n.a.	n.a.	n.a.
Total equity	74,428	71,612	63,944	54,503	49,460	44,921	41,463	41,707	38,951	36,906	30,638
Total liabilities and equity	$ 1,212,853	$ 1,180,258	$ 1,074,208	$ 940,550	$ 859,745	$ 823,954	$ 793,833	$ 751,702	$ 726,206	$ 654,989	$ 723,859

Condensed Income Statement

(Millions of Canadian dollars)	IFRS 2017	2016	2015	2014	2013	2012	2011	CGAAP 2011	2010	2009	2008
Net interest income	$ 17,140	$ 16,531	$ 14,771	$ 14,116	$ 13,249	$ 12,439	$ 11,357	$ 10,600	$ 10,338	$ 10,705	$ 9,054
Non-interest income (1)	23,529	22,264	20,932	19,992	17,433	16,708	16,281	16,830	15,744	15,736	12,528
Total revenue (1)	40,669	38,795	35,703	34,108	30,682	29,147	27,638	27,430	26,082	26,441	21,582
Provision for credit losses (PCL)	1,150	1,546	1,097	1,164	1,237	1,299	1,133	975	1,240	2,167	1,595
Insurance policyholder benefits, claims and acquisition expense	3,053	3,424	2,963	3,573	2,784	3,621	3,358	3,360	3,546	3,042	1,631
Non-interest expense (NIE) (1)	21,794	20,526	19,020	17,661	16,214	14,641	14,167	14,453	13,469	13,436	12,351
Non-controlling interest	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	104	99	100	81
Net income from continuing operations	11,469	10,458	10,026	9,004	8,342	7,558	6,970	6,650	5,732	5,681	4,555
Net loss from discontinued operations	–	–	–	–	–	(51)	(526)	(1,798)	(509)	(1,823)	–
Net income	$ 11,469	$ 10,458	$ 10,026	$ 9,004	$ 8,342	$ 7,507	$ 6,444	$ 4,852	$ 5,223	$ 3,858	$ 4,555

Other Statistics – reported

(Millions of Canadian dollars, except percentages and per share amounts)	IFRS 2017	2016	2015	2014	2013	2012	2011	CGAAP 2011	2010	2009	2008
PROFITABILITY MEASURES (2)											
Earnings per shares (EPS) – basic	$ 7.59	$ 6.80	$ 6.75	$ 6.03	$ 5.53	$ 4.96	$ 4.25	$ 3.21	$ 3.49	$ 2.59	$ 3.41
– diluted	$ 7.56	$ 6.78	$ 6.73	$ 6.00	$ 5.49	$ 4.91	$ 4.19	$ 3.19	$ 3.46	$ 2.57	$ 3.38
Return on common equity (ROE)	17.0%	16.3%	18.6%	19.0%	19.7%	19.6%	18.7%	12.9%	14.9%	11.9%	18.1%
Return on risk-weighted assets (RWA) (3)	2.49%	2.34%	2.45%	2.52%	2.67%	2.70%	2.44%	1.87%	2.03%	1.50%	1.78%
Efficiency ratio (1), (2)	53.6%	52.9%	53.3%	51.8%	52.8%	50.2%	51.3%	52.7%	51.6%	50.8%	57.2%
KEY RATIOS											
PCL on impaired loans as a % of Average net loans and acceptances	0.21%	0.28%	0.24%	0.27%	0.31%	0.35%	0.33%	0.34%	0.45%	0.72%	0.53%
Net interest margin (average earning assets)	1.72%	1.70%	1.71%	1.86%	1.88%	1.97%	1.86%	1.84%	1.99%	2.19%	1.71%
SHARE INFORMATION (4)											
Common shares outstanding (000s) – end of period	1,452,898	1,485,394	1,443,423	1,442,233	1,441,056	1,445,303	1,438,376	1,438,376	1,424,922	1,417,610	1,341,260
Dividends declared per common share	$ 3.48	$ 3.24	$ 3.08	$ 2.84	$ 2.53	$ 2.28	$ 2.08	$ 2.08	$ 2.00	$ 2.00	$ 2.00
Dividend yield	3.8%	4.3%	4.1%	3.8%	4.0%	4.5%	3.9%	3.9%	3.6%	4.8%	4.2%
Dividend payout ratio	46%	48%	46%	47%	46%	46%	45%	47%	52%	52%	59%
Book value per share	$ 46.41	$ 43.32	$ 39.51	$ 33.69	$ 29.87	$ 26.52	$ 24.25	$ 25.65	$ 23.99	$ 22.67	$ 20.90
Common share price (RY on TSX) – close, end of period	$ 100.87	$ 83.80	$ 74.77	$ 80.01	$ 70.02	$ 56.94	$ 48.62	$ 48.62	$ 54.39	$ 54.80	$ 46.84
Market capitalization (TSX)	146,554	124,476	107,925	115,393	100,903	82,296	69,934	69,934	77,502	77,685	62,825
Market price to book value	2.17	1.93	1.89	2.38	2.34	2.15	2.00	1.90	2.27	2.42	2.24
CAPITAL MEASURES – CONSOLIDATED (5)											
Common Equity Tier 1 capital ratio	10.9%	10.8%	10.6%	9.9%	9.6%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tier 1 capital ratio	12.3%	12.3%	12.2%	11.4%	11.7%	13.1%	n.a.	13.3%	13.0%	13.0%	9.0%
Total capital ratio	14.2%	14.4%	14.0%	13.4%	14.0%	15.1%	n.a.	15.3%	14.4%	14.2%	11.0%
Leverage Ratio	4.4%	4.4%	4.30%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

(1) Effective Q4 2017, service fees and other costs incurred in association with certain commissions and fees earned are presented on a gross basis in non-interest expense. As at November 1, 2014, comparative amounts have been reclassified to conform with this presentation.
(2) Ratios for 2009-2012 represent continuing operations.
(3) Return on risk-weighted assets (RWA) for fiscal 2011 is based on RWA reported under CGAAP and Income reported under IFRS.
(4) On April 6, 2006, we paid a stock dividend of one common share on each of our issued and outstanding common shares. The effect was the same as two-for-one split of our common shares. All common share and per share information have been adjusted retroactively for the stock dividend.
(5) Effective 2013 we calculate the capital ratios and multiples using the Basel III (all-in basis) framework unless otherwise stated. 2008-2012 capital ratios and multiples were calculated using the Basel II framework. 2004-2007 capital ratios and 2005-2007 asset-to-capital multiples were calculated using the Basel I framework. Capital ratios and multiples for 2011 were determined under Canadian GAAP.

Glossary

Acceptances
A bill of exchange or negotiable instrument drawn by the borrower for payment at maturity and accepted by a bank. The acceptance constitutes a guarantee of payment by the bank and can be traded in the money market. The bank earns a "stamping fee" for providing this guarantee.

Acquired Credit Impaired (ACI) loans
Are loans identified as impaired on the acquisition date based on specific risk characteristics such as indications that the borrower is experiencing significant financial difficulty, probability of bankruptcy or other financial reorganization, payment status and economic conditions that correlate with defaults.

Allowance for credit losses
The amount deemed adequate by management to absorb identified credit losses as well as losses that have been incurred but are not yet identifiable as at the balance sheet date. This allowance is established to cover the lending portfolio including loans, acceptances, guarantees, letters of credit, and unfunded commitments. The allowance is increased by the provision for credit losses, which is charged to income and decreased by the amount of write-offs, net of recoveries in the period.

Asset-backed securities (ABS)
Securities created through the securitization of a pool of assets, for example auto loans or credit card loans.

Assets under administration (AUA)
Assets administered by us, which are beneficially owned by clients, as at October 31, unless otherwise noted. Services provided in respect of assets under administration are of an administrative nature, including safekeeping, collecting investment income, settling purchase and sale transactions, and record keeping.

Assets under management (AUM)
Assets managed by us, which are beneficially owned by clients, as at October 31, unless otherwise noted. Services provided in respect of assets under management include the selection of investments and the provision of investment advice. We have assets under management that are also administered by us and included in assets under administration.

Auction rate securities (ARS)
Debt securities whose interest rate is regularly reset through an auction process.

Average earning assets
Average earning assets include interest-bearing deposits with other banks including certain components of cash and due from banks, securities, assets purchased under reverse repurchase agreements and securities borrowed, loans, and excludes segregated fund net assets and other assets. The averages are based on the daily balances for the period.

Basis point (bp)
One one-hundredth of a percentage point (.01%).

Collateral
Assets pledged as security for a loan or other obligation. Collateral can take many forms, such as cash, highly rated securities, property, inventory, equipment and receivables.

Collateralized debt obligation (CDO)
Securities with multiple tranches that are issued by structured entities and collateralized by debt obligations including bonds and loans. Each tranche offers a varying degree of risk and return so as to meet investor demand.

Commercial mortgage-backed securities (CMBS)
Securities created through the securitization of commercial mortgages.

Commitments to extend credit
Unutilized amount of credit facilities available to clients either in the form of loans, bankers' acceptances and other on-balance sheet financing, or through off-balance sheet products such as guarantees and letters of credit.

Common Equity Tier 1 (CET1) capital
A regulatory Basel III capital measure comprised mainly of common shareholders' equity less regulatory deductions and adjustments for goodwill and intangibles, defined benefit pension fund assets, shortfall in allowances and other specified items.

Common Equity Tier 1 capital ratio
A risk-based capital measure calculated as CET1 capital divided by risk-weighted assets.

Covered bonds
Full recourse on-balance sheet obligations issued by banks and credit institutions that are also fully collateralized by assets over which investors enjoy a priority claim in the event of an issuer's insolvency.

Credit default swaps (CDS)
A derivative contract that provides the purchaser with a one-time payment should the referenced entity/entities default (or a similar triggering event occur).

Derivative
A contract between two parties, which requires little or no initial investment and where payments between the parties are dependent upon the movements in price of an underlying instrument, index or financial rate. Examples of derivatives include swaps, options, forward rate agreements and futures. The notional amount of the derivative is the contract amount used as a reference point to calculate the payments to be exchanged between the two parties, and the notional amount itself is generally not exchanged by the parties.

