Royal Bank of Canada

Pillar 3 Report

As at January 31, 2019

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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 Pillar 3 Report, our 2018 Annual Report, in Q1 2019 Report to Shareholders, in other filings with Canadian regulators or the SEC, in other reports to shareholders and in other communications. 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 and management objectives 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. Additional information about certain risk factors can be found in the risk sections of our 2018 Annual Report and the Risk Management section of our Q1 2019 Report to Shareholders. When relying on our forward-looking statements to make decisions with respect to us, investors and others should carefully consider these risk factors as well as other uncertainties and potential events. 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.

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 84,000+ 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 33 other countries.

Our business segments include Personal & Commercial Banking, Wealth Management, Insurance, Investor & Treasury Services, and Capital Markets. 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.

Capital framework

Our consolidated regulatory capital requirements are determined by guidelines issued by the Office of the Superintendent of the Financial Institutions (OSFI), which are based on the Basel III framework adopted by the Basel Committee on Banking Supervision (BCBS).

The Basel III framework integrates three “Pillars” to establish a robust foundation for banking supervision and financial stability:

- Pillar 1 prescribes minimum capital requirements and addresses capital adequacy, including standards for calculating risk-weighted assets (RWA);
- Pillar 2 requires the establishment of internal assessment processes and supervisory review to evaluate the risk profile and capital adequacy of banks;
- Pillar 3 enhances the consistency and comparability of risk and capital profiles between banks and across jurisdictions for market participants through meaningful disclosures.

Under Basel III, banks use defined approaches to calculate their minimum regulatory capital required to support various risks and exposure types including credit, counterparty credit, market, operational, and securitizations exposures. We determine our regulatory leverage ratio based on OSFI’s Leverage Requirements (LR) Guideline, which reflects the BCBS Basel III leverage ratio requirements. Refer to the “Capital management” section of our 2018 Annual Report for further information on calculation approaches. Refer to the following sections in this report for further information on the respective approaches:

- Credit Risk
- Counterparty Credit Risk
- Market Risk
- Operational Risk
- Securitization Exposures

In January 2015, the BCBS published the “Revised Pillar 3 Disclosure Requirements” (Revised Standards) to encourage market discipline through regulatory disclosure requirements. The Revised Standards require comprehensive disclosure of our risks and regulatory capital including our methodologies used in calculating capital requirements instituted under Pillar 1. Existing requirements in the areas of credit risk, counterparty credit risk and securitization activities are replaced by the Revised Standards. OSFI mandated the domestic implementation of the first phase of the Revised Standards for Canadian domestic systemically important banks (D-SIBs) for the reporting period ending October 31, 2018. This Pillar 3 report provides disclosures reflective of this first phase of the Revised Standards.

Capital framework (continued)

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 disclosure standard consolidates all existing Pillar 3 disclosure requirements of the Basel III framework, including the leverage and liquidity ratios disclosure templates. OSFI has not yet released the implementation date for the BCBS phase two disclosure requirements.

In December 2018, the BCBS finalized the last phase (phase three) of its disclosure requirements entitled "Pillar 3 disclosure requirements – updated framework". These additional disclosure requirements relate to Basel III Reforms which will become effective Q1 2022 and certain additional new disclosures mandated in relation to asset encumbrance, capital distribution constraint and prudential treatment of problem assets which become effective by year end 2020. OSFI has not yet released the implementation date for BCBS phase three disclosures.

Effective November 1, 2019, OSFI adopted the BCBS frameworks related to the Standardized approach to counterparty credit risk (SA-CCR), capital requirements for bank exposures to central counterparties (CCPs) and the revised securitization framework as incorporated in the OSFI's Capital Adequacy Requirements (CAR) guideline. Our Q1 2019 figures reported in this Pillar 3 document reflect the CAR guideline requirements.

Refer to our Q1 2019 Report to Shareholders, Capital, liquidity and other regulatory developments section for further information on other upcoming regulatory reforms.

TLAC framework

The Canadian Bail-in regime, including OSFI's Total Loss Absorbing Capacity (TLAC) Framework Guideline, came into effect on September 23, 2018. The purpose of the TLAC requirement is to address the sufficiency of a Canadian Domestic Systemically Important Bank's (D-SIB) 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 (senior bail-in debt), which includes senior unsecured debt with an original term to maturity of greater than 400 days and remaining term to maturity of greater than 365 days. Under the Bail-in regime, bail-in debt which would ordinarily rank equally to Other Liabilities in liquidation, is subject to conversion under statutory resolution powers whereas Other Liabilities are not subject to such conversion.

TLAC requirements establish two minimum standards; which are required to be met effective November 1, 2021: the risk-based TLAC ratio, which builds on the risk-based capital ratios described in the CAR guideline, and the TLAC leverage ratio, which builds on the leverage ratio described in OSFI's Leverage Requirements guideline. The risk-based TLAC ratio is defined as TLAC divided by Total risk-weighted assets (RWA) while the TLAC leverage ratio is defined as TLAC divided by the Leverage ratio exposure. OSFI has provided notification requiring systemically important banks to maintain a minimum TLAC ratio of 23.25% (inclusive of the revised domestic stability buffer of 1.75% which is effective Q2 2019) and a TLAC leverage ratio of 6.75%. We began issuing TLAC eligible debt in Q4 2018 and our TLAC ratio is 15.7% as at January 31, 2019. Our TLAC ratio is expected to increase through normal course refinancing of maturing debt through the effective date of the TLAC requirements.

In May 2018, OSFI published its TLAC Disclosure Guideline for Canadian D-SIBs. The disclosure requirements reflect the BCBS TLAC disclosure requirements as outlined in the BCBS March 2017 phase two requirements mentioned above. Four additional tables have been added in our Q1 2019 Pillar 3 document to comply with OSFI's Pillar 3 TLAC disclosure requirements.

DISCLOSURE MAP

Pillar 3 Requirement	Pillar 3 Requirement		2018 Annual Report section	Sub-section	2018 Annual Report Reference
Overview of key metrics, risk management and RWA	KM1				
	OVA	a) Business model and risk profile	Risk management - Overview	Objectives and Risk Management Principles	49
				Risk pyramid	50
			Top and emerging risks	Top and emerging risks	50-51
			Enterprise risk management	Risk governance	52
				Risk appetite	53
				Risk measurement	53
				Risk control	54
		b) Risk governance structure	Enterprise risk management	Risk governance	52
				Risk control	54
		c) Communication and enforcement of risk culture within the bank	Enterprise risk management	Risk conduct and culture	55
		d) Scope and main features of risk measurement systems	Enterprise risk management	Risk measurement	53
		e) Risk information reporting	Enterprise risk management	Risk control – *Reporting*	55
		f) Stress testing	Enterprise risk management	Risk measurement – *Stress testing*	53-54
			Market risk	Stress tests	67
			Systemic risk	n/a	87-88
		g) Strategies and processes applied to manage, hedge and mitigate risks	Enterprise risk management	Risk appetite	53
				Risk measurement	53
				Risk control	54
			Credit risk	Overview	56
				Credit risk measurement	56
				Credit risk assessment	57-58
				Credit risk mitigation	59
				Credit risk approval	59
				Credit risk administration	59
			Market risk	Market risk controls – FVTPL positions	67
				Value-at-Risk and Stressed Value-at-Risk	67
				Stress tests	67
				Market risk controls – Structural Interest Rate Risk (SIRR)	69
				SIRR measurement	69
				Non-trading foreign exchange rate risk	70
			Liquidity and funding risk	Overview	72
				Risk control	73
				Risk measurement	73
				Funding	75
				Liquidity coverage ratio	79
			Insurance risk	Insurance risk	83
			Operational risk	Overview	83
				Operational risk framework	83
			Regulatory compliance risk	Regulatory compliance risk	85
			Strategic risk	Strategic risk	85
			Reputation risk	Reputation risk	85
			Competitive risk	Competitive risk	87
			Systemic risk	Systemic risk	87-88
			Consolidated Financial Statements	Note 8 – Derivative financial instruments and hedging activities - *Derivatives issued for trading purposes*	171
				Note 8 – Derivative financial instruments and hedging activities - *Derivatives issued for other than trading purposes*	171
				Note 8 – Derivative financial instruments and hedging activities - *Derivative-related credit risk*	173-174
	OV1				

DISCLOSURE MAP (continued)

Pillar 3 Requirement	Pillar 3 Requirement		2018 Annual Report section	Sub-section	2018 Annual Report Reference
Linkages between financial statements and regulatory exposures	LI1				
	LI2				
	LIA				
Credit risk	CRA	a) Translation of the business model into the components of the bank's credit risk profile	Credit risk	Overview	56
				Gross credit risk exposure	57
		b) Criteria and approach used for defining credit risk management policy and for setting credit risk limits	Enterprise risk management	Risk governance	52
				Risk appetite	53
				Risk measurement	53
				Risk control - *Authorities and limits*	55
			Credit risk	Overview	56
				Credit risk assessment	57-58
				Credit risk mitigation	59
				Credit risk approval	59
		c) Structure and organization of the credit risk management and control function	Enterprise risk management	Risk governance	52
				Risk control	54
		d) Interaction between the credit risk management, risk control, compliance and internal audit functions	Enterprise risk management	Risk governance	52
		e) Scope and content of the reporting on credit risk exposure to the executive management and to the board of directors	Enterprise risk management	Risk governance	52
				Risk control - *Reporting*	55
	CR1				
	CR2 [1]				
	CRB	a) The scope and definitions of "past due" and "impaired" exposures used for accounting purposes and the differences, if any, between the definition of past due and default for accounting and regulatory purposes.	Consolidated Financial Statements	Note 2 – Summary of significant accounting policies, estimates and judgments - *Definition of default* *Credit impaired financial assets (Stage 3)*	125
		b) The extent of past-due exposures (more than 90 days) that are not considered to be impaired and the reasons for this.	Consolidated Financial Statements	Note 2 – Summary of significant accounting policies, estimates and judgments - *Definition of default*	125
		c) Description of methods used for determining impairments.	Consolidated Financial Statements	Note 2 – Summary of significant accounting policies, estimates and judgments - *Allowance for credit losses*	123-126, 129
		d) The bank's own definition of a restructured exposure.	Consolidated Financial Statements	Note 2 – Summary of significant accounting policies, estimates and judgments - *Modifications*	126
	CRC	a) Core features of policies and processes for, and an indication of the extent to which the bank makes use of, on– and off–balance sheet netting	Credit risk	Counterparty credit risk	58
			Consolidated Financial Statements	Note 8 – Derivative financial instruments and hedging activities – *Derivative-related credit risk*	173-174
			Consolidated Financial Statements	Note 30 – Offsetting financial assets and financial liabilities	207-208
		b) Core features of policies and processes for collateral evaluation and management	Credit risk	Credit risk mitigation - *Collateral*	59
		c) Information about market or credit risk concentrations under the credit risk mitigation instruments used	Credit risk	Credit risk mitigation	59
				Credit risk approval - *Credit risk limits*	59
			Consolidated Financial Statements	Note 8 – Derivative financial instruments and hedging activities	170-178

[1]Requirement for disclosure of this table is only semi-annual.