Dividend payout ratio
Common dividends as a percentage of net income available to common shareholders.

Earnings per share (EPS), basic
Calculated as net income available to common shareholders divided by the average number of shares outstanding.

Earnings per share (EPS), diluted
Calculated as net income available to common shareholders divided by the average number of shares outstanding adjusted for the dilutive effects of stock options and other convertible securities.

Economic capital
An estimate of the amount of equity capital required to underpin risks. It is calculated by estimating the level of capital that is necessary to support our various businesses, given their risks, consistent with our desired solvency standard and credit ratings. The identified risks for which we calculate Economic Capital are credit, market (trading and non-trading), operational, business, fixed asset, and insurance. Additionally, Economic Capital includes goodwill and intangibles, and allows for diversification benefits across risks and business segments.

Expected credit losses
The difference between the contractual cash flows due to us in accordance with the relevant contractual terms and the cash flows that we expect to receive, discounted to the balance sheet date.

Fair value
Fair value of a financial instrument is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.

Federal Deposit Insurance Corporation (FDIC)
An independent U.S. government agency that aims to preserve and promote public confidence in the U.S. financial system by insuring deposits in banks and thrift institutions; identifying, monitoring and addressing risks to these deposits; and limiting the effect on the economic and financial system when a bank or thrift institution fails.

Funding Valuation Adjustment
Funding valuation adjustments are calculated to incorporate cost and benefit of funding in the valuation of uncollateralized and under-collateralized OTC derivatives. Future expected cash flows of these derivatives are discounted to reflect the cost and benefit of funding the derivatives by using a funding curve, implied volatilities and correlations as inputs.

Guarantees and standby letters of credit
These primarily represent irrevocable assurances that a bank will make payments in the event that its client cannot meet its financial obligations to third parties. Certain other guarantees, such as bid and performance bonds, represent non-financial undertakings.

Hedge
A risk management technique used to mitigate exposure from market, interest rate or foreign currency exchange risk arising from normal banking operations. The elimination or reduction of such exposure is accomplished by establishing offsetting positions. For example, assets denominated in foreign currencies can be offset with liabilities in the same currencies or through the use of foreign exchange hedging instruments such as futures, options or foreign exchange contracts.

Hedge funds
A type of investment fund, marketed to accredited high net worth investors, that is subject to limited regulation and restrictions on its investments compared to retail mutual funds, and that often utilize aggressive strategies such as selling short, leverage, program trading, swaps, arbitrage and derivatives.

High-quality liquid assets (HQLA)
Assets are considered to be HQLA if they can be easily and immediately converted into cash at little or no loss of value during a time of stress.

Home equity products
This is comprised of residential mortgages and secured personal loans whereby the borrower pledges real estate as collateral.

International Financial Reporting Standards (IFRS)
IFRS are principles-based standards, interpretations and the framework adopted by the International Accounting Standards Board.

Impaired loans
Loans are classified as impaired when there has been a deterioration of credit quality to the extent that management no longer has reasonable assurance of timely collection of the full amount of principal and interest in accordance with the contractual terms of the loan agreement. Credit card balances are not classified as impaired as they are directly written off after payments are 180 days past due.

Innovative capital instruments
Innovative capital instruments are capital instruments issued by structured entities, whose primary purpose is to raise capital. We previously issued innovative capital instruments, RBC Trust Capital Securities (RBC TruCS) through RBC Capital Trust. As per OSFI Basel III guidelines, non-qualifying innovative capital instruments treated as additional Tier 1 capital are subject to phase out over a ten year period beginning on January 1, 2013.

Leverage Ratio
A Basel III regulatory measure, the ratio divides Tier 1 capital by the sum of total assets plus specified off-balance sheet items.

Liquidity Coverage Ratio (LCR)
The Liquidity Coverage Ratio is a Basel III metric that measures the sufficiency of HQLA available to meet net short-term financial obligations over a thirty day period in an acute stress scenario.

Loan-to-value (LTV) ratio
Calculated based on the total facility amount for the residential mortgage and homeline product divided by the value of the related residential property.

Master netting agreement
An agreement between us and a counterparty designed to reduce the credit risk of multiple derivative transactions through the creation of a legal right of offset of exposure in the event of a default.

Net interest income
The difference between what is earned on assets such as loans and securities and what is paid on liabilities such as deposits and subordinated debentures.

Net interest margin (on average earning assets)
Calculated as net interest income divided by average earning assets.

Normal course issuer bid (NCIB)
A program for the repurchase of our own shares for cancellation through a stock exchange that is subject to the various rules of the relevant stock exchange and securities commission.

Notional amount
The contract amount used as a reference point to calculate payments for derivatives.

Off-balance sheet financial instruments
A variety of arrangements offered to clients, which include credit derivatives, written put options, backstop liquidity facilities, stable value products, financial standby letters of credit, performance guarantees, credit enhancements, mortgage loans sold with recourse, commitments to extend credit, securities lending, documentary and commercial letters of credit, note issuances and revolving underwriting facilities, securities lending indemnifications and indemnifications.

Office of the Superintendent of Financial Institutions Canada (OSFI)
The primary regulator of federally chartered financial institutions and federally administered pension plans in Canada. OSFI's mission is to safeguard policyholders, depositors and pension plan members from undue loss.

Operating leverage
The difference between our revenue growth rate and non-interest expense growth rate.

Options
A contract or a provision of a contract that gives one party (the option holder) the right, but not the obligation, to perform a specified transaction with another party (the option issuer or option writer) according to specified terms.

Primary dealer
A formal designation provided to a bank or securities broker-dealer permitted to trade directly with a country's central bank. Primary dealers participate in open market operations, act as market-makers of government debt and provide market information and analysis to assist with monetary policy.

Provision for credit losses (PCL)
The amount charged to income necessary to bring the allowance for credit losses to a level determined appropriate by management. This includes both provisions on impaired loans and loans not yet identified as impaired.

Repurchase agreements
These involve the sale of securities for cash and the simultaneous repurchase of the securities for value at a later date. These transactions normally do not constitute economic sales and therefore are treated as collateralized financing transactions.

Residential mortgage-backed securities (RMBS)
Securities created through the securitization of residential mortgage loans.

Return on common equity (ROE)
Net income available to common shareholders, expressed as a percentage of average common equity.

Reverse repurchase agreements
These involve the purchase of securities for cash and the simultaneous sale of the securities for value at a later date. These transactions normally do not constitute economic sales and therefore are treated as collateralized financing transactions.

Risk-weighted assets (RWA)
Assets adjusted by a regulatory risk-weight factor to reflect the riskiness of on and off-balance sheet exposures. Certain assets are not risk-weighted, but deducted from capital. The calculation is defined by guidelines issued by OSFI. For more details, refer to the Capital management section.

Securities lending
Transactions in which the owner of a security agrees to lend it under the terms of a prearranged contract to a borrower for a fee. The borrower must collateralize the security loan at all times. An intermediary such as a bank often acts as agent for the owner of the security. There are two types of securities lending arrangements: lending with and without credit or market risk indemnification. In securities lending without indemnification, the bank bears no risk of loss. For transactions in which the bank provides an indemnification, it bears the risk of loss if the borrower defaults and the value of the collateral declines concurrently.

Securities sold short
A transaction in which the seller sells securities and then borrows the securities in order to deliver them to the purchaser upon settlement. At a later date, the seller buys identical securities in the market to replace the borrowed securities.

Securitization
The process by which various financial assets are packaged into newly issued securities backed by these assets.

Structured entities
A structured entity is an entity in which voting or similar rights are not the dominant factor in deciding who controls the entity, such as when the activities that significantly affect the entity's returns are directed by means of contractual arrangements. Structured entities often have restricted activities, narrow and well defined objectives, insufficient equity to finance their activities, and financing in the form of multiple contractually-linked instruments.

Standardized Approach
Risk weights prescribed by OSFI are used to calculate risk-weighted assets for the credit risk exposures. Credit assessments by OSFI-recognized external credit rating agencies of S&P, Moody's, Fitch and DBRS are used to risk-weight our Sovereign and Bank exposures based on the standards and guidelines issued by OSFI. For our Business and Retail exposures, we use the standard risk weights prescribed by OSFI.

Structured investment vehicle
Managed investment vehicle that holds mainly highly rated asset-backed securities and funds itself using the short-term commercial paper market as well as the medium-term note (MTN) market.

Subprime loans
Subprime lending is the practice of making loans to borrowers who do not qualify for the best market interest rates because of their deficient credit history. Subprime lending carries more risk for lenders due to the combination of higher interest rates for the borrowers, poorer credit histories, and adverse financial situations usually associated with subprime applicants.

Taxable equivalent basis (teb)
Income from certain specified tax advantaged sources (eligible Canadian taxable corporate dividends) is increased to a level that would make it comparable to income from taxable sources. There is an offsetting adjustment in the tax provision, thereby generating the same after-tax net income.

Tier 1 capital
Tier 1 capital comprises predominantly of CET1 capital, with additional Tier 1 items such as preferred shares, innovative instruments and non-controlling interests in subsidiaries Tier 1 instruments.

Tier 2 capital
Tier 2 capital consists mainly of subordinated debentures that meet certain criteria, certain loan loss allowances and non-controlling interests in subsidiaries' Tier 2 instruments.

Total capital and total capital ratio
Total capital is defined as the total of Tier 1 and Tier 2 capital. The total capital ratio is calculated by dividing total capital by risk-weighted assets.

Tranche
A security class created whereby the risks and returns associated with a pool of assets are packaged into several classes of securities offering different risk and return profiles from those of the underlying asset pool. Tranches are typically rated by ratings agencies, and reflect both the credit quality of underlying collateral as well as the level of protection based on the tranches' relative subordination.

Trust Capital Securities (RBC TruCS)
Transferable trust units issued by structured entities RBC Capital Trust or RBC Capital Trust II for the purpose of raising innovative Tier 1 capital.

Value-at-Risk (VaR)
A generally accepted risk-measurement concept that uses statistical models based on historical information to estimate within a given level of confidence the maximum loss in market value we would experience in our trading portfolio from an adverse one-day movement in market rates and prices.