DISCLOSURE MAP (continued)

Pillar 3 Requirement	Pillar 3 Requirement		2018 Annual Report section	Sub-section	2018 Annual Report Reference
Credit risk (continued)	CR3 [1]				
	CRD				
	CR4				
	CR5				
	CRE				
	CR6				
	CR7				
	CR8				
	CR9 [2]				
	CR10		n/a	n/a	n/a
Counterparty credit risk	CCRA	a) Risk management objectives and policies related to counterparty credit risk	Credit risk	Credit risk assessment – *Counterparty credit risk*	58
			Consolidated Financial Statements	Note 8 – Derivative financial instruments and hedging activities – *Derivative-related credit risk*	173-174
			Consolidated Financial Statements	Note 2 – Summary of significant accounting policies, estimates and judgements – *Derivatives*	126, 129, 133-134
		b) The method used to assign the operating limits defined in terms of internal capital for counterparty credit exposures and for CCP exposures	Credit risk	Credit risk assessment – *Counterparty credit risk*	58
		c) Policies relating to guarantees and other risk mitigants and assessments concerning counterparty credit risk, including exposures towards CCPs	Credit risk	Credit risk assessment – *Counterparty credit risk*	58
			Consolidated Financial Statements	Note 8 – Derivative financial instruments and hedging activities – *Derivative-related credit risk*	173-174
			Consolidated Financial Statements	Note 30 – Offsetting financial assets and financial liabilities	207-208
		d) Policies with respect to wrong-way risk exposures	Credit risk	Credit risk assessment – *Counterparty credit risk*	58
		e) The impact in terms of the amount of collateral that the bank would be required to provide given a credit rating downgrade	Liquidity and funding risk	Credit ratings	78
	CCR1				
	CCR2				
	CCR3				
	CCR4				
	CCR5 [1]				
	CCR6 [1]				
	CCR7		n/a	n/a	n/a
	CCR8	f) Exposures to central counterparties			

[1]Requirement for disclosure of this table is only semi-annual.
[2]Requirement for disclosure of this table is only annual.

DISCLOSURE MAP (continued)

Pillar 3 Requirement	Pillar 3 Requirement		2018 Annual Report section	Sub-section	2018 Annual Report Reference
Securitization	SECA	a) Objectives in relation to securitization activities	Off-balance sheet arrangements	Off-balance sheet arrangements	47-49
			Consolidated Financial Statements	Note 6 – Derecognition of financial assets	166
			Consolidated Financial Statements	Note 7 – Structured entities	167-170
		b) List of SPEs where RBC is sponsor / provides implicit support	Consolidated Financial Statements	Note 7 – Structured entities	167-170
		c) Accounting policies for securitization	Consolidated Financial Statements	Note 2 – Summary of significant accounting policies, estimates and judgments – Basis of consolidation	121-122
				Note 2 – Summary of significant accounting policies, estimates and judgments – Derecognition of financial assets	133
			Critical accounting policies and estimates	Consolidation of structured entities	102
		d) the names of external credit assessment institution (ECAIs) used for securitizations and the types of securitization exposure for which each agency is used	Capital Management (also refer to CRD in this document)	Regulatory capital approach for securitization exposures	98-99
		e) Use of Basel IAA for capital purposes	Credit risk	n/a	56-59
			Capital Management	Regulatory capital approach for securitization exposures	98-99
		f) Use of other internal assessment for capital purposes	Credit risk	Credit risk assessment	57-58
	SEC1	Securitization exposures in the banking book			
	SEC2	Securitization activities in the trading book			
	SEC3	Securitization exposures in the banking book and associated regulatory capital requirements - bank acting as originator or as sponsor			
	SEC4	Securitization exposures in the banking book and associated capital requirements - bank acting as investor			
Market risk	MRA	a) Processes implemented to identify, measure, monitor and control the bank's market risks	Market risk	Market risk controls – FVTPL positions	67
				Stress Tests	67
				Market risk measures – FVTPL positions	68
				Market risk measures for other FVTPL positions – Assets and liabilities of RBC Insurance	69
				Market risk controls – Structural Interest Rate Risk (SIRR) positions	69
				SIRR measurement	69
				Market risk measures – Structural Interest Rate Sensitivities	69
				Market risk measures for other material non-trading portfolios	70
		Policies for hedging risk and strategies/processes for monitoring the continuing effectiveness of hedges	Consolidated Financial Statements	Note 2 – Summary of significant accounting policies, estimates and judgements – *Hedge accounting*	134
		b) Description of the market risk governance structure established to implement the strategies and processes of the bank	Enterprise risk management	Risk Governance	52
				Risk Appetite	53
				Risk Measurement	53
				Risk Control	54
				Stress Testing	53-54
				Risk Conduct and Culture	55
		Description of the relationships and the communication mechanisms between the different parties involved in market risk management	Enterprise risk management	Risk governance	52
				Risk Control	54

DISCLOSURE MAP (continued)

Pillar 3 Requirement	Pillar 3 Requirement		2018 Annual Report section	Sub-section	2018 Annual Report Reference
Market risk (continued)	MRA (continued)	c) Scope and nature of risk reporting and/or measurement systems	Enterprise risk management	Risk Measurement	53
				Risk Control	54
				Stress Testing	53-54
			Market risk	Market risk controls – FVTPL positions	67
				Stress Tests	67
				Market risk measures – FVTPL positions	68
				Market risk measures for other FVTPL positions - Assets and liabilities of RBC Insurance	69
				Market risk controls – Structural Interest Rate Risk (SIRR) positions	69
				SIRR measurement	69
				Market risk measures – Structural Interest Rate Sensitivities	69
				Market risk measures for other material non-trading portfolios	70
	MRB	c) General description of the models (VaR/stressed VaR)	Market risk	Market risk controls – FVTPL positions	67
		g) Description of stress testing applied to the modelling parameters	Market risk	Stress Tests	67
	MR1				
	MR2				
	MR3				
	MR4 [1]				
Total loss absorbing capacity	KM2				
	TLAC1				
	TLAC2				
	TLAC3				
Operational Risk		a) Details of the approach for operational risk capital assessment for which the bank qualifies	Operational risk	Operational risk capital	84
			Capital management	Attributed capital in the context of our business activities	97-98
		b) Description of the advanced measurement approaches for operational risk (AMA)	Operational risk	Operational risk capital	84
			Capital management	Attributed capital in the context of our business activities	97-98
		c) Description of the use of insurance for the purpose of mitigating operational risk	Operational risk	Operational risk capital	84
Interest rate risk in the banking book			Market risk	Market risk	67-72

[1]Requirement for disclosure of this table is only annual.

OVERVIEW OF KEY METRICS, RISK MANAGEMENT AND RWA

KM1: Key Capital and Leverage metrics (at consolidated group level)

	(Millions of Canadian dollars)	a January 31 2019	b October 31 2018	c Change
	Available capital (amounts)			
1	Common Equity Tier 1 (CET1)	57,963	57,001	962
2	Tier 1	64,341	63,279	1,062
3	Total capital	73,758	72,494	1,264
	Risk-weighted assets (amounts)			
4	Total risk-weighted assets (RWA)	508,512	496,459	12,053
	Risk-based capital ratios as a percentage of RWA			
5	Common Equity Tier 1 ratio	11.4%	11.5%	-0.1%
6	Tier 1 ratio	12.7%	12.8%	-0.1%
7	Total capital ratio	14.5%	14.6%	-0.1%
	Additional CET1 buffer requirements as a percentage of RWA			
8	Capital conservation buffer requirement	2.5%	2.5%	-
9	Countercyclical buffer requirement	-	-	-
10	Bank G-SIB and/or D-SIB additional requirements	1.0%	1.0%	-
11	Total of bank CET1 specific buffer requirements (row 8 + row 9 + row 10)	3.5%	3.5%	-
12	CET1 available after meeting the bank's minimum capital requirements (row 5 - 8%)[1]	3.4%	3.5%	-0.1%
	Basel III leverage ratio			
13	Total Basel III leverage ratio exposure measure	1,501,830	1,450,769	51,061
14	Basel III leverage ratio (row 2 / row 13)	4.3%	4.4%	-0.1%

[1] 8% reflects minimum capital requirements which includes D-SIB/G-SIB surcharge, and excludes the OSFI Domestic Stability Buffer of 1.5% (1.75% in April 2019). Refer to our Capital Management section of our 2018 Annual Report and Q1 Report to Shareholders.

Our CET1 ratio was 11.4%, down 10 bps from last quarter, mainly reflecting higher RWA due to business growth, regulatory changes relating to the phase-out of the CVA scalars, adoption of the SA-CCR framework and revised securitization framework, and share repurchases, offset by internal capital generation.

Total RWA of $509 billion, increased $12 billion from previous quarter, and CET1 RWA increased $13 billion from previous quarter. The difference between Total RWA and CET1 RWA in the previous quarter was due to the CVA scalar adjustments, which were phased out beginning this quarter. Increase in RWA was driven by business growth in wholesale and retail lending, and market risk portfolios. The impact of regulatory changes in the current quarter, as noted previously, also contributed to the increase.