Principal subsidiaries

Principal subsidiaries (1)	Principal office address (2)	Carrying value of voting shares owned by the Bank (3)
Royal Bank Holding Inc.	Toronto, Ontario, Canada	56,397
Royal Mutual Funds Inc.	Toronto, Ontario, Canada	
RBC Insurance Holdings Inc.	Mississauga, Ontario, Canada	
RBC Insurance Company of Canada	Mississauga, Ontario, Canada	
RBC Life Insurance Company	Mississauga, Ontario, Canada	
RBC Direct Investing Inc.	Toronto, Ontario, Canada	
RBC Phillips, Hager & North Investment Counsel Inc.	Toronto, Ontario, Canada	
R.B.C. Holdings (Bahamas) Limited	Nassau, New Providence, Bahamas	
RBC Caribbean Investments Limited	George Town, Grand Cayman, Cayman Islands	
Royal Bank of Canada Insurance Company Ltd.	St. Michael, Barbados	
Investment Holdings (Cayman) Limited	George Town, Grand Cayman, Cayman Islands	
RBC (Barbados) Funding Ltd.	St. Michael, Barbados	
Capital Funding Alberta Limited	Calgary, Alberta, Canada	
RBC Global Asset Management Inc.	Toronto, Ontario, Canada	
RBC Investor Services Trust	Toronto, Ontario, Canada	
RBC Investor Services Bank S.A.	Esch-sur-Alzette, Luxembourg	
RBC (Barbados) Trading Bank Corporation	St. James, Barbados	
BlueBay Asset Management (Services) Ltd	London, England	
RBC USA Holdco Corporation (2)	New York, New York, U.S.	19,080
RBC Capital Markets, LLC (2)	New York, New York, U.S.	
RBC Bank (Georgia), National Association (2)	Atlanta, Georgia, U.S.	
City National Bank	Los Angeles, California, U.S.	
RBC Global Asset Management (U.S.) Inc.	Minneapolis, Minnesota, U.S.	
RBC Dominion Securities Limited	Toronto, Ontario, Canada	8,378
RBC Dominion Securities Inc.	Toronto, Ontario, Canada	
RBC Finance S.à r.l./B.V. (2)	Amsterdam, Netherlands	3,200
RBC Holdings (Luxembourg) S.A R.L.	Luxembourg, Luxembourg	
RBC Holdings (Channel Islands) Limited	Jersey, Channel Islands	
Royal Bank of Canada (Channel Islands) Limited	Guernsey, Channel Islands	
RBC Holdings (Barbados) Ltd.	St. Michael, Barbados	3,171
RBC Financial (Caribbean) Limited	Port of Spain, Trinidad and Tobago	
RBC Europe Limited	London, England	1,820
RBC Capital Trust	Toronto, Ontario, Canada	1,624
Royal Bank Mortgage Corporation	Toronto, Ontario, Canada	1,173
The Royal Trust Company	Montreal, Quebec, Canada	692
Royal Trust Corporation of Canada	Toronto, Ontario, Canada	229
RBC Covered Bond Guarantor Limited Partnership	Toronto, Ontario, Canada	154

(1) The Bank directly or indirectly controls each subsidiary.

(2) Each subsidiary is incorporated or organized under the law of the state or country in which the principal office is situated, except for RBC USA Holdco Corporation which is incorporated under the laws of the State of Delaware, U.S., RBC Capital Markets, LLC, which is organized under the laws of the State of Minnesota, U.S. RBC Finance S.à r.l. / B.V. is a company incorporated in the Netherlands with its official seat in Amsterdam, the Netherlands, and place of effective management, central administration, and principal establishment in Luxembourg, Grand Duchy of Luxembourg. RBC Bank (Georgia), National Association is a national banking association organized under the laws of the U.S. with its main office in Atlanta, Georgia and management offices in Raleigh, North Carolina.

(3) The carrying value (in millions of Canadian dollars) of voting shares is stated as the Bank's equity in such investments.

Shareholder Information

Corporate headquarters
Street address:
Royal Bank of Canada
200 Bay Street
Toronto, Ontario M5J 2J5
Canada
Tel: 1-888-212-5533

Mailing address:
P.O. Box 1
Royal Bank Plaza
Toronto, Ontario M5J 2J5
Canada
website: rbc.com

Transfer Agent and Registrar
Main Agent:
Computershare Trust
Company of Canada
1500 Robert-Bourassa Blvd.
Suite 700
Montreal, Quebec H3A 3S8
Canada
Tel: 1-866-586-7635 (Canada and the U.S.) or 514-982-7555 (International)
Fax: 514-982-7580
website: computershare.com/rbc

Co-Transfer Agent (U.S.):
Computershare Trust
Company, N.A.
250 Royall Street
Canton, Massachusetts 02021
U.S.A.

Co-Transfer Agent (U.K.):
Computershare Investor
Services PLC
Securities Services – Registrars
P.O. Box 82, The Pavilions,
Bridgwater Road,
Bristol BS99 6ZZ
U.K.

Stock exchange listings
(Symbol: RY)

Common shares are listed on:
Canada – Toronto Stock Exchange (TSX)
U.S. – New York Stock Exchange (NYSE)
Switzerland – Swiss Exchange (SIX)

All preferred shares are listed on the TSX with the exception of the series C-2. The related depository shares of the series C-2 preferred shares are listed on the NYSE.

Valuation day price
For Canadian income tax purposes, Royal Bank of Canada's common stock was quoted at $29.52 per share on the Valuation Day (December 22, 1971). This is equivalent to $7.38 per share after adjusting for the two-for-one stock split of March 1981 and the two-for-one stock split of February 1990. The one-for-one stock dividends in October 2000 and April 2006 did not affect the Valuation Day amount for our common shares.

Shareholder contacts
For dividend information, change in share registration or address, lost stock certificates, tax forms, estate transfers or dividend reinvestment, please contact:
Computershare Trust Company of Canada
100 University Avenue, 8th Floor
Toronto, Ontario M5J 2Y1
Canada

Tel: 1-866-586-7635 (Canada and the U.S.) or 514-982-7555 (International)
Fax: 1-888-453-0330 (Canada and the U.S.) or 416-263-9394 (International)
email: service@computershare.com

For other shareholder inquiries, please contact:
Shareholder Relations
Royal Bank of Canada
200 Bay Street
South Tower
Toronto, Ontario M5J 2J5
Canada
Tel: 416-955-7806

Financial analysts, portfolio managers, institutional investors
For financial information inquiries, please contact:
Investor Relations
Royal Bank of Canada
155 Wellington Street West
Toronto, Ontario M5V 3K7
Canada
Tel: 416-955-7802
or visit our website at
rbc.com/investorrelations

Direct deposit service
Shareholders in Canada and the U.S. may have their RBC common share dividends deposited directly to their bank account by electronic funds transfer. To arrange for this service, please contact our Transfer Agent and Registrar, Computershare Trust Company of Canada.

Eligible dividend designation
For purposes of the *Income Tax Act* (Canada) and any corresponding provincial and territorial tax legislation, all dividends (and deemed dividends) paid by RBC to Canadian residents on both its common and preferred shares, are designated as "eligible dividends", unless stated otherwise.

Common share repurchases
We are engaged in a Normal Course Issuer Bid (NCIB) which allows us to repurchase for cancellation, up to 30 million common shares during the period spanning March 14, 2017 to March 10, 2018. We determine the amount and timing of the purchases under the NCIB, subject to prior consultation with the Office of the Superintendent of Financial Institutions Canada (OSFI).

A copy of our Notice of Intention to file a NCIB may be obtained, without charge, by contacting our Corporate Secretary at our Toronto mailing address.

2018 Quarterly earnings release dates

First quarter	February 23
Second quarter	May 24
Third quarter	August 23
Fourth quarter	November 28

2018 Annual Meeting
The Annual Meeting of Common Shareholders will be held on Friday, April 6, 2018, at 9:30 a.m. (Eastern Time), at the Metro Toronto Convention Centre, 255 Front Street West, Toronto, Ontario, Canada

Dividend dates for 2018
Subject to approval by the Board of Directors

	Record dates	Payment dates
Common and preferred shares series W, AA, AC, AD, AE, AF, AG, AJ, AK, AL, AZ, BB, BD, BF, BH, BI, BJ, BK and BM	January 25 April 25 July 26 October 25	February 23 May 24 August 24 November 23
Preferred shares series C-2 (US$)	January 26 April 27 July 27 October 26	February 7 May 7 August 7 November 7

Governance
Summaries of the significant ways in which corporate governance practices followed by RBC differ from corporate governance practices required to be followed by U.S. domestic companies under the NYSE listing standards are available on our website at rbc.com/governance.

Information contained in or otherwise accessible through the websites mentioned in this report to shareholders does not form a part of this report. All references to websites are inactive textual references and are for your information only.

Trademarks used in this report include the LION & GLOBE Symbol, ROYAL BANK OF CANADA, RBC, RBC AMPLIFY, RBC CAPITAL MARKETS, RBC CAPITAL TRUST, RBC FUTURE LAUNCH, RBC GLOBAL ASSET MANAGEMENT, RBC INSURANCE, RBC REWARDS, RBC TruCS, RBC WEALTH MANAGEMENT, DIGITALLY ENABLED RELATIONSHIP BANK, MYADVISOR, NOMI FIND & SAVE and NOMI INSIGHTS which are trademarks of Royal Bank of Canada used by Royal Bank of Canada and/or by its subsidiaries under license. VISA is a registered trademark of Visa International Service Association. All other trademarks mentioned in this report which are not the property of Royal Bank of Canada, are owned by their respective holders.

Exhibit 3

Consent of Independent Registered Public Accounting Firm

We hereby consent to the incorporation by reference in this Annual Report on Form 40-F for the year ended October 31, 2017 of Royal Bank of Canada of our report dated November 28, 2017, relating to the consolidated financial statements and the effectiveness of internal control over financial reporting, which appears in the Exhibit incorporated by reference in this Annual Report on Form 40-F.

We also consent to the incorporation by reference in Registration Statements on Form F-3 Nos. 333-12036, 333-12050, 333-13052, 333-13112, 333-14144, 333-110953, 333-117922, 333-178350, 333-207754, 333-207750, 333-207748, 333-211680 on Form S-8, and Nos. 333-203567, 333-208507 of Royal Bank of Canada of our report dated November 28, 2017 referred to above. We also consent to reference to us under the heading "Experts", which appears in the Annual Information Form included in the Exhibit incorporated by reference in this Annual Report on Form 40-F, which is incorporated by reference in such Registration Statements.

/s/ PricewaterhouseCoopers LLP

Chartered Professional Accountants, Licensed Public Accountants
Toronto, Canada
November 29, 2017

RBC Code of Conduct

A message from David McKay
President and CEO, RBC

Building Trust - RBC® and You

Why do banks matter? They facilitate personal and business financial transactions, match saving and borrowing needs, and help domestic and international markets function. They provide financial advice, help manage risks and are vital for economic growth. Banks hold this important position in our society because of the trust others place in them. It's crucial that clients, employees, investors, communities, and regulators have confidence that banks act fairly and ethically.

At RBC, we hold ourselves to the highest standards of integrity to build trust with every interaction. By listening to clients and communities to understand their interests and needs, we reinforce the trust that is so important to our success and to our Vision – *To be among the world's most trusted and successful financial institutions*. Our Values, especially our Value of Integrity, and Code of Conduct guide us and set expectations for ethical behaviour and decision-making. They help us decide how we serve our clients and deal with each other with respect, transparency and fairness.

Our Code protects employees, clients and RBC by providing a common understanding of what's acceptable and what's not. It's a resource that helps us understand what's expected and why.

We are all responsible for protecting and enhancing RBC's reputation by following our Code of Conduct. It's also important that we support one another in doing what's right, by speaking up candidly and challenging situations we believe are wrong.

Please read the Code carefully, discuss what it means with your manager and colleagues, and ask questions to ensure you understand it and what it requires of you.

You represent RBC both on and off the job. You keep RBC a leader in a changing world by relying on enduring beliefs – our Values of client first, collaboration, accountability, diversity and inclusion and integrity — and you bring to life our purpose of helping clients thrive and communities prosper. Successful companies simply don't exist without the right people. It all starts with you.

David McKay, President and CEO, RBC

Our Vision and Values

RBC's Values define what we stand for everywhere we do business. They are reflected in our behaviour and the way we build relationships and deliver value to all our stakeholders — clients, employees, shareholders, communities and others we deal with. Guided by our shared Values and united in a common purpose, we can achieve our strategic goals and accomplish great results. We demonstrate our Vision – **To be Among the World's Most Trusted and Successful Financial Institutions** - by living our Values in the decisions and actions we take every day. These five Values set the tone for our culture and unify us across geographies and businesses:

CLIENT FIRST: **We will always earn the right to be our clients' first choice.**

- Put client needs above our own, whatever our role, to build lasting relationships
- Listen with empathy, understand client needs to offer the right advice and solutions
- Bring the best of RBC to deliver excellent value and differentiated client experiences

COLLABORATION: **We win as One RBC.**

- Believe in each other and trust in teamwork and colleagues' intentions
- Share knowledge, listen, and teach to learn and achieve more together
- Look beyond ourselves to see the bigger picture for opportunities and solutions

ACCOUNTABILITY: **We take ownership for personal and collective high performance.**

- Be bolder, reach higher, act with courage to realize potential and make a difference
- Own it; seek out accountability and empowerment to grow and excel
- Be curious and learn continuously to build skills and careers

DIVERSITY & INCLUSION: **We embrace diversity for innovation and growth.**

- Speak up for inclusion and empower people to grow and achieve more
- Seek out and respect different perspectives to challenge conventional approaches
- Identify and act on the opportunities and needs that client diversity brings

INTEGRITY: **We hold ourselves to the highest standards to build trust.**

- Be respectful, transparent and fair in all relationships
- Stand up for what we believe; speak with candour; constructively challenge
- Build trust of clients, colleagues and community partners by listening to and understanding their interests and needs

At RBC we bring these Values to life every day — continuing to earn the trust of RBC's clients and ensuring our strong reputation for doing what's right.

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Publication date: January 1, 2017

1. Our Culture of Integrity

1.1 Living Our Values and Acting with Integrity

RBC is a values-based organization. Respect for each other, RBC clients and our commitments to all our stakeholders are rooted in our Values. RBC's Code of Conduct (the "Code") incorporates RBC's Values, and in particular our Value of Integrity, to guide our day-to-day actions and decisions so we can always do the right thing.

Throughout the Code, "RBC" means Royal Bank of Canada and all its subsidiaries and affiliates.

1.2 Our Culture of Integrity — Doing What's Right

Every day our actions demonstrate not only our Value of always earning the right to be our clients' first choice, but also our personal commitments. We each have a responsibility to be truthful, respect others, and comply with laws, regulations and RBC's policies. (In the Code, the word "policy" includes policies, procedures and standards.) Over many years RBC has earned trust and a reputation for doing what's right through the actions of those who work here. A continued strong focus on doing what's right will sustain and build on that trust — the cornerstone of the financial services industry and our relationships with clients and communities.

We do business across the globe, and each one of us has a responsibility to behave with integrity so that we can continue to serve clients and generate value for RBC's shareholders. More than simply being aware of our Values and following our Code, we need to make them an integral part of how we operate day to day. This will ensure we tell the truth, respect others, uphold the law, speak up to challenge what we believe is wrong, and comply with policies and practices. These behaviours are the foundation for our culture of integrity and doing what's right.

Tell the truth

Our work places us in a position of trust. RBC clients, shareholders, communities and our colleagues rely on us to be honest and do business responsibly. We do what we say we will do and earn the trust and loyalty of our clients, shareholders and communities.

Respect others and treat them fairly

Showing respect for everyone we work with, treating them fairly and taking personal responsibility for high performance enable us to achieve RBC's strategic goals. By living our Values and following the Code, we show others we honour the trust they place in us — making RBC a great place to work and do business.

Uphold the law

RBC is subject to the laws of the countries where we do business. RBC's policies are designed to comply with its legal and regulatory obligations, including the intent and spirit of the laws that apply to it. By doing so, RBC maintains its reputation for acting with integrity. To this end, each of us must understand and comply with RBC's policies and practices that apply to the way we do our jobs. Keep in mind that

breaking the law could result in civil and criminal penalties and fines for RBC and the individual involved, as well as potential damage to both RBC's and the individual's reputation.

Speak up to challenge what we believe is wrong
Constructively challenging decisions and behaviour that we believe are wrong helps ensure we continue to live our Values in our work at RBC. And seeking out constructive challenge when we make business decisions helps ensure those decisions are right for RBC – and clients, colleagues, shareholders and communities.

Comply with policies and instructions
We are each responsible for knowing and following the RBC policies that apply to us. We must also comply with managers' instructions unless they are inconsistent with RBC Values or policies, against the law or result in health and safety risks. In these circumstances, or if we are unsure about the right thing to do, we should raise our concerns with one of the Key Contacts.

We must always be aware of both enterprise and local policies specific to business or geographic areas and work within the boundaries of what we have been authorized to do.

1.3 Our Shared Commitment and Accountability

The Code applies to all RBC employees, contract workers and members of the boards of directors.

The importance of the Code cannot be overemphasized. Understanding and complying with the Code is a condition of our work at RBC, and critical to earning the trust RBC clients and communities have placed in us. This Code helps to protect our personal integrity and reputation as well as RBC's and the financial services industry's as a whole.

Any one of us who breaches, or fails to report an actual or possible breach of the Code will be subject to corrective or disciplinary action. Corrective or disciplinary action is RBC's response to unacceptable behaviour, including breach of the Code, and can range from reprimands and impact on performance ratings and compensation, to termination of our working relationship with RBC.

We also expect RBC suppliers to follow similar principles and share our commitment to ethics and integrity as set out in our Supplier Code of Conduct. We will not knowingly use suppliers or other third parties who violate the law or operate unethically.

Approval of the Code
The RBC Board of Directors approves the Code.

Waivers
Waivers of the Code, or any of its provisions, are seldom considered. If a waiver is necessary to accommodate exceptional circumstances, it must be approved by RBC's Chief Human Resources Officer and RBC's Chief Compliance Officer. A waiver of the Code for Royal Bank of Canada directors or specified executive officers must be approved by Royal Bank of Canada's Board of Directors. Approved waivers must be disclosed publicly as required by law and RBC policies.

2. Speaking Up, Raising Concerns and Reporting Misconduct

Our shared commitment and accountability involve more than just personally complying with the Code and acting with integrity. At RBC, we have a responsibility to seek guidance and raise concerns about compliance with the Code, RBC policies and the law, and a duty to report misconduct. If we need guidance, have questions or are unsure about the right thing to do, we should speak with our manager, senior management or one of the Key Contacts.

When deciding whether to speak up and raise concerns, we should ask ourselves these questions:

- Is this legal?
- Is this fair and ethical?
- How would RBC clients, our colleagues or third parties view this situation?
- Would RBC's reputation be damaged if this situation became public knowledge?

2.1 Speaking Up and Raising Concerns

We ensure that all questions and concerns raised are addressed. While the Code and RBC policies outline the ethical behaviour expected of us, they cannot anticipate every situation we encounter. By speaking up and raising our concerns, we ensure RBC does the right thing and we protect our clients' interests and assets, and RBC's reputation.

2.2 Reporting Misconduct

We have a duty to report actual or possible misconduct that we become aware of. This includes violations of the Code, policies and the law. We must promptly notify our manager, senior management or any of the Key Contacts if we:

- are asked to commit or believe we have witnessed a potentially illegal or unethical act, or
- become aware of a breach of the Code or any other situation that could put RBC at risk of loss or harm.

All reports are investigated promptly and thoroughly, as appropriate. RBC keeps these reports confidential, and a report of misconduct or information is disclosed only to the extent necessary to investigate and address the situation or as legally required.

Refer to RBC's Standard on Reporting Misconduct for further details.