Our Tier 1 capital ratio of 12.7% was down 10 bps, reflecting the factors noted above under the CET1 ratio. Tier 1 capital ratio was also favourably impacted by net preferred share issuances.

Our Total capital ratio of 14.5% was down 10 bps, reflecting the factors noted above under the Tier 1 ratio.

Our Leverage ratio of 4.3% was down 10 bps from last quarter, primarily due to growth in leverage ratio exposures, mainly in loans and securities, regulatory changes, and share repurchases, offset by internal capital generation.

OVA: Bank risk management approach

The table below presents an overview of Pillar 3 disclosure requirements that have been met within our 2018 Annual Report and incorporated by reference into this Pillar 3 report. Our 2018 Annual Report is available free of charge on our website at http://www.rbc.com/investorrelations

Pillar 3 disclosures requirement		RBC 2018 Annual Report section	Sub-section
a)	Business model and risk profile	Risk management overview	Objectives and Risk Management Principles
			Risk pyramid
		Top and emerging risks	Top and emerging risks
		Enterprise risk management	Risk governance
			Risk appetite
			Risk measurement
			Risk control
b)	Risk governance structure	Enterprise risk management	Risk governance
			Risk control
c)	Communication and enforcement of risk culture within the bank	Enterprise risk management	Risk conduct and culture
d)	Scope and main features of risk measurement systems	Enterprise risk management	Risk measurement
e)	Risk information reporting	Enterprise risk management	Risk control – *Reporting*
f)	Stress testing	Enterprise risk management	Risk measurement – *Stress testing*
		Market risk	Stress tests
		Systemic risk	n/a
g)	Strategies and processes applied to manage, hedge and mitigate risks	Enterprise risk management	Risk appetite
			Risk measurement
			Risk control
		Credit risk	Overview
			Credit risk measurement
			Credit risk assessment
			Credit risk mitigation
			Credit risk approval
			Credit risk administration
		Market risk	Market risk controls – FVTPL positions
			Value-at-Risk and Stressed Value-at-Risk
			Stress tests
			Market risk controls – Structural Interest Rate Risk (SIRR) positions
			SIRR measurement
			Non-trading foreign exchange rate risk
		Liquidity and funding risk	Overview
			Risk control
			Risk measurement
			Funding
			Liquidity coverage ratio
		Insurance risk	Insurance risk
		Operational risk	Overview
			Operational risk framework
		Regulatory compliance risk	Regulatory compliance risk
		Strategic risk	Strategic risk
		Reputation risk	Reputation risk
		Competitive risk	Competitive risk
		Systemic risk	Systemic risk
		Consolidated Financial Statements	Note 8 - Derivative financial instruments and hedging activities – *Derivatives issued for trading purposes*
			Note 8 - Derivative financial instruments and hedging activities – *Derivatives issued for other-than-trading purposes*
			Note 8 - Derivative financial instruments and hedging activities – *Derivative-related credit risk*

OV1: Overview of risk weighted assets (RWA)

The following table presents an overview of our RWA and the related minimum capital requirements by risk type.

		a	b	c	d
		RWA		Minimum capital requirements[1]	RWA
	(Millions of Canadian dollars)	January 31 2019	October 31 2018	January 31 2019	Change (a-b)
1	**Credit risk (excluding counterparty credit risk)**	**335,832**	**331,613**	**26,866**	**4,219**
2	Of which Standardized approach (SA)	78,239	77,266	6,259	973
3	Of which Internal rating-based (IRB) approach	257,593	254,347	20,607	3,246
4	**Counterparty credit risk (CCR)**	**47,375**	**43,443**	**3,789**	**3,932**
4a	Of which other CCR[2]	10,452	30,108	836	(19,656)
4b	Credit valuation adjustment (CVA)	13,580	13,335	1,086	245
5	Of which Standardised approach for counterparty credit risk (SA-CCR)[2]	23,343	-	1,867	23,343
6	Of which Internal model method (IMM)	-	-	-	-
7	Equity positions in banking book under market-based approach	2,244	2,209	180	35
8	Equity investments in funds – look-through approach	-	-	-	-
9	Equity investments in funds – mandate-based approach	2,232	2,075	179	157
10	Equity investments in funds – fall-back approach	121	125	10	(4)
11	Settlement risk	399	498	32	(99)
12	**Securitisation exposures in banking book**	**10,072**	**10,320**	**805**	**(248)**
12a	Of which transitional grandfathering adjustment	(6,888)	-	(551)	(6,888)
13	Of which IRB ratings-based approach (SEC-IRBA)	480	-	38	480
14	Of which External ratings-based approach (SEC-ERBA)	13,555	10,320	1,084	3,235
15	Of which Standardized approach (SEC-SA)	2,925	-	234	2,925
16	**Market risk**	**34,862**	**32,209**	**2,789**	**2,653**
17	Of which Standardized approach (SA)	12,979	12,976	1,038	3
18	Of which Internal model approaches (IMA)	21,883	19,233	1,751	2,650
19	**Operational risk**	**63,647**	**62,716**	**5,092**	**931**
20	Of which Basic Indicator Approach	-	-	-	-
21	Of which Standardized Approach	5,314	5,194	425	120
22	Of which Advanced Measurement Approach	58,333	57,522	4,667	811
23	Amounts below the thresholds for deduction (subject to 250% risk weight)	11,728	11,251	938	477
24	Floor adjustment	-	-	-	-
25	**Total (1+4+7+8+9+10+11+12+16+19+23+24)**	**508,512**	**496,459**	**40,680**	**12,053**

[1] Amount reflects BCBS 8% minimum capital requirements determined as RWA x 8% (i.e. column a x 8 %).

[2] October 31, 2018 CCR figures reflect the Current Exposure Method for derivatives and securities financing in row 4a. Effective Q1 2019, the SA-CCR methodology was adopted for derivatives as per OSFI requirements and is reflected in row 5.

During the quarter, Total RWA increased by $12 billion, and CET1 RWA increased by $13 billion. Total RWA changes are driven by the following:

Credit risk
RWA increase of $4.2 billion, primarily reflecting business growth in our wholesale and retail lending. Composition of Standardized and IRB RWA remain consistent quarter over quarter.

Counterparty credit risk
The adoption of the Standardized Approach to Counterparty Credit Risk in determining EAD for derivatives, and the phase out of the CVA scaling factor have contributed majority to the increase in Counterparty credit risk RWA.

Securitization exposures in banking book
Securitization RWA remain relatively flat this quarter. The revised securitization framework became effective for RBC beginning Q1 2019; however, OSFI has granted a transitional grandfathering adjustment on all existing transactions prior to October 31, 2018, which defers the impact on adoption by one year.

Market risk
RWA increased by $2.7 billion, primarily due to movement in risk levels and FX translation impact of a weaker Canadian dollar.

Operational risk
RWA increased by $0.9 billion, driven mainly by revenue growth.

LINKAGES BETWEEN FINANCIAL STATEMENTS AND REGULATORY EXPOSURES

LI1: Differences between accounting and regulatory scopes of consolidation and mapping of financial statement categories with regulatory risk categories

The following table provides the differences between carrying values presented in our financial statements prepared in accordance with International Financial Reporting Standards (IFRS) and our regulatory exposures. It further breaks down the amounts in our financial statements into regulatory risk categories.

As at January 31, 2019

	a	b	c	d	e	f	g
			Carrying values of items:[1]				
(Millions of Canadian dollars)	Carrying values as reported in published financial statements	Carrying values under scope of regulatory consolidation	Subject to credit risk framework	Subject to counterparty credit risk framework	Subject to the securitization framework	Subject to the market risk framework	Not subject to capital requirements or subject to deduction from capital
Assets							
Cash and due from banks	40,033	40,031	40,031	-	-	-	-
Interest-bearing deposits with banks	38,653	38,653	38,653	-	-	-	-
Securities							
Trading	138,173	129,595	1,523	-	86	127,986	-
Investment, net of applicable allowance	97,659	95,534	82,490	-	13,044	-	-
	235,832	225,129	84,013	-	13,130	127,986	-
Assets purchased under reverse repurchase agreements and securities borrowed	297,660	297,660	-	297,660	-	-	-
Loans							
Retail	401,767	401,478	393,012	-	-	-	8,466
Wholesale	191,114	189,008	175,609	516	8,005	3,441	1,437
	592,881	590,486	568,621	516	8,005	3,441	9,903
Allowance for loan losses	(3,061)	(3,061)	-	-	-	-	(3,061)
	589,820	587,425	568,621	516	8,005	3,441	6,842
Segregated fund net assets	1,443	-	-	-	-	-	-
Other							
Customers' liability under acceptances	16,750	16,750	16,750	-	-	-	-
Derivatives[2]	84,816	85,070	-	85,070	-	82,607	-
Premises and equipment, net	2,918	2,915	2,915	-	-	-	-
Goodwill	11,149	11,149	-	-	-	-	11,149
Other intangibles	4,711	4,624	-	-	-	-	4,624
Other assets	42,422	44,003	20,894	19,762	23	2,886	438
	162,766	164,511	40,559	104,832	23	85,493	16,211
Total assets[2]	**1,366,207**	**1,353,409**	**771,877**	**403,008**	**21,158**	**216,920**	**23,053**
Liabilities and equity							
Deposits							
Personal	280,171	280,171	-	-	-	-	280,171
Business and government	540,234	540,578	-	-	-	-	540,578
Bank	32,159	32,159	-	-	-	-	32,159
	852,564	852,908	-	-	-	-	852,908
Segregated fund net liabilities	1,443	-	-	-	-	-	-
Other							
Acceptances	16,781	16,781	-	-	-	-	16,781
Obligations related to securities sold short	33,242	33,242	-	-	-	-	33,242
Obligations related to assets sold under repurchase agreements and securities loaned	224,529	224,529	-	224,529	-	-	-
Derivatives[2]	81,766	81,766	-	81,766	-	79,690	-
Insurance claims and policy benefit liabilities	10,512	-	-	-	-	-	-
Other liabilities	55,465	54,264	-	-	-	-	54,264
	422,295	410,582	-	306,295	-	79,690	104,287
Subordinated debentures	9,255	9,255	-	-	-	-	9,255
Total liabilities[2]	1,285,557	1,272,745	-	306,295	-	79,690	966,450
Equity attributable to shareholders							
Preferred shares	6,406	6,406	-	-	-	-	6,406
Common shares	17,565	17,565	-	-	-	-	17,565
Retained earnings	52,208	52,219	-	-	-	-	52,219
Other components of equity	4,374	4,377	-	-	-	-	4,377
	80,553	80,567	-	-	-	-	80,567
Non-controlling interests	97	97	-	-	-	-	97
Total equity	80,650	80,664	-	-	-	-	80,664
Total liabilities and equity[2]	**1,366,207**	**1,353,409**	**-**	**306,295**	**-**	**79,690**	**1,047,114**

[1] Column c to g reflect a further breakout of column b by providing the respective CAR guideline frameworks utilized.