Some examples of misconduct are:

- deliberate failure to comply with policies, management instructions or the law
- disrespectful behaviour, harassment, and actual or threatened violence
- misappropriation (including theft and kiting), improper use of company or client assets or systems, and improper sales reporting

- inappropriate client referrals, failing to report unusual client transactions and inappropriate use or disclosure of client information
- inappropriate social media use

2.3 Investigations, Inquiries and Reviews

Each of us has a duty to cooperate with internal or external investigations, inquiries, and reviews of concerns or possible misconduct in a forthright manner. In these situations, we must provide honest, accurate, complete and timely information.

2.4 RBC's Commitment to Non-Retaliation

There will be no retaliation for speaking up and making a truthful report of actual or possible misconduct, for participating in an investigation, or for exercising our legal rights. Retaliation can include behaviour or actions that punish or deter someone from speaking up. Retaliation can be an unjustified decision affecting someone's compensation, job security, career mobility or performance rating, and can also include unnecessarily monitoring someone's work, excluding them from meetings or team events and withholding work-related information. If you believe you've encountered any form of retaliation, follow the reporting procedures set out in the Respectful Workplace Policy to ensure the situation is addressed promptly.

Our commitment to non-retaliation means RBC:

- investigates every claim of retaliation
- follows up with employees who raise concerns
- monitors employment decisions made in relation to those who report misconduct
- provides education and coaching on retaliation to managers of employees who raise concerns, and
- takes disciplinary action to address retaliation.

Some examples of activity that is not retaliation:

- disciplinary action for misconduct
- performance management, and
- routine coaching.

2.5 What We Expect of Our People Managers

While we are all held to the high ethical standards set out in our Values and the Code, those of us who are people managers are expected to:

- promote awareness and understanding of RBC Values and the Code
- lead by example – demonstrate RBC's high standards for behaviour to make sure our team members understand how they apply to the way we work at RBC and represent RBC outside of our work
- maintain an environment where everyone feels comfortable asking questions, raising concerns and making reports, while respecting the privacy of those who do, and

- promptly escalate concerns and reports of possible or actual misconduct as appropriate, and follow up to ensure they are addressed.

Our integrity underpins everything we do. It is the foundation for the way we deal with our clients and communities, work with our partners for a stronger RBC, conduct our many businesses and safeguard our assets. The Code explains how we maintain our culture of doing what's right – a culture that makes RBC trusted and successful.

3. Integrity in Dealing with RBC Clients, Communities and Others

We are committed to promoting fairness in our dealings with our clients, shareholders, suppliers and others, carefully weighing our responsibilities to all stakeholders.

We are in a relationship business and we pride ourselves on the quality of the service and products we provide RBC clients. Integrity and trust help us better serve RBC clients, and we make sure we put their interests above our own in offering advice and solutions. The same applies to the communities where we live and work, making us a company that people want to do business with and work for.

3.1 Protecting RBC Client Information

Clients care deeply about the privacy of the information they share with us. Protecting their information and keeping their trust is integral to the financial services industry. It's also central to our culture of doing what's right. We each have a duty to keep RBC client information confidential and secure from the risk of theft, loss, improper disclosure or misuse. We do this by complying with RBC's Privacy Risk Management Policy. We are responsible for keeping RBC client information private, even after we leave RBC's service.
When collecting, using and safeguarding client information, we must treat it as we would RBC's own information. We must never share non-public information — accidentally or intentionally — with a third party or colleague who does not have a business need to know.

In the event of improper disclosure or a privacy breach, we must also follow established procedures. We must immediately report a potential or actual privacy breach to our local Privacy Officer, and we must never share any details about the breach with others who do not have a business need to know.

3.2 Protecting RBC Business Information

RBC's business information is one of our most important assets, so we have a duty to safeguard it by complying with RBC information security policies.

For more information, please refer to RBC's Privacy Risk Management Policy and Proprietary information in section 6.2 of this Code.

What can I do to protect RBC business or client information?

- Operate on a “need to know”, rather than “nice to know” basis, and share RBC business or client information only with those who need it for an appropriate business purpose.
- Always use proper procedures to share information securely.
- When working in public places (for example, while commuting, in restaurants or in hotels) take care not to be overheard or allow RBC business or client information to be visible or left behind.
- Dispose of confidential information as required by RBC’s Privacy Risk Management Policy.
- Immediately report any potential or actual privacy or information security incidents or breaches.

3.3 Protecting RBC’s Reputation in Our Communities

Individual character and personal activities

We must avoid any conduct or association which could bring our honesty, integrity or trustworthiness into question. It’s important to understand how closely our clients, shareholders and communities, as well as our colleagues, associate our off-duty conduct with RBC, and how our off-duty conduct impacts RBC’s reputation and brand. We are held to RBC’s Values and the standards set out in the Code both on and off duty, and our duty to report actual or possible misconduct applies equally when we’re off duty.

“Off-duty” conduct can become an issue when it:

- damages RBC’s reputation (e.g. you post a disparaging Facebook comment about your manager’s abilities)
- impedes our ability to perform our duties (e.g. a mobile mortgage specialist has his/her driver’s licence revoked and cannot drive to see clients)
- brings our integrity and Values into question (e.g. cyber-bullying or harassing a colleague off hours)

External representation

Our Values and the Code provide a foundation for our behaviour when we represent RBC at work and in our communities. Our integrity and trust must be beyond reproach.

- **Business use of external social media**
  One of the ways RBC communicates is through social media. As with other communications, it is important that our business and corporate social media use is appropriate and consistent with RBC’s general communication strategy. To ensure this, only specifically approved employees may participate in external social media for RBC business or corporate use. This is set out in our Enterprise-Wide Policy on the Usage of External Social Media and in other business-specific social media policies.

  Personal use of social media
  When we participate personally in external or internal social media, we should do so responsibly as we could be considered to represent RBC both at and outside of work. We need to consider the potential impact our comments may have on RBC’s reputation, and be guided by our Values and the standards set out in the Code. Social media is not an appropriate venue to express concerns about RBC, our stakeholders or our competition. RBC provides multiple avenues for us to voice our

concerns and have them addressed. Refer to RBC's Enterprise Guidelines for Personal Use of Social Media for more guidance.

When using social media (for example, Facebook, LinkedIn, Twitter, YouTube, QZone and Google), remember that our words are public and permanent. We should consider the following when using social media:

- Safeguard our personal and professional reputations.
- When we identify ourselves as working for RBC or provide our RBC-owned email address when using social media personally, our actions can reflect on our own and RBC's reputation.
- Confidential, non-public information relating to RBC, RBC clients, employees, contract workers, or other persons must never be a part of our social media conversations (for example RBC's financial information, client and employee personal information, business plans, pending product launches, partnerships with third parties and employment relationships).
- We must not represent RBC's position on an issue without approval from Corporate Communications and our manager.
- If we see an issue involving RBC unfolding in social media, or if we are contacted by the media, we should contact Corporate Communications. We should not try to address the issue ourselves, speak or respond for RBC, unless authorized to by Corporate Communications and our manager.

- **Responding to inquiries from the media**
  We manage and protect RBC's reputation and ensure consistency in managing media inquiries. Only those of us who have been authorized to do so may communicate with the media on RBC's behalf. Media inquiries must be referred to our Corporate Communications representatives; we are not authorized to address media questions ourselves. For more information, refer to RBC's Media and Communications Policy.

Supporting our communities

We support the communities where we live, work and do business. We also accept accountability for the social and economic effects of our business decisions. We take pride in the value of our contributions and encourage employee volunteerism.

We must obtain our manager's permission to solicit for or promote other causes or issues, including charitable ones, in RBC workplaces. Personal contributions to political and charitable causes must be at our own expense and must not interfere with our work at RBC.

Environmental sustainability

RBC promotes environmental sustainability. This means minimizing our environmental footprint and offering environmentally responsible products and services. We believe fulfilling our goals in these areas will lead to short- and long-term benefits for RBC shareholders, clients, colleagues and the communities where we live and do business.

Political involvement and contributions

We support participation in general political processes.

We must not use RBC time or resources to promote political candidates either inside or outside the workplace. If we choose to participate in political activity, we do so on our own behalf, at our own

expense, and not as representatives of RBC. We must never use our affiliation with RBC to market our political activities.

3.4 Responding to Government or Regulatory Inquiries

From time to time, we may receive an inquiry from government authorities or regulators regarding RBC business. When approached for information, we follow the procedures established for our business unit. This includes escalating the inquiry to our manager or local Compliance group, as appropriate.

4. Integrity in Working Together at RBC

At RBC, we have a strong and capable global team serving our clients, working together to deliver on our strategy, and creating value and growth for our clients, communities and shareholders. We believe in each other and have confidence and trust in the capabilities and intentions of our colleagues. Our integrity, diversity & inclusiveness, and collaboration help make RBC a great place to work, belong and thrive.

4.1 Respectful Workplace

We all have a right to work in a respectful and professional environment. Treating each other with respect and dignity ensures a healthy and productive work environment. We respect our colleagues, RBC clients and others we deal with.

We must all behave in a way that contributes to a workplace free from discrimination, harassment, sexual harassment, violence and retaliation.

Harassment, including sexual harassment, discrimination, violence, retaliation and other disrespectful and inappropriate behaviour – whether or not it's intentional – are not tolerated at RBC. Harassment is behaviour that, because of its nature or persistence, interferes with a climate of mutual respect for the dignity and worth of each person. It also undermines the integrity of our relationship with RBC and one another.

Maintaining a respectful workplace requires us to behave professionally while working for RBC and when we use RBC systems. We must not use RBC networks, systems, devices or access to the Internet to view or communicate offensive material.

Refer to RBC's Respectful Workplace Policy for details and procedures for reporting breaches.

Not all negative interactions are harassment, discrimination or retaliation. For example,

- minor conflicts that arise because of differences in work or communication styles, and general disagreements and challenges are not harassment
- performance management and other manager activities that are part of their responsibilities and performed for legitimate business purposes are not harassment, discrimination or retaliation, and
- constructive challenge that encourages the exchange of ideas is not harassment.

Sexual harassment is a specific form of harassment that includes unwelcome behaviour such as:

- Sexual advances or flirtations
- "Suggestive" jokes or stories
- Conversations about sexual exploits or desires
- Displaying or circulating sexually suggestive pictures, objects or representations of any action or subject that is sexual in nature

It is also sexual harassment where someone feels they must submit, or are afraid to refuse or object to such behaviour – either for fear of negative workplace consequences or to obtain a positive work outcome such as a compensation increase or promotion.

Speak UP!

- Early, informal and direct communication with the person whose behaviour you feel is inappropriate is encouraged. Often this will put an end to the conduct without resorting to more formal measures
- If you decide not to talk directly to the person, or the conduct continues, you should raise your concern to a manager or Human Resources.

Examples of disrespectful and inappropriate behaviour are:

- lewd, profane, abusive or demeaning language (including email communication)
- yelling at another person
- threatening, bullying or intimidation
- fighting
- rough, boisterous or disruptive behaviour, and
- jokes that demean or belittle others, even when no offence is intended – such as racist, sexist and sexual orientation jokes.

4.2 Equal Opportunity, Fair Workplace and Human Rights

Equal opportunity
RBC promotes equal opportunity in all dealings with RBC employees, contract workers, clients and others we deal with. In addition, RBC provides equal opportunity for advancement and growth in the workplace by filling open positions based on business need and candidate merit.

Fair workplace
We treat all employees and contract workers fairly, pay fair compensation and provide respectful work environments. All employees are encouraged to raise concerns directly within RBC using any of the Key Contacts.

Human rights
We comply with all laws regarding non-discrimination and human rights in the jurisdictions where we operate. These laws often prohibit discrimination on certain grounds, such as race, colour, religion, age, gender, marital status, sexual orientation and disability.

Even where laws allow for discrimination on these grounds, RBC operates in a way that doesn't differentiate unfairly.

4.3 Personal Information About Us

Those of us who work at RBC have a right to privacy. Personal information about each of us is confidential. Collection, use and disclosure of this information must be relevant to our working relationship with RBC.

Additionally, when someone confides in us and asks us to keep the information confidential, we must do so, except as required by law or the Code. Keeping information private and confidential is a matter of personal integrity, honouring the trust others place in us. For more information, please refer to RBC's Employee Privacy View.

Personal information about us is used by RBC where needed to manage our working relationships, and must be kept confidential as outlined in RBC's Employee Privacy View. It includes:

- information required to verify credentials and education
- employment-related credit checks
- home address
- home phone number and personal cell phone number
- government-issued identification numbers
- compensation
- performance reviews
- corrective/disciplinary actions, and
- health and benefit information and insurance records, including date of birth and non-HIPAA (Health Insurance Portability and Accountability Act) information in the U.S.

4.4 Workplace Health and Safety

RBC is committed to providing a healthy and safe workplace and complying with health and safety laws. Maintaining such a workplace is a shared responsibility of RBC and its managers, employees and contract workers. All employees and contract workers are to take every reasonable and necessary precaution to ensure their health and safety as well as those of their colleagues.

To ensure our workplaces are healthy and safe, we understand and follow RBC's health and safety policies. We also:

- do not have weapons of any kind in our possession while on RBC premises, and
- obtain management approval and ensure any required permits have been obtained before serving alcohol on RBC premises.

5. Integrity in How We Do Business

Ethical behaviour governs every aspect of our business, from day-to-day transactions to special projects.

5.1 Business Dealings

As representatives of RBC, we have a duty to never mislead others — even by omission — about RBC products or services. We must be mindful when evaluating RBC communications that all information is clear and not misleading in any way. This is especially important with regard to our sales representation, marketing and advertising.

To this end, we promptly correct misstatements when we notice them, or when they are brought to our attention. We must make every reasonable effort to provide full and fair information and avoid errors or ambiguity in any statement issued on RBC's behalf. This means we must be knowledgeable about the products and services we promote to ensure our communications about them are accurate.

5.2 Avoiding and Managing Conflicts of Interest

By acting without bias, we can assure RBC stakeholders of our integrity. This means that the decisions we make in our work with RBC must be independent of our personal interests. Obligations arising from our other business, family and social relationships must not play a role in our work for RBC. A conflict of interest — actual, potential or perceived — is a situation that could cause others to doubt our ability to perform our jobs effectively and objectively, without bias. Keep in mind that a conflict of interest can exist even where we have not behaved improperly or unethically. Even the impression of a conflict of interest can affect RBC's reputation and our own.

We cannot prevent or avoid the presence of conflicts of interest, as they arise naturally out of our various relationships with RBC, its clients and others. We can avoid some conflicts of interest, and manage others so that we remain objective in our work at RBC.

We have an ongoing responsibility to identify conflicts of interest in relation to RBC, its clients and its suppliers. This includes potential and perceived conflicts as well as actual ones. We must immediately disclose all conflicts we identify so they can be avoided or managed appropriately.

How can I recognize and manage potential conflicts of interest?

- Think about how your actions would look to others.
- Disclose activities upfront, especially if you are unsure about potential conflict.
- Talk to your manager or local Compliance group if you have any questions.

Some common conflicts of interest are described in the following sections. Note that in these sections *"family"* includes:

- a spouse, common law partner or domestic partner
- children and step-children
- parents and siblings
- grandparents and grandchildren, and
- other relatives by blood or marriage.

For more information, refer to RBC's Conflicts of Interest Policy and related control standards as well as RBC's Enterprise Anti-Bribery Anti-Corruption Policy. These resources also explain how to disclose actual, potential or perceived conflicts.

Managing our dealings with RBC

We often use RBC products and services ourselves, as do many of our friends and family members. We must make sure all our personal, family and friends' dealings with RBC are handled at arm's length – independent of their relationship to us and our relationship with RBC—by following relevant procedures for the business we work in. For more information, we should check with our local Compliance group**.**

Managing working relationships with family and friends

It is possible for our personal relationships to have an effect on our work at RBC. We must understand the actual or perceived effects that personal relationships can have in order to avoid situations that would reflect negatively on RBC.

What types of relationships could cause a conflict of interest?

- A direct supervisory relationship with a family member or close friend
- A working relationship where we may have the ability to favourably impact compensation, work conditions or promotion prospects of a close friend or family member
- An outside activity, external directorship or work arrangement that interferes or competes with RBC's business

Remember, there is no substitute for good judgment and common sense. If we are ever in doubt about a relationship that may put us in a conflict of interest, we should speak with our manager.

Likewise, our loyalties can become conflicted if friends or family members work for a company that does or seeks to do business with RBC as an RBC client or supplier. This is especially likely to be a problem if it happens to those of us who are involved in the approval or selection process, contract negotiations or relationship management with RBC clients or suppliers. In these cases, we must inform our manager or local Compliance group of the potential conflict of interest so it can be addressed.

Managing outside activities or work

Some of us take on additional work or activities outside our work at RBC. This may take the form of part-time work elsewhere, volunteer activity or a personal business run from home. No matter the type of work, these additional activities must not be with one of RBC's competitors. They also must not interfere with our responsibilities to RBC or its clients.

We must be aware of actual, potential or perceived conflicts of interest related to outside activities and must disclose and obtain approval for them as required. Doing so allows us to maintain our commitment to integrity while maximizing our business and relationships.

For more information, refer to the Control Standards for Outside Activities.

Managing external directorships

RBC encourages us to participate in our communities. For example, some of us may choose to take on directorships or similar roles at companies, organizations, clubs, associations or foundations. If we do, the role must not compromise our ability to do our best work for RBC and its clients. We must be careful to avoid actual, potential or perceived conflicts of interest and potential reputational issues. Roles and relationships must be assessed to ensure we comply with the Code and RBC policies on disclosure and approval. Generally, it is not acceptable to act as an officer or director of a client's business.

For publicly traded, private for-profit, not-for-profit, or venture capital entities/organizations, refer to RBC's Conflicts of Interest Policy and the Control Standards for External Directorships for the required process and approvals.

Accepting appointments or inheritances

RBC's clients look to us for advice on their financial matters. Clients may ask or appoint us to represent them or their interests in a variety of situations. These appointments include our acting as attorneys, mandataries, trustees, executors, administrators, liquidators, protectors, and in other appointments or fiduciary roles. In some instances, clients wish to show their appreciation for the value of our services by giving us a gift effective on their death. These can be made in the client's will, by designation as beneficiary under a client's policy, plan or account, or by joint ownership of an asset. To make sure there is no appearance of conflict, we and our families must not accept these requests, appointments, gifts or benefits unless they arise independently of the client relationship. We must ensure we follow established procedures before accepting any appointment or benefit, obtaining management and local Compliance approvals appropriate for the business we work in. When acceptance of certain appointments is part of our role (such as being a discretionary investment manager), we must follow RBC policies.

Managing gifts and entertainment

In business, it is common to foster relationships by exchanging courtesies such as meals, gifts and entertainment. However, we must ensure that the gifts and entertainment we accept are not intended or designed to influence our business judgment on behalf of RBC. Likewise, we must never give gifts or entertainment intended to inappropriately influence someone else's business judgment. To keep our purposes clear, all gifts and entertainment we accept or give must comply with RBC policies. We must take extra caution when the intended recipient of a gift or entertainment is a public official.

In all cases, we must comply with RBC's Conflicts of Interest Policy, the Control Standards for Gifts and Entertainment and RBC's Enterprise Anti-Bribery Anti-Corruption Policy. Your business unit may also have more specific rules; for further information you should contact your local Compliance group.

Gifts are anything of value given or received in relation to RBC business. We may only give or accept gifts that are customary, modest, and culturally sensitive. We must never accept or give cash, bonds or negotiable securities, although gift certificates or gift cards are allowed as long as they cannot be converted into cash.