[2] Derivative assets and liabilities are subject to both counterparty credit risk and market risk framework – hence column b will not equal to the sum of column c to g.

LI1: Differences between accounting and regulatory scopes of consolidation and mapping of financial statement categories with regulatory risk categories (continued)

As at October 31, 2018

	a	b	c	d	e	f	g
			Carrying values of items:[1]				
(Millions of Canadian dollars)	Carrying values as reported in published financial statements	Carrying values under scope of regulatory consolidation	Subject to credit risk framework	Subject to counterparty credit risk framework	Subject to the securitization framework	Subject to the market risk framework	Not subject to capital requirements or subject to deduction from capital
Assets							
Cash and due from banks	30,209	30,207	30,207	-	-	-	-
Interest-bearing deposits with banks	36,471	36,471	36,471	-	-	-	-
Securities							
Trading	128,258	120,162	1,432	-	187	118,543	-
Investment, net of applicable allowance	94,608	92,555	79,685	-	12,870	-	-
	222,866	212,717	81,117	-	13,057	118,543	-
Assets purchased under reverse repurchase agreements and securities borrowed	294,602	294,602	-	294,602	-	-	-
Loans							
Retail	399,452	399,167	389,534	-	-	-	9,633
Wholesale	180,278	178,280	166,566	479	6,474	3,477	1,284
	579,730	577,447	556,100	479	6,474	3,477	10,917
Allowance for loan losses	(2,912)	(2,912)	-	-	-	-	(2,912)
	576,818	574,535	556,100	479	6,474	3,477	8,005
Segregated fund net assets	1,368	-	-	-	-	-	-
Other							
Customers' liability under acceptances	15,641	15,641	15,641	-	-	-	-
Derivatives [2]	94,039	94,125	-	94,125	-	91,192	-
Premises and equipment, net	2,832	2,829	2,829	-	-	-	-
Goodwill	11,137	11,137	-	-	-	-	11,137
Other intangibles	4,687	4,603	-	-	-	-	4,603
Other assets	44,064	45,480	37,554	4,593	23	2,608	702
	172,400	173,815	56,024	98,718	23	93,800	16,442
Total assets[2]	**1,334,734**	**1,322,347**	**759,919**	**393,799**	**19,554**	**215,820**	**24,447**
Liabilities and equity							
Deposits							
Personal	270,154	270,154	-	-	-	-	270,154
Business and government	534,371	534,492	-	-	-	-	534,492
Bank	32,521	32,521	-	-	-	-	32,521
	837,046	837,167	-	-	-	-	837,167
Segregated fund net liabilities	1,368	-	-	-	-	-	-
Other							
Acceptances	15,662	15,662	-	-	-	-	15,662
Obligations related to securities sold short	32,247	32,247	-	-	-	-	32,247
Obligations related to assets sold under repurchase agreements and securities loaned	206,814	206,814	-	206,814	-	-	-
Derivatives2	90,238	90,238	-	90,238	-	87,761	-
Insurance claims and policy benefit liabilities	10,000	-	-	-	-	-	-
Other liabilities	52,273	51,077	-	-	-	-	51,077
	407,234	396,038	-	297,052	-	87,761	98,986
Subordinated debentures	9,131	9,131	-	-	-	-	9,131
Total liabilities[2]	1,254,779	1,242,336	-	297,052	-	87,761	945,284
Equity attributable to shareholders							
Preferred shares	6,309	6,309	-	-	-	-	6,309
Common shares	17,617	17,617	-	-	-	-	17,617
Retained earnings	51,112	51,114	-	-	-	-	51,114
Other components of equity	4,823	4,877	-	-	-	-	4,877
	79,861	79,917	-	-	-	-	79,917
Non-controlling interests	94	94	-	-	-	-	94
Total equity	79,955	80,011	-	-	-	-	80,011
Total liabilities and equity[2]	**1,334,734**	**1,322,347**	**-**	**297,052**	**-**	**87,761**	**1,025,295**

[1] Column c to g reflect a further breakout of column b by providing the respective CAR guideline frameworks utilized.

[2] Derivative assets and liabilities are subject to both counterparty credit risk and market risk framework – hence column b will not equal to the sum of column c to g.

LI2: Main sources of differences between regulatory exposure amounts and carrying values in financial statements

The following table provides the key differences between the exposure amounts for regulatory purposes and the accounting carrying values as presented in our financial statements that are within the scope of regulatory consolidation.

As at January 31, 2019

		a	b	c	d	e
			Items subject to:			
	(Millions of Canadian dollars)	Total	Credit risk framework	Securitization framework	Counterparty credit risk framework	Market risk framework
1	**Asset carrying value amount under scope of regulatory consolidation (as per template LI1)**[1]	**1,330,356**	**771,877**	**21,158**	**403,008**	**216,920**
2	Liabilities carrying value amount under regulatory scope of consolidation (as per template LI1)[1]	306,295	-	-	306,295	79,690
3	Total net amount under regulatory scope of consolidation	1,024,061	771,877	21,158	96,713	137,230
4	Off-balance sheet amounts[2]	1,156,513	311,549	43,639	801,325	-
5	Differences due to Fair Value adjustment	14	14	-	-	(2,917)
6	Differences due to different netting rules, other than those already included in row 2	937	937	-	-	-
7	Differences due to consideration of provisions	330	330	-	-	-
8	Differences due to prudential filters	-	-	-	-	-
9	Difference due to accounting and risk treatment of securitizations and other items	5,251	3,852	1,399	-	-
10	**Exposure amounts considered for regulatory purposes**	**2,187,106**	**1,088,559**	**66,196**	**898,038**	**134,313**

[1] Amount reflects Table LI1 columns (c), (d), (e) and (f) from the previous page. Derivative assets and liabilities are subject to both counterparty credit risk and market risk framework – hence column a will not equal to the sum of column b to e.

[2] Off-balance sheet amounts reflect the application of credit conversion factors.

As at October 31, 2018

		a	b	c	d	e
			Items subject to:			
	(Millions of Canadian dollars)	Total	Credit risk framework	Securitization framework	Counterparty credit risk framework	Market risk framework
1	**Asset carrying value amount under scope of regulatory consolidation (as per template LI1)**[1]	**1,297,900**	**759,919**	**19,554**	**393,799**	**215,820**
2	Liabilities carrying value amount under regulatory scope of consolidation (as per template LI1)[1]	297,052	-	-	297,052	87,761
3	Total net amount under regulatory scope of consolidation	1,000,848	759,919	19,554	96,747	128,059
4	Off-balance sheet amounts[2]	1,114,918	306,189	42,215	766,514	-
5	Differences due to Fair Value adjustment	299	299	-	-	(3,429)
6	Differences due to different netting rules, other than those already included in row 2	995	995	-	-	-
7	Differences due to consideration of provisions	306	306	-	-	-
8	Differences due to prudential filters	-	-	-	-	-
9	Difference due to accounting and risk treatment of securitizations and other items	5,195	3,626	1,569	-	-
10	**Exposure amounts considered for regulatory purposes**	**2,122,561**	**1,071,334**	**63,338**	**863,261**	**124,630**

[1] Amount reflects Table LI1 columns (c), (d), (e) and (f) from the previous page. Derivative assets and liabilities are subject to both counterparty credit risk and market risk framework – hence column a will not equal to the sum of column b to e.

[2] Off-balance sheet amounts reflect the application of credit conversion factors.

LIA: Explanations of differences between accounting and regulatory exposure amounts

Our consolidated balance sheet ("accounting balance sheet") is prepared in compliance with International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board. We leverage our accounting balance sheet to apply the required regulatory requirements prescribed by OSFI to determine our regulatory capital consolidated balance sheet.

In Template LI1: Differences between accounting and regulatory scopes of consolidation and mapping of financial statement categories with regulatory risk categories, we identify the differences between our IFRS consolidated accounting balance sheet (column a in LI1) and our regulatory capital consolidated balance sheet (column b in LI1). Our regulatory capital consolidated balance sheet, on which capital adequacy requirements are determined, reflects all of our consolidated subsidiaries except for our insurance subsidiaries as prescribed by OSFI's CAR guidelines.

In Template LI2: Main sources of differences between regulatory exposure amounts and carrying values in financial statements, we quantify measurement differences other than regulatory consolidation.

Our banking book regulatory carrying values reflect our IFRS accounting balance sheet values except for our fair valued loans and debt securities carried at fair value through other comprehensive income (FVOCI) (available for sale (AFS) under IAS 39), which under the Credit risk framework, are measured at amortized cost. Off-balance sheet regulatory asset values reflect prescribed conversion factors and undrawn amounts.

Regulatory carrying values for our Counterparty credit risk related to our derivative assets and liabilities, assets purchased under reverse repurchase agreements and securities borrowed and obligations related to assets sold under repurchase agreements and securities loaned are determined using OSFI's CAR guidelines Chapter 4 Settlement and Counterparty risk framework. On November 1, 2018, OSFI adopted the BCBS Standardized Approach for measuring Counterparty credit risk for derivative regulatory exposures and we have adopted this methodology for our derivative regulatory exposures. The main differences between the accounting and regulatory amounts for Counterparty credit risk relate to regulatory inclusion of potential future exposure amounts and differences in allowed IFRS and regulatory netting rules, and also application of financial collateral in the calculation of regulatory exposure amount.

The regulatory carrying value of exposures subject to the securitization framework includes our on-balance sheet third party securitization holdings as well as our securitized credit card exposures which meet the risk transference requirements under the CAR guidelines Chapter 7 but are not considered securitized for the purposes of our IFRS accounting balance sheet. Our regulatory carrying values are determined based on the BCBS revised securitization framework adopted by OSFI on November 1, 2018.

Our trading book regulatory carrying values are determined as prescribed under the CAR guidelines Chapter 9. We employ OSFI's prudent valuation guidance requirements, as stated in CAR Chapter 9 section 9.8 to our trading book. Refer to our 2018 Annual Report - Risk Management section which provides further insight into how we measure our market risk and the linkage of market risk to selected balance sheet items.

CREDIT RISK

CRA: General qualitative information about credit risk

The table below presents an overview of Pillar 3 disclosure requirements that have been met within our 2018 Annual Report and incorporated by reference into this Pillar 3 report. Our 2018 Annual Report is available free of charge on our website at http://www.rbc.com/investorrelations

	Pillar 3 disclosures requirement	RBC 2018 Annual Report section	Sub-section
a)	Translation of the business model into the components of the bank's credit risk profile	Credit risk	Overview
			Gross credit risk exposure
b)	Criteria and approach used for defining credit risk management policy and for setting credit risk limits	Enterprise risk management	Risk governance
			Risk appetite
			Risk measurement
			Risk control - *Authorities and limits*
		Credit risk	Overview
			Credit risk assessment
			Credit risk mitigation
			Credit risk approval
c)	Structure and organization of the credit risk management and control function	Enterprise risk management	Risk governance
			Risk control
d)	Interaction between the credit risk management, risk control, compliance and internal audit functions	Enterprise risk management	Risk governance
e)	Scope and content of the reporting on credit risk exposure to the executive management and to the board of directors	Enterprise risk management	Risk governance
			Risk control - *Reporting*

CR1: Credit quality of assets

The following table presents a comprehensive view of the credit quality of our on- and off-balance sheet assets.

As at January 31, 2019

		a	b	c	d
		Gross carrying values of			
	(Millions of Canadian dollars)	Defaulted exposures[1]	Non-defaulted exposures	Allowances/impairments[2]	Net values (a+b-c)
1	Loans	2,642	565,967	3,062	565,547
2	Debt Securities	-	81,808	45	81,763
3	Off-Balance Sheet exposures[3]	265	254,997	203	255,059
4	**Total**	**2,907**	**902,772**	**3,310**	**902,369**

[1] Definition of default as per the CAR guidelines.

[2] Reflects Stage 1, 2 and 3 allowances under IFRS 9.

[3] Off balance sheet amounts are before the application of credit conversion factors and reflect guarantees given and irrevocable loan commitments. Revocable loan commitments are excluded as per BCBS requirements.

As at October 31, 2018

		a	b	c	d
		Gross carrying values of			
	(Millions of Canadian dollars)	Defaulted exposures[1]	Non-defaulted exposures	Allowances/impairments[2,4]	Net values (a+b-c)
1	Loans	2,027	554,073	2,912	553,188
2	Debt Securities	-	79,190	49	79,141
3	Off-Balance Sheet exposures[3]	289	255,609	175	255,723
4	**Total**	**2,316**	**888,872**	**3,136**	**888,052**

[1] Definition of default as per the CAR guidelines.

[2] Reflects Stage 1, 2 and 3 allowances under IFRS 9.

[3] Off balance sheet amounts are before the application of credit conversion factors and reflect guarantees given and irrevocable loan commitments. Revocable loan commitments are excluded as per BCBS requirements.

[4] This prior period number has been restated to reflect all three stages of allowances under IFRS 9 and not only stage 3.

CRB: Additional disclosure related to the credit quality of assets

The table below presents an overview of Pillar 3 disclosure requirements that have been met within our 2018 Annual Report and incorporated by reference into this Pillar 3 report. Our 2018 Annual Report is available free of charge on our website at http://www.rbc.com/investorrelations

Pillar 3 disclosures requirement		RBC 2018 Annual Report section	Sub-section
a)	Definitions of past due and impaired exposures	Consolidated Financial Statements	Note 2 - Summary of significant accounting policies, estimates and judgments "Definition of default" "Credit impaired financial assets (Stage 3)"
b)	Extent of past due exposures	Consolidated Financial Statements	Note 2 - Summary of significant accounting policies, estimates and judgments "Definition of default"
c)	Description of methods used for determining impairments	Consolidated Financial Statements	Note 2 - Summary of significant accounting policies, estimates and judgments "Allowance for credit losses"
d)	Definition of a restructured exposure	Consolidated Financial Statements	Note 2 - Summary of significant accounting policies, estimates and judgments "Modifications”

CRB: Additional disclosure related to the credit quality of assets (continued)

(e) Breakdown of exposures by geographical areas, industry and residual maturity

The following table provides a breakdown of our credit risk exposures by geographical areas, industry and residual maturity. Our classification below reflects the Basel regulatory defined exposure classes. Amounts shown below reflect Exposures at default (EAD), which is the amount expected to be owed by an obligor at the time of default

As at January 31, 2019

	a	b	c	d	e
	Credit Risk[1,2]			Counterparty Credit Risk[5]	
	On-balance sheet amount	Off-balance sheet amount[3]		Repo-style Transaction	Derivatives
(Millions of Canadian dollars)		Undrawn	Other[4]		
Retail					
Residential secured[6]	300,348	61,224			
Qualifying revolving	25,025	70,202			
Other retail	55,704	14,084	71		
Total Retail	**381,077**	**145,510**	**71**		
Wholesale					
Agriculture	8,799	1,723	39	-	64
Automotive	9,898	7,053	359	-	1,215
Banking	40,633	1,788	531	51,701	19,528
Consumer Discretionary	16,770	7,810	611	-	522
Consumer Staples	5,174	6,490	513	-	1,036
Oil & Gas	6,868	10,784	1,440	-	1,370
Financial Services	24,140	22,173	2,903	109,330	15,998
Financing Products	1,351	1,389	358	167	1,017
Forest Products	1,455	743	89	-	40
Governments	119,675	5,962	1,514	8,638	6,711
Industrial Products	6,976	7,803	694	-	719
Information Technology	6,387	5,948	191	-	4,031
Investments	15,870	1,046	389	13	176
Mining & Metals	1,537	4,130	914	-	158
Public Works & Infrastructure	1,932	1,799	424	-	171
Real Estate & Related	56,858	11,259	1,373	-	661
Other Services	25,314	11,332	918	1	1,091
Telecom & Media	6,832	11,822	259	-	1,221
Transportation	5,691	5,857	2,272	-	1,517
Utilities	10,274	18,735	3,900	-	3,059
Other Sectors	2,699	293	1	11	16,652
Total Wholesale	**375,133**	**145,939**	**19,692**	**169,861**	**76,957**
Total Exposure[1]	**756,210**	**291,449**	**19,763**	**169,861**	**76,957**
By Geography[7]					
Canada	522,082	211,263	9,956	75,296	32,521
United States	146,940	59,663	8,520	39,788	17,781
Europe	57,051	18,162	1,151	49,862	22,251
Other International	30,137	2,361	136	4,915	4,404
Total Exposure[1,7]	**756,210**	**291,449**	**19,763**	**169,861**	**76,957**
By Maturity					
Unconditionally cancellable	354,911	143,759	63	-	-
Within 1 year	164,388	48,547	11,051	169,861	39,095
1 to 5 year	203,358	93,341	6,945	-	23,533
Over 5 years	33,553	5,802	1,704	-	14,329
Total Exposure[1]	**756,210**	**291,449**	**19,763**	**169,861**	**76,957**

[1] Excludes securitization, banking book equities and other assets not subject to standardized or IRB approach.
[2] EAD for Standardized exposures are reported net of Stage 3 allowances and EAD for IRB exposures are reported gross of all allowances for credit loss and partial write-off as per regulatory definitions.
[3] EAD for Undrawn credit commitments and other off-balance sheet amounts are reported after the application of credit conversion factors.
[4] Includes other off-balance sheet exposures such as letters of credit & guarantees.
[5] Counterparty credit risk EAD reflects exposure amount after netting. Collateral is included in EAD for repo-style transactions to the extent allowed by regulatory guidelines.
[6] Includes residential mortgages and home equity lines of credit.
[7] Geographic profile is based on the country of residence of the borrower.

CRB: Additional disclosure related to the credit quality of assets (continued)

As at October 31, 2018

	a	b	c	d	e
	Credit Risk[1,2]			Counterparty Credit Risk[5]	
	On-balance sheet amount	Off-balance sheet amount[3]		Repo-style Transaction	Derivatives
(Millions of Canadian dollars)		Undrawn	Other[4]		
Retail					
Residential secured[6]	298,555	59,840			
Qualifying revolving	24,223	65,617			
Other retail	54,170	12,693	52		
Total Retail	**376,948**	**138,150**	**52**		
Wholesale					
Agriculture	8,510	1,760	43	-	45
Automotive	8,936	6,435	345	-	504
Banking	47,868	1,734	549	52,394	26,313
Consumer Discretionary	15,784	7,928	587	-	293
Consumer Staples	4,662	6,316	517	-	672
Oil & Gas	6,186	10,704	1,483	-	1,717
Financial Services	25,798	22,345	2,164	110,246	30,580
Financing Products	1,234	1,269	359	-	352
Forest Products	1,140	933	89	-	23
Governments	110,192	7,566	1,798	9,476	7,182
Industrial Products	7,751	8,219	686	-	455
Information Technology	4,843	5,152	178	15	1,967
Investments	16,157	956	389	11	157
Mining & Metals	1,486	3,886	917	-	184
Public Works & Infrastructure	1,899	1,836	425	-	115
Real Estate & Related	54,490	11,832	1,338	-	385
Other Services	23,892	12,452	877	2	551
Telecom & Media	7,957	12,116	134	-	1,534
Transportation	5,861	5,600	2,185	-	1,270
Utilities	9,357	19,598	3,561	-	2,581
Other Sectors	1,931	303	1	126	11,898
Total Wholesale	365,934	148,940	18,625	172,270	88,778
Total Exposure[1]	**742,882**	**287,090**	**18,677**	**172,270**	**88,778**
By Geography[7]					
Canada	510,445	205,875	9,387	78,172	29,195
United States	147,543	60,172	7,981	41,897	16,059
Europe	54,061	18,450	1,150	48,874	39,719
Other International	30,833	2,593	159	3,327	3,805
Total Exposure[1,7]	**742,882**	**287,090**	**18,677**	**172,270**	**88,778**
By Maturity					
Unconditionally cancellable	352,685	136,478	51	-	-
Within 1 year	173,225	50,952	9,496	172,270	31,377
1 to 5 year	180,322	92,337	7,798	-	34,286
Over 5 years	36,650	7,323	1,332	-	23,115
Total Exposure[1]	**742,882**	**287,090**	**18,677**	**172,270**	**88,778**

[1] Excludes securitization, banking book equities and other assets not subject to standardized or IRB approach.
[2] EAD for Standardized exposures are reported net of Stage 3 allowances and EAD for IRB exposures are reported gross of all allowances for credit loss and partial write-off as per regulatory definitions.
[3] EAD for Undrawn credit commitments and other off-balance sheet amounts are reported after the application of credit conversion factors.
[4] Includes other off-balance sheet exposures such as letters of credit & guarantees.
[5] Counterparty credit risk EAD reflects exposure amount after netting. Collateral is included in EAD for repo-style transactions to the extent allowed by regulatory guidelines.
[6] Includes residential mortgages and home equity lines of credit.
[7] Geographic profile is based on the country of residence of the borrower.