Key things to remember when considering gifts or entertainment:

- Cash, bonds and negotiable securities are never acceptable gifts regardless of the amount.
- RBC's Control Standards for Gifts and Entertainment set out limits for gifts, as set out below. Note that the limits are annual, cumulative limits for any one client or supplier, and refer to a gift's cost or value, whichever is more:
    - $100 CAD in Canada
    - $100 USD in the United States
    - £100 Sterling in the United Kingdom
    - €100 Euro in Europe, and
    - in all other jurisdictions, the local currency equivalent to 100 Canadian dollars.
- Paying for a client's travel or lodging expenses is not permitted; similarly, receiving travel or lodging expenses is also not permitted.
- Entertainment must not seem excessive or inappropriate; if unsure, seek guidance from your manager or Compliance before accepting an invitation.
- Seek guidance from Compliance before providing a gift or entertainment to a public official.
- Gifts and entertainment must not create a sense of obligation for either party – it's never wrong to question the motive behind business gifts and entertainment.
- Whether your business unit has specific rules regarding gifts or entertainment.

Entertainment includes any event we host or attend for business related purposes. Common examples include meals, sporting events, theatrical performances and educational events. Entertainment should always be in good taste and consistent with usual business practice. As with gifts, we must avoid entertainment that is too lavish or expensive because it may also be seen to influence our judgment.

If only one party attends the event, then it is considered a gift. For example, if a supplier gives us tickets to an event, but does not attend, then we must follow the control standard for gifts.

RBC has restrictions on payment and acceptance of payment of travel or lodging expenses. These apply to situations where RBC is providing entertainment or where we are accepting travel or lodging expenses from a third party.

5.3 Preventing Financial Crime

Anti-money laundering ("AML") and anti-terrorist financing

Money laundering and terrorist financing are serious issues in many parts of the world. Global efforts to prevent these crimes receive significant attention from regulators, governments, international organizations and law enforcement agencies.

It is important that we know and comply with all laws and RBC policies designed to detect and deter money laundering and terrorist financing activities. To do this, we must be vigilant and exercise good judgment when dealing with unusual or suspicious transactions or activities.

For more information, please refer to RBC's Enterprise Anti-Money Laundering and Anti-Terrorist Financing (AML/ATF) Policy.

What can I do to identify and prevent money laundering or terrorist financing?

- Know your clients ("KYC"), verify their identity and that of any beneficial owners, and obtain evidence of their source of wealth and source of funds.
- Identify and escalate as soon as possible any unusual activity you believe may potentially be related to money laundering or terrorist financing activity.
- Never advise ('tip off') anyone suspected of possible money laundering or terrorist financing activity of your concerns or notify them of any potential reporting.
- Never alter, remove or disguise information to facilitate a transaction that would otherwise be prohibited under the law.

Anti-bribery and anti-corruption

Government and other groups globally are working to fight corruption because of its damaging effects on countries, communities and businesses. We support these efforts through our commitment to operate with integrity. We are committed to doing business based on the quality of RBC's reputation and the services we provide, and not because we have gained any dishonest or unfair advantage. We continue to enhance our Anti-Bribery Anti-Corruption Policy and other controls to be sure that we abide by the anti-corruption laws in place wherever we do business.

What can I do to prevent bribery and corruption?

- Never solicit, give, receive or promise any "item of value", either directly or indirectly, with the intent of helping RBC obtain an advantage. This includes offering, providing or receiving excessive or inappropriate gifts and entertainment.
- Never make facilitation payments. These are typically small payments or fees made to government officials to obtain or speed up routine actions or services such as obtaining licences or permits. If in doubt, always check with Compliance before considering a payment.
- Never knowingly facilitate any transaction involving or associated with the proceeds of bribery and corruption.

For more information, please refer to RBC's Enterprise Anti-Bribery Anti-Corruption Policy and RBC's Control Standards for Gifts and Entertainment.

5.4 Securities Trading

Many of the countries where we do business have laws regarding when we can trade in securities issued by any company.

Before trading in the securities of RBC, its clients or any other company, we must familiarize ourselves with RBC's policies on personal trading, as well as the effect that the perception of wrongdoing may have.

From time to time, we may have access to material, non-public (or "inside") information about a company, including RBC or its clients. As a rule, inside information can reasonably be expected to affect the market value or price of a company's securities. Similarly, a reasonable investor would consider it important when deciding whether to buy, sell or hold onto a security. When we have inside information about a company, we must not trade in the securities of that company. Doing so is called "insider trading" – which is illegal and subject to fines and penalties. It is also illegal to provide inside information to another (this is usually called "tipping") unless it is necessary to accomplish a legitimate business purpose.

For more information, refer to RBC's Inside Information and Information Barriers Policy and the Personal Trading Policy.

- Directors of Royal Bank of Canada should refer to the *Insider Trading and Reporting Policy and Procedures for Directors of Royal Bank of Canada.*

- Non-executive directors of Royal Bank of Canada and its subsidiaries who are not otherwise officers, employees, or directors of Royal Bank of Canada, should refer to the Policy on Inside Information and Personal Trading for Non-Executive Directors of Subsidiaries of Royal Bank of Canada.

5.5 Fair Competition

RBC seeks to ensure fair business practices are followed wherever we do business. Many countries where we do business have laws to promote fair competition and reduce monopolistic (or anti-competitive) activity.

At RBC, each of us has a responsibility to know and comply with applicable competition and anti-trust laws. We need to be able to recognize and avoid situations that may conflict with these laws. To ensure we comply with these laws, we must be especially careful when dealing with competitors of RBC. Never agree or arrange with a competitor to do any of the following:

- fix, maintain, increase or try to control the price of a product or service
- divide or allocate sales, clients or markets for the supply of products or services, or
- fix, maintain, increase, lessen, or otherwise try to control the supply of a product or service.

We must take great care at industry association meetings or other events where we may interact with competitors. If a competitor mentions any of these practices, we should voice our disagreement and withdraw from the discussion. While industry associations can provide excellent opportunities for networking and business development, they pose challenges as well. When attending events, we must

be careful to avoid even the appearance that RBC participates in or endorses unfair or manipulative business conduct.

Other examples of activities where competition issues arise:

- bid-rigging, or secretly making agreements with other bidders when submitting bids or tenders
- making availability of a product or service conditional on the purchase of another product or service
- communications that could be interpreted to show an anti-competitive intent or behaviour, such as advertisements that are misleading, unfair or inaccurate when they compare RBC products with those of our competitors, or
- any other act that is likely to harm competition substantially if done in circumstances where RBC is an important participant in a market or a class of business.

For more information, please refer to RBC's Enterprise Anti-Trust and Competition Law Policy.

5.6 Global Economic Sanctions

Economic Sanctions
As a regulated financial institution, RBC must comply with economic sanctions in Canada and other jurisdictions where we operate. We must be aware of any economic sanctions that may apply and their impact to RBC. Contact the General Counsel Group or Global Anti-Money Laundering Compliance for advice if you are unsure of the right course of action.

For more information, please refer to RBC's Global Economic Sanctions Policy.

6. Integrity in Safeguarding Entrusted Assets

As a financial institution, we manage the assets in our care responsibly and ethically to earn and maintain our stakeholders' trust.

6.1 Protecting RBC Client Property

In order to earn RBC clients' trust, we must safeguard their property. This property should be used only in accordance with their directions, relevant RBC policy and the law. Using this property inappropriately or for personal gain is a violation of this trust.

6.2 Protecting RBC Property

Fraud, misappropriation and other types of misconduct

Many of us have access to premises, systems and information about RBC processes that are not available to RBC clients or the general public. We must never use this access or information to benefit ourselves, our families or our friends, or for any purpose unrelated to the performance of our duties. Fraud, misappropriation of property or corporate opportunities and other types of misuse are never tolerated.

Acts of fraud may include intentionally concealing or misrepresenting facts for the purpose of inducing, deceiving or misleading others.

Some examples of fraud are:

- improper financial reporting (such as improper revenue recognition and over- or understating assets or liabilities)
- deliberate failure to fulfill our disclosure obligations, and
- falsifying records (such as forging client or management signatures).

"Misappropriation" includes theft or other intentional misuse of RBC assets, systems, processes or RBC client funds. Misuse can include any purpose not related to the performance of our duties.

Some examples of misappropriation and misuse are:

- intentional personal use of RBC expense accounts or corporate credit cards — expense accounts and corporate credit cards must be used only for expenses eligible for reimbursement under RBC's expense guidelines
- unauthorized "borrowing" and "kiting" (taking advantage of the time delay required for an item to clear)
- obtaining funds through false pretences such as depositing a cheque known to be NSF (Non- Sufficient Funds) or making an "empty envelope deposit" in an automated banking machine, and
- personally taking advantage of opportunities identified through the use of corporate property, information or position.

Proprietary information

RBC proprietary information includes non-public or undisclosed information we withhold from general knowledge. This information is critical to our business, and could be useful to our competitors or harmful to RBC if disclosed.

Some examples of proprietary information are:

- RBC client lists and trade secrets
- technical and statistical information
- financial documents
- contract documentation
- legal or business matters
- business processes, and
- corporate strategies and plans.

RBC's proprietary information may be disclosed to outside parties only if required by law or if properly authorized. Even then, we disclose the information only once the appropriate confidentiality agreement has been signed. Our responsibility to safeguard RBC's proprietary information continues, even after we leave RBC's service. Proprietary information is to be protected in keeping with RBC's Privacy Risk Management Policy.

Trademarks, copyright and other intellectual property

RBC intellectual property has important commercial value and is crucial to RBC's effective competition in the marketplace. It includes any of the following that we create while working for RBC:

- inventions, improvements, works of authorship, developments, concepts or ideas
- data, processes, online websites or applications, computer software programs, or discoveries, and
- trade secrets, trademarks, brand names, copyrights or logos.

Any intellectual property we generate in our RBC work belongs to RBC and remains with RBC after we leave RBC's service. We should use RBC intellectual property only as permitted in this Code and RBC policies.

RBC intellectual property must not be used by a third party without our prior approval. Similarly, we may use a third party's intellectual property only with the third party's prior approval. For example, all original musical, artistic and literary works, computer software, performances and sound recordings are protected by copyright laws. We must not download, install or copy software to our RBC-issued computers or devices without first obtaining the owner's permission.

We should seek guidance from the General Counsel Group if we suspect RBC intellectual property has been infringed upon or otherwise misused, or if we have any questions on the use of intellectual property.