CRB: Additional disclosure related to the credit quality of assets (continued)

(f) Amounts of impaired exposures (according to the definition used by the bank for accounting purposes) and related allowances and write-offs, broken down by geographical areas and industry

The following tables provide a breakdown of impaired exposures by geographical areas and industry.

As at January 31, 2019

Impaired exposures by geography[1] and portfolio (Millions of Canadian dollars)	Gross impaired exposures	Allowance[2]	Net impaired exposures
Canada			
Retail	749	176	573
Wholesale	407	111	296
Securities	-	-	-
Total - Canada	**1,156**	**287**	**869**
United States			
Retail	30	2	28
Wholesale	949	226	723
Securities	-	-	-
Total - United States	**979**	**228**	**751**
Other International			
Retail	331	169	162
Wholesale	316	111	205
Securities	127	3	124
Total - Other International	**774**	**283**	**491**
Total			
Retail	1,110	347	763
Wholesale	1,672	448	1,224
Securities	127	3	124
Total impaired exposures	**2,909**	**798**	**2,111**

[1] Geographic information is based on residence of borrower.

[2] Allowance reflects only Stage 3 IFRS 9 allowances.

As at October 31, 2018

Impaired exposures by geography[1] and portfolio (Millions of Canadian dollars)	Gross impaired exposures	Allowance[2]	Net impaired exposures
Canada			
Retail	723	168	555
Wholesale	396	92	304
Securities	-	-	-
Total - Canada	**1,119**	**260**	**859**
United States			
Retail	23	1	22
Wholesale	401	164	237
Securities	-	-	-
Total - United States	**424**	**165**	**259**
Other International			
Retail	327	166	161
Wholesale	313	109	204
Securities	125	-	125
Total - Other International	**765**	**275**	**490**
Total			
Retail	1,073	335	738
Wholesale	1,110	365	745
Securities	125	-	125
Total impaired exposures	**2,308**	**700**	**1,608**

[1] Geographic information is based on residence of borrower.

[2] Allowance reflects only Stage 3 IFRS 9 allowances.

CRB: Additional disclosure related to the credit quality of assets (continued)

Net write-offs by geography[1] and portfolio (Millions of Canadian dollars)	**For the three months ended January 31, 2019**	**For the three months ended October 31, 2018**
Canada		
Retail	239	246
Wholesale	16	24
Total Canada	**255**	**270**
United States[2]		
Retail	1	1
Wholesale	44	(6)
Total United States	**45**	**(5)**
Other International		
Retail	2	0
Wholesale[2]	1	31
Total Other International	**3**	**31**
Total		
Retail	242	247
Wholesale	61	49
Total net write-offs	**303**	**296**

[1] Geographic information is based on residence of borrower.

[2] Includes acquired credit-impaired loans related to the acquisition of City National.

CRB: Additional disclosure related to the credit quality of assets (continued)

As at January 31, 2019

Impaired exposures by portfolio and sector (Millions of Canadian dollars)	Gross impaired exposures	Allowance[1]	Net impaired exposures
Retail			
Residential mortgages	754	192	562
Personal	310	138	172
Small business	46	17	29
Total Retail	**1,110**	**347**	**763**
Wholesale			
Agriculture	19	2	17
Automotive	7	5	2
Banking	15	1	14
Consumer Discretionary	127	13	114
Consumer Staples	21	3	18
Oil and Gas	226	73	153
Financial Services	83	20	63
Financial Products	-	-	-
Forest Products	5	6	(1)
Governments	9	4	5
Industrial Products	48	21	27
Information Technology	9	4	5
Investments	13	4	9
Mining and Metals	2	1	1
Public Works and Infrastructure	9	1	8
Real Estate and Related	433	127	306
Other Services	82	35	47
Telecom and Media	8	7	1
Transportation	33	19	14
Utilities	460	76	384
Other	63	26	37
Total Wholesale	**1,672**	**448**	**1,224**
Total impaired loans	**2,782**	**795**	**1,987**
Securities	127	3	124
Total impaired exposures	**2,909**	**798**	**2,111**

[1] Allowance reflects only Stage 3 IFRS 9 allowances.

CRB: Additional disclosure related to the credit quality of assets (continued)

As at October 31, 2018

Impaired exposures by portfolio and sector (Millions of Canadian dollars)	Gross impaired exposures	Allowance[1]	Net impaired exposures
Retail			
Residential mortgages	726	176	550
Personal	303	141	162
Small business	44	18	26
Total Retail	**1,073**	**335**	**738**
Wholesale			
Agriculture	29	4	25
Automotive	7	4	3
Banking	18	1	17
Consumer Discretionary	138	43	95
Consumer Staples	23	7	16
Oil and Gas	230	78	152
Financial Services	80	22	58
Financial Products	-	-	-
Forest Products	9	3	6
Governments	15	2	13
Industrial Products	42	13	29
Information Technology	2	-	2
Investments	8	3	5
Mining and Metals	2	-	2
Public Works and Infrastructure	3	1	2
Real Estate and Related	290	110	180
Other Services	73	16	57
Telecom and Media	8	3	5
Transportation	58	31	27
Utilities	8	-	8
Other	67	24	43
Total Wholesale	**1,110**	**365**	**745**
Total impaired loans	**2,183**	**700**	**1,483**
Securities	125	-	125
Total impaired exposures	**2,308**	**700**	**1,608**

[1] Allowance reflects only Stage 3 IFRS 9 allowances.

CRB: Additional disclosure related to the credit quality of assets (continued)

(g) Ageing analysis of accounting past-due exposures

The following table provides the ageing of our retail and wholesale past due exposures.

As at January 31, 2019

(Millions of Canadian dollars)	1 to 29 days	30 to 89 days	90 days and greater	Total
Retail	2,992	1,403	174	4,569
Wholesale	1,562	485	-	2,047
Total	**4,554**	**1,888**	**174**	**6,616**

As at October 31, 2018

(Millions of Canadian dollars)	1 to 29 days	30 to 89 days	90 days and greater	Total
Retail	2,995	1,402	179	4,576
Wholesale	1,246	468	-	1,714
Total	**4,241**	**1,870**	**179**	**6,290**

(h) Breakdown of restructured exposures between impaired and not impaired exposures

Amounts are deemed not significant for disclosure.

CRC: Qualitative disclosure requirements related to credit risk mitigation techniques

The table below presents an overview of Pillar 3 disclosure requirements that have been met within our 2018 Annual Report and incorporated by reference into this Pillar 3 report. Our 2018 Annual Report is available free of charge on our website at http://www.rbc.com/investorrelations

	Pillar 3 disclosures requirement	RBC 2018 Annual Report section	Sub-section
a)	Core features of policies and processes for, and an indication of the extent to which the bank makes use of, on- and off-balance sheet netting	Credit risk	Counterparty credit risk
		Consolidated Financial Statements	Note 8 - Derivative financial instruments and hedging activities – *Derivative-related credit risk*
			Note 30 - Offsetting financial assets and financial liabilities
b)	Core features of policies and processes for collateral evaluation and management	Credit risk	Credit risk mitigation - *Collateral*
c)	Information about market or credit risk concentrations under the credit risk mitigation instruments used	Credit risk	Credit risk mitigation
			Credit risk approval – *Credit risk limits*
		Consolidated Financial Statements	Note 8 - Derivative financial instruments and hedging activities

CRD: Qualitative disclosures on banks' use of external credit ratings under the standardized approach for credit risk

As detailed in section CR4, certain of our portfolios RWA amounts are calculated as per OSFI's CAR Guideline Standardized Approach requirements. OSFI's Standardized Approach methodology allows for the reliance on the external credit ratings of counterparties, issued by independent rating agencies, for the determination of RWA. Five external rating agencies ratings, namely, Standard & Poor's (S&P), Moody's Investors Service, Fitch Rating Services, DBRS and Kroll Bond Rating Agency, Inc. have been approved by OSFI. Currently, external ratings are used to determine the RWA amounts associated with our wholesale exposures under the asset classes of corporate, sovereign, public sector entities, multilateral development banks, banks and securities firms. As well, external ratings are used for determining the risk weighting for certain of our securitizations exposures.

External ratings utilized from the above-mentioned rating agencies are either an issuer rating or an issue-specific rating. We rely on an issue-specific rating if it is available for the purposes of determining RWA for the exposure we hold. We utilize the issuer rating only for our exposures which rank pari-passu with senior claims of the issuer.

Our supervisor, OSFI specifies in its CAR guideline the required standard mapping of long term external ratings of the above rating agencies to an equivalent risk weight. We rely on OSFI's mapping to determine the appropriate risk buckets for our Standardized Approach portfolios under the guideline. OSFI's current mapping of external rating agencies rating is reflected in the table below:

			Long-term rating		
Standardized Risk Weight Category	**S&P**	**Moody's**	**Fitch**	**DBRS**	**Kroll**
Long Term					
(AAA to AA-)	AAA to AA-	AAA to AA3	AAA to AA-	AAA to AA (low)	AAA to AA-
(A+ to A-)	A+ to A-	A1 to A3	A+ to A-	A(high) to A(low)	A+ to A-
(BBB+ to BBB-)	BBB+ to BBB-	BAA1 to BAA3	BBB+ to BBB-	BBB(high) to BBB(low)	BBB+ to BBB-
(BB+ to BB-)	BB+ to BB-	BA1 to BA3	BB+ to BB-	BB(high) to BB(low)	BB+ to BB-
(B+ to B-)	B+ to B-	B1 to B3	B+ to B-	B(high) to B(low)	B+ to B-
(Below B-)	Below B-	Below B3	Below B-	CCC or lower	Below B-

We understand that OSFI annually reviews the list of acceptable rating agencies and will reflect any changes in allowed rating agencies in its annual update to the CAR guidelines.

CR4: Standardized approach – credit risk exposure and credit risk mitigation (CRM) effects

The following table provides the effect of CRM on the calculation of capital requirements under the standardized approach. It presents on-balance sheet and off-balance sheet exposures before and after credit conversion factors (CCF) and CRM as well as associated RWA and RWA density by asset classes. As noted in CRD, the external ratings of the counterparty is relied on to determine the prescribed regulatory risk weight to be assigned.

As at January 31, 2019

		a	b	c	d	e	f
	(Millions of Canadian dollars, except as otherwise noted)	Exposures before CCF and CRM		Exposures post-CCF and CRM		RWA and RWA density	
	Asset Classes	On-balance sheet amount	Off-balance sheet amount	On-balance sheet amount	Off-balance sheet amount	RWA	RWA density
1	Sovereigns and their central banks[1]	13,265	326	30,842	7	46	0.1%
2	Non-central government public sector entities	10,585	33	10,623	16	1,763	16.6%
3	Multilateral development banks	375	-	375	-	-	-
4	Banks	3,640	389	3,640	140	878	23.2%
5	Securities firms[1]	1,096	2,248	2,107	1,025	1,051	33.6%
6	Corporates[1]	46,978	28,307	40,440	6,493	46,865	100.0%
7	Regulatory retail portfolios	7,338	4,184	7,335	1,572	7,138	80.1%
8	Secured by residential property[1]	35,725	-	17,166	-	6,744	39.3%
9	Secured by commercial real estate	-	-	-	-	-	-
10	Equity	-	-	-	-	-	-
11	Past-due loans	469	1	467	1	631	134.8%
12	Higher-risk categories	428	424	428	200	942	150.0%
13	Other assets	10,944	-	10,944	-	12,181	111.3%
14	**Total**	**130,843**	**35,912**	**124,367**	**9,454**	**78,239**	**58.5%**

[1] When CRM is available in the form of an eligible guarantee, the portion that is covered by the guarantee will attract the risk weight of the protection provider and will be reflected in the protection provider's asset class in column c and d.

As at October 31, 2018

		a	b	c	d	e	f
	(Millions of Canadian dollars, except as otherwise noted)	Exposures before CCF and CRM		Exposures post-CCF and CRM		RWA and RWA density	
	Asset Classes	On-balance sheet amount	Off-balance sheet amount	On-balance sheet amount	Off-balance sheet amount	RWA	RWA density
1	Sovereigns and their central banks[1]	16,011	324	33,542	5	9	-
2	Non-central government public sector entities	8,904	31	8,927	15	1,842	20.6%
3	Multilateral development banks	367	-	367	-	-	-
4	Banks	4,164	317	4,164	125	1,168	27.2%
5	Securities firms[1]	1,327	2,406	2,339	1,114	1,084	31.4%
6	Corporates[1]	44,961	26,759	38,360	6,123	44,429	100.0%
7	Regulatory retail portfolios	7,013	3,915	7,013	1,497	6,836	80.3%
8	Secured by residential property[1]	35,187	-	16,669	-	6,530	39.2%
9	Secured by commercial real estate	-	-	-	-	-	-
10	Equity	-	-	-	-	-	-
11	Past-due loans	449	1	447	1	604	134.8%
12	Higher-risk categories	452	391	452	183	952	150.0%
13	Other assets	12,678	-	12,678	-	13,812	108.9%
14	**Total**	**131,513**	**34,144**	**124,958**	**9,063**	**77,266**	**57.7%**

[1] When CRM is available in the form of an eligible guarantee, the portion that is covered by the guarantee will attract the risk weight of the protection provider and will be reflected in the protection provider's asset class in column c and d.

CR5: Standardized approach – exposures by asset classes and risk weights

The following table presents the breakdown of credit risk exposures under the standardized approach by asset classes and risk weight.

As at January 31, 2019

		a	b	c	d	e	f	g	h	i	j
	Risk weight / Asset Classes (Millions of Canadian dollars)	0%	10%	20%	35%	50%	75%	100%	150%	Others	Total credit exposures amount (post CCF and post-CRM)
1	Sovereigns and their central banks	30,759	-	-	-	87	-	3	-	-	30,849
2	Non-central government public sector entities	2,137	-	8,386	-	60	-	56	-	-	10,639
3	Multilateral development banks	375	-	-	-	-	-	-	-	-	375
4	Banks	-	-	3,620	-	13	-	147	-	-	3,780
5	Securities firms	-	-	2,066	-	856	-	210	-	-	3,132
6	Corporates	-	-	55	-	48	-	46,830	-	-	46,933
7	Regulatory retail portfolios	-	-	-	-	-	7,065	1,842	-	-	8,907
8	Secured by residential property	-	-	-	15,327	-	1,839	-	-	-	17,166
9	Secured by commercial real estate	-	-	-	-	-	-	-	-	-	-
10	Equity	-	-	-	-	-	-	-	-	-	-
11	Past-due loans	-	-	-	-	-	-	141	327	-	468
12	Higher-risk categories	-	-	-	-	-	-	-	628	-	628
13	Other assets	1,739	-	-	-	-	-	8,946	-	259	10,944
14	**Total**	**35,010**	**-**	**14,127**	**15,327**	**1,064**	**8,904**	**58,175**	**955**	**259**	**133,821**

CR5: Standardized approach – exposures by asset classes and risk weights (continued)

As at October 31, 2018

		a	b	c	d	e	f	g	h	i	j
	Risk weight / Asset Classes (Millions of Canadian dollars)	0%	10%	20%	35%	50%	75%	100%	150%	Others	Total credit exposures amount (post CCF and post-CRM)
1	Sovereigns and their central banks	33,534	-	-	-	11	-	3	-	-	33,547
2	Non-central government public sector entities	-	-	8,829	-	75	-	38	-	-	8,942
3	Multilateral development banks	367	-	-	-	-	-	-	-	-	367
4	Banks	-	-	3,898	-	8	-	384	-	-	4,289
5	Securities firms	-	-	2,424	-	862	-	167	-	-	3,453
6	Corporates	-	-	56	-	34	-	44,393	-	-	44,483
7	Regulatory retail portfolios	-	-	-	-	-	6,697	1,814	-	-	8,511
8	Secured by residential property	-	-	-	14,932	-	1,737	-	-	-	16,669
9	Secured by commercial real estate	-	-	-	-	-	-	-	-	-	-
10	Equity	-	-	-	-	-	-	-	-	-	-
11	Past-due loans	-	-	-	-	-	-	135	312	-	447
12	Higher-risk categories	-	-	-	-	-	-	-	635	-	635
13	Other assets	1,790	-	-	-	-	-	10,634	-	254	12,678
14	**Total**	**35,691**	**-**	**15,207**	**14,932**	**990**	**8,434**	**57,568**	**947**	**254**	**134,021**

CRE: Qualitative disclosures related to internal risk-based (IRB) models

In measuring credit risk to determine regulatory capital, two principal approaches applied are: the Internal Ratings Based (IRB) approach and the Standardized approach. The majority of our credit risk exposures are reported under the IRB approach, as approved by OSFI. The remainder of our portfolios are reported under the Standardized approach. The Standardized approach uses risk weights prescribed by OSFI to calculate RWA for credit risk exposures.

Under the IRB approach, we determine our own estimates for Probability of Default (PD), Loss Given Default (LGD) and Exposure at Default (EAD). They are the key credit parameters that form the basis of our credit risk measures. Internal ratings for borrower facilities and their corresponding estimates are used for credit approval, risk management, internal capital allocations, and corporate governance functions. In addition, the IRB parameter estimates are critical inputs for enterprise and regulatory stress-testing.

In accordance with the IRB approach for credit risk, models are designed for wholesale and retail portfolios. For Wholesale portfolios, a PD is estimated for each internal borrower grade and LGD and EAD parameters are estimated for each credit facility. For Retail portfolios, borrowers are risk rated using internal credit scoring models. Credit scores are one of the key drivers for segmentation of the portfolios into pools. Retail PD, EAD and LGD parameters are estimated at the pool level. All IRB approach regulatory capital models for wholesale and retail credit risk are subject to approval by the Office of the Superintendent of Financial Institutions (OSFI).

Credit parameter estimates are based on our internal historical default and loan loss experience and are augmented by external data where appropriate. We employ a two-dimensional risk rating system for the majority of our credit portfolios. The first dimension is oriented to the risk of borrower default and quantified through the PD assigned to the borrower. The second dimension captures transaction-specific factors such as collateral, product type, and seniority, and is quantified by LGD and EAD estimates that apply at the credit facility level.

PD is an estimated percentage that represents the likelihood of default of an obligor within a given time period for a specific rating grade or for a particular pool of exposure. Each obligor is assigned a Borrower Risk Rating (BRR), reflecting an assessment of the credit quality of the obligor and each BRR has a PD calibrated against it. 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. PD estimates are designed to be a conservative reflection of our experience through an economic cycle, including periods of economic downturn. The BRR differentiates the riskiness of obligors and represents our evaluation of the obligors’ ability and willingness to meet their contractual obligations on time over a three-year time horizon.