Proper use of RBC networks, systems software, devices and the Internet

Most of the equipment, systems and technologies that we use in our work belong to RBC. This includes RBC computer networks, software, computers and portable devices, as well as the messages communicated with them. Where RBC policies permit us to use our personal equipment for RBC work, we must follow the policies associated with that use.

When sending communications through RBC networks, we must always maintain a professional tone and comply with the Code and RBC policies including the Respectful Workplace Policy. We follow these requirements whether we are using RBC equipment or our own.

RBC reserves the right to monitor, audit and inspect our use of RBC systems and technology, including internet usage and email. While we may use of RBC equipment, systems and technology for personal reasons, we must always comply with the Code and RBC policies, including the Respectful Workplace Policy, and our personal use must be reasonable. In line with this policy, we must not use these systems to view or communicate inappropriate material. These systems also must not be used to do work on behalf of another business or organization, unless authorized by RBC.

Some examples of inappropriate material are:

- sexually explicit material
- gambling websites
- derogatory jokes, and
- offensive or demeaning statements or images about a person or group, including those that relate to race, religion, disability, sexual orientation or gender.

6.3 Keeping Accurate Books and Records

RBC's credibility depends on the integrity of its books, records and accounting. Clients rely on us to maintain and provide accurate records of their dealings with us — a duty RBC takes seriously. We must ensure RBC's books and records are accurate, timely and complete, and reflect RBC business, operations, earnings and financial status.

To maintain accurate books and records, we follow internal processes and procedures. This includes capturing information in the proper system and labelling it correctly so it is complete and accurate.

We are expected to act honestly and with integrity in handling RBC accounts at all times. For instance, overstating an amount on an expense report or falsifying a sales record in order to exceed a target would be serious violations of RBC's trust in us and the Code. We must also never mischaracterize a payment in order to hide its true purpose (such as disguising a bribe as a "sales fee" or legitimate expense). False statements such as these are never tolerated, no matter how small the amount or the reason behind the action.

We all provide information that RBC uses to prepare financial statements, regulatory reports and publicly-filed documents. This means we all play a role in ensuring that the information we record complies with all applicable accepted accounting principles and RBC internal controls.

Keep in mind that falsifying financial or business records (including client documentation) or making false statements to our auditors is against the law. Likewise, it is unethical, unlawful and prohibited to make a payment or establish an account on RBC's behalf for any purpose other than as described in supporting documentation.

7. Conclusion

Our Code of Conduct is integral to the way we do business at RBC. It helps define our culture of doing what's right and provides all of us with the same frame of reference for dealing with issues that can be both sensitive and complex.

"We are all responsible for protecting and enhancing RBC's reputation by following our Code of Conduct. It's also important that we support one another in doing what's right, including feeling empowered to challenge situations we believe are wrong." ***David McKay, President and CEO, RBC***

Exhibit 5

Industry Guide 3 — Return on Equity and Assets Ratios

	For the Year Ended October 31, 2017	For the Year Ended October 31, 2016	For the Year Ended October 31, 2015
Return on Assets	0.97%	0.89%	0.95%
Return on Equity	17.0%	16.3%	18.6%
Dividend Payout Ratio	46%	48%	46%
Equity to Asset Ratio	6.12%	5.90%	5.57%

Exhibit 7

CONSOLIDATED RATIOS OF EARNINGS TO FIXED CHARGES

The tables below set forth our consolidated ratios of earnings to fixed charges for the five-year period ended October 31, 2017:

	Year ended October 31, 2017	Year ended October 31, 2016	Year ended October 31, 2015	Year ended October 31, 2014	Year ended October 31, 2013
Excluding Interest on Deposits	5.17	5.90	6.14	6.23	5.34
Including Interest on Deposits	2.43	2.61	2.53	2.43	2.28

For purposes of computing these ratios, earnings represent net income plus income taxes and fixed charges (excluding capitalized interest). Fixed charges represent (i) estimated interest within rental expense, (ii) amortization of debt issuance costs, and (iii) interest (including capitalized interest), including or excluding deposit interest as indicated.

Royal Bank of Canada and Subsidiaries
Ratio of Earnings to Fixed Charges and Preferred Dividends

(Canadian dollars in millions)	Year Ended October 31, 2017	Year Ended October 31, 2016	Year Ended October 31, 2015	Year Ended October 31, 2014	Year Ended October 31, 2013	
Excluding Interest on Deposits						
Net Income before income taxes	$ 14,672	$ 13,299	$ 12,623	$ 11,710	$ 10,447	
Less: Income/(loss) from equity investees (Note 1)	(331)	(184)	(146)	(162)	(139)	***Note 1***
Fixed Charges:						
Interest expense (excl. Deposits)	$ 3,200	$ 2,454	$ 2,235	$ 2,030	$ 2,205	
Estimated interest within rental expense	241	220	193	177	169	
Total fixed charges	3,441	2,674	2,428	2,207	2,374	
Preferred dividend requirements (Note 2)	385	374	240	277	317	***Note 2***
Fixed charges and preferred dividends	3,826	3,047	2,668	2,484	2,691	
Earnings	17,782	15,788	14,905	13,755	12,682	
Ratio of earnings to fixed charges	**5.17**	**5.90**	**6.14**	**6.23**	**5.34**	
Ratio of earnings to fixed charges and preferred dividends	**4.65**	**5.18**	**5.59**	**5.54**	**4.71**	
Including Interest on Deposits						
Net Income before income taxes	$ 14,672	$ 13,299	$ 12,623	$ 11,710	$ 10,447	
Less: Income/(loss) from equity investees (Note 1)	(331)	(184)	(146)	(162)	(139)	***Note 1***
Fixed Charges:						
Interest expense (incl. Deposits)	$ 9,764	$ 7,921	$ 7,958	$ 7,903	$ 7,899	
Estimated interest within rental expense	241	219	193	177	169	
Total fixed charges	10,005	8,140	8,151	8,080	8,068	
Preferred dividend requirements (Note 2)	385	374	240	277	317	***Note 2***
Fixed charges and preferred dividends	10,390	8,514	8,391	8,357	8,385	
Earnings	24,346	21,255	20,628	19,628	18,376	
Ratio of earnings to fixed charges	**2.43**	**2.61**	**2.53**	**2.43**	**2.28**	
Ratio of earnings to fixed charges and preferred dividends	**2.34**	**2.50**	**2.46**	**2.35**	**2.19**	

Note (1)	2017	2016	2015	2014	2013
Equity in Undistributed Earnings of Unconsolidated Subsidiaries Calculation (C $'000s):					
Associated Corporations					
(equity accounted investments - IFRS)	335	176	149	162	159
Impairment of investments in JV and associates	(4)	8	(3)	-	(20)
	331	184	146	162	139
Note (2)					
Preferred Dividend Requirements Calculation (C $ millions):					
Preferred Dividends (per Income Statement)	300	294	191	213	253
Taxable Equivalent Gross-up (1-Effective Tax Rate for period)	78.2%	78.6%	79.4%	76.9%	79.9%
Preferred Dividend Requirement	385	374	240	277	317
Effective Tax Rate	21.8%	21.4%	20.6%	23.1%	20.1%

Exhibit 31.1

SOX 302 CERTIFICATION

I, David I. McKay, certify that:

1. I have reviewed this annual report on Form 40-F of Royal Bank of Canada;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the issuer as of, and for, the periods presented in this report;
4. The issuer's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the issuer and have:
   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the issuer, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
   (c) Evaluated the effectiveness of the issuer's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
   (d) Disclosed in this report any change in the issuer's internal control over financial reporting that occurred during the period covered by the annual report that has materially affected, or is reasonably likely to materially affect, the issuer's internal control over financial reporting; and
5. The issuer's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the issuer's auditors and the audit committee of the issuer's board of directors (or persons performing the equivalent functions):
   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the issuer's ability to record, process, summarize and report financial information; and
   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the issuer's internal control over financial reporting.

November 29, 2017

/s/ David I. McKay
Name: David I. McKay
Title: President and Chief Executive Officer

Exhibit 31.2

SOX 302 CERTIFICATION

I, Rod Bolger, certify that:

1. I have reviewed this annual report on Form 40-F of Royal Bank of Canada;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the issuer as of, and for, the periods presented in this report;
4. The issuer's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the issuer and have:
   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the issuer, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
   (c) Evaluated the effectiveness of the issuer's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
   (d) Disclosed in this report any change in the issuer's internal control over financial reporting that occurred during the period covered by the annual report that has materially affected, or is reasonably likely to materially affect, the issuer's internal control over financial reporting; and
5. The issuer's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the issuer's auditors and the audit committee of the issuer's board of directors (or persons performing the equivalent functions):
   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the issuer's ability to record, process, summarize and report financial information; and
   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the issuer's internal control over financial reporting.

November 29, 2017

/s/ Rod Bolger
Name: Rod Bolger
Title: Chief Financial Officer

Exhibit 32.1

CERTIFICATIONS

Pursuant to section 906 of the Sarbanes-Oxley Act of 2002 (subsections (a) and (b) of section 1350, chapter 63 of title 18, United States Code), the undersigned officer of Royal Bank of Canada, a Canadian chartered Bank (the "Bank"), hereby certifies, to such officer's knowledge, that:

The annual report on Form 40-F for the year ended October 31, 2017 (the "Report") of the Bank fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934 and information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Bank.

Dated: November 29, 2017

/s/ David I. McKay

Name: David I. McKay
Title: President and Chief Executive Officer

Exhibit 32.2

CERTIFICATIONS

Pursuant to section 906 of the Sarbanes-Oxley Act of 2002 (subsections (a) and (b) of section 1350, chapter 63 of title 18, United States Code), the undersigned officer of Royal Bank of Canada, a Canadian chartered Bank (the "Bank"), hereby certifies, to such officer's knowledge, that:

The annual report on Form 40-F for the year ended October 31, 2017 (the "Report") of the Bank fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934 and information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Bank.

Dated: November 29, 2017

/s/ Rod Bolger

Name: Rod Bolger
Title: Chief Financial Officer