EAD is an amount expected to be owed by an obligor at the time of default. 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. Rates are estimated to reflect an economic downturn, with added conservatism to reflect data and statistical uncertainties identified in the modelling process.

LGD is an estimated percentage of EAD that is not expected to be recovered during the collection and recovery process. Each credit facility is assigned an LGD rate reflective of the extent of losses anticipated in the event the obligor defaults. Factors used in estimating LGD include seniority of debt, collateral security, and the industry sector in which the obligor operates. Estimated LGD rates draw primarily on internal loss experience and appropriate external data is used to supplement the estimation process when necessary. LGD rates are estimated to reflect conditions that might be expected to prevail in an economic downturn, with additional conservatism added to reflect data limitations and statistical uncertainties identified in the estimation 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 procedures are performed.

CRE: Qualitative disclosures related to internal risk-based (IRB) models (continued)

EAD Covered by the Various Approaches

The following table outlines the percentage of our EAD covered by the IRB and Standardized approaches for each of our portfolios. The Foundation Internal Ratings Based (FIRB) approach is currently not applied.

As at January 31, 2019

	EAD covered by the various approaches		
EAD (in %)	Standardized Approach[1]	IRB Approach	Other
Retail			
Residential secured	14%	86%	-
Qualifying revolving	-	100%	-
Other retail	5%	95%	-
Wholesale	-	-	-
Corporate	15%	85%	-
Sovereign	16%	84%	-
Bank	4%	96%	-
Equity	-	100%	-
Other assets not subject to Standardized or IRB Approaches	-	-	100%
Total	**11%**	**88%**	**1%**

[1] Standardized Approach includes assumptions and waivers granted by OSFI based on an OSFI approved rollout plan.

As at October 31, 2018

	EAD covered by the various approaches		
EAD (in %)	Standardized Approach[1]	IRB Approach	Other
Retail			
Residential secured	14%	86%	-
Qualifying revolving	-	100%	-
Other retail	5%	95%	-
Wholesale	-	-	-
Corporate	15%	85%	-
Sovereign	18%	82%	-
Bank	5%	95%	-
Equity	-	100%	-
Other assets not subject to Standardized or IRB Approaches	-	-	100%
Total	**11%**	**87%**	**2%**

[1] Standardized Approach includes assumptions and waivers granted by OSFI based on an OSFI approved rollout plan.

CRE: Qualitative disclosures related to internal risk-based (IRB) models (continued)

Parameters Governance

The techniques used to develop models are in accordance with banking industry standards and regulatory requirements. We calibrate our models to ensure that variations of default rates through an economic cycle are included in the underlying data. We also build conservatism into our model development process to reflect statistical uncertainties.

Our models have Model Development Owners (MDO) who are accountable for the development and performance of models within the framework set by our policies, standards and procedures. MDOs are responsible for collecting, defining and documenting model requirements, collecting and reviewing data, testing and evaluating, designing model performance monitoring, and documenting.

Our models are required to be independently reviewed and comprehensively evaluated by the Enterprise Model Risk Management (EMRM) team. EMRM is responsible for the review and challenge of the methodology underpinning the estimation of the parameters. EMRM issues a report at the end of each validation exercise that documents the scope, approach and findings of the review. The parameters reviewed by EMRM are presented to the Credit Models Governance Committee and approved by RBC's senior risk management committee.

Back-testing of Parameters and Model Performance

The IRB credit risk parameters are estimated, at a minimum, annually and more frequently if deemed necessary. In order to ensure that any material events are identified in a timely fashion, we engage in regular monitoring of realized results against established estimates. In cases where the actual results exceed predefined thresholds, a review of the results will be conducted and documented which may lead to a re-calibration of the parameters. Any recommended changes to the parameters would be approved by the Credit Models Governance Committee.

CR6: IRB – Credit risk exposures by portfolio and PD range

The following table provides the key parameters used for the calculation of capital requirements for credit risk exposures under the IRB approach, broken down by asset class and PD range.

As at January 31, 2019

			a	b	c	d	e	f	g	h	i	j	k	l
	(Millions of Canadian dollars, except as otherwise noted)	PD scale[1]	Original on-balance sheet gross exposure	Off-balance sheet exposures pre CCF	Average CCF (%)	EAD post CRM and post-CCF	Average PD (%)	Number of obligors[2]	Average LGD (%)	Average maturity (in years)	RWA	RWA density (%)	EL	Provisions[3]
	Asset Classes													
1	**Sovereigns**													
		0.00 to < 0.15	112,350	24,312	57.66	178,767	0.03	1,497	19.56	1.39	9,859	6.0	10	
		0.15 to < 0.25	142	406	67.07	379	0.23	103	38.79	2.58	168	44.0	-	
		0.25 to < 0.50	337	149	58.50	415	0.32	145	43.46	1.54	209	50.0	1	
		0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	
		0.75 to < 2.50	229	19	52.02	238	1.09	312	29.13	2.91	165	69.0	1	
		2.50 to < 10.00	18	18	41.75	20	3.14	24	37.58	3.07	25	121.0	-	
		10.00 to < 100.00	-	-	65.00	-	15.29	2	28.05	1.75	-	141.0	-	
		100.00 (default)	15	-	-	15	100.00	6	45.77	2.50	21	143.0	5	
	Total Sovereigns		113,091	24,904	57.80	179,834	0.04	2,089	19.68	1.39	10,447	6.0	17	-
2	**Banks**													
		0.00 to < 0.15	24,867	2,531	46.92	32,938	0.05	209	31.05	2.30	5,942	18.0	5	
		0.15 to < 0.25	85	410	45.61	520	0.23	31	39.23	2.17	297	57.0	-	
		0.25 to < 0.50	629	176	44.81	773	0.47	44	45.13	3.43	671	87.0	1	
		0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	
		0.75 to < 2.50	742	898	43.15	1,134	1.01	89	30.60	3.29	836	74.0	4	
		2.50 to < 10.00	23	69	35.05	47	6.40	13	44.21	1.20	85	182.0	1	
		10.00 to < 100.00	6	41	31.84	19	22.36	13	44.80	1.00	51	266.0	2	
		100.00 (default)	18	-	-	18	100.00	2	40.02	1.74	1	6.0	12	
	Total Banks		26,370	4,125	45.53	35,449	0.16	401	31.49	2.36	7,883	22.0	25	12
3	**Corporates**													
		0.00 to < 0.15	22,806	106,969	57.89	83,725	0.09	10,121	40.60	2.51	23,327	28.0	30	
		0.15 to < 0.25	11,480	30,219	58.90	28,293	0.23	4,875	41.62	2.82	14,050	50.0	27	
		0.25 to < 0.50	35,216	48,250	52.42	58,880	0.38	15,594	38.91	2.68	33,608	57.0	87	
		0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	
		0.75 to < 2.50	66,114	56,665	43.43	85,745	1.19	33,162	34.57	2.54	62,794	73.0	351	
		2.50 to < 10.00	20,927	25,088	44.25	28,849	3.72	20,034	35.54	2.69	30,204	105.0	380	
		10.00 to < 100.00	1,125	642	44.90	1,225	20.51	1,197	34.22	2.02	2,034	166.0	88	
		100.00 (default)	1,354	298	20.77	1,378	100.00	950	40.58	2.12	4,094	297.0	350	
	Total Corporates		159,022	268,130	52.75	288,096	1.42	85,933	38.03	2.60	170,111	59.0	1,312	492
4	**Total Wholesale**		**298,483**	**297,159**	**53.07**	**503,379**	**0.70**	**88,423**	**21.75**	**1.55**	**188,441**	**37.0**	**1,354**	**504**

[1] Refer to "Internal ratings map" under the Credit Risk Assessment section in our 2018 Annual Report MD&A.

[2] Number of obligors is defined as the number of borrowers in each PD band. For Retail exposures, a borrower can appear in multiple PD bands if the borrower has more than one type of product with the bank. Wholesale obligors are reflected as unique borrowers. For example, sovereign obligors include central banks or agencies, public sector entities and multilateral development banks which are each reflected as unique borrowers in the sovereign asset class.

[3] Provisions reflect only IFRS 9 Stage 3 allowances under the IRB portfolio.

CR6: IRB – Credit risk exposures by portfolio and PD range (continued)

As at January 31, 2019

			a	b	c	d	e	f	g	h	i	j	k	l
	(Millions of Canadian dollars, except as otherwise noted)	PD scale[1]	Original on-balance sheet gross exposure	Off-balance sheet exposures pre CCF	Average CCF (%)	EAD post CRM and post-CCF	Average PD (%)	Number of obligors[2]	Average LGD (%)	Average maturity (in years)	RWA	RWA density (%)	EL	Provisions[3]
	Asset Classes													
5	**Retail insured exposure secured by real estate[4]**													
		0.00 to < 0.15	37,079			34,200	0.09	106,078	10.08		771	2.0	3	
		0.15 to < 0.25	11,867			1,024	0.17	57,506	11.68		44	4.0	-	
		0.25 to < 0.50	14,695			411	0.38	17,115	13.35		37	9.0	-	
		0.50 to < 0.75	2,561			176	0.65	6,804	10.21		18	10.0	-	
		0.75 to < 2.50	8,917			338	1.05	66,012	10.32		43	13.0	-	
		2.50 to < 10.00	7,108			185	3.18	27,821	10.00		50	27.0	1	
		10.00 to < 100.00	1,019			-	65.98	21,329	10.02		-	32.0	-	
		100.00 (default)	267			-	-	3,955	-		-	-	-	
	Total Retail insured exposure secured by real estate		83,513			36,335	0.12	306,620	10.16		965	3.0	4	-
6	**Uninsured residential mortgages**													
		0.00 to < 0.15	82,613	196	100.00	82,809	0.06	467,744	18.74		2,596	3.0	9	
		0.15 to < 0.25	35,017	122	100.00	35,139	0.23	123,584	19.19		3,165	9.0	15	
		0.25 to < 0.50	1,837	145	100.00	1,983	0.45	54,823	21.21		325	16.0	2	
		0.50 to < 0.75	15,248	42	100.00	15,291	0.65	67,186	19.61		2,975	19.0	19	
		0.75 to < 2.50	32	97	100.00	128	1.08	282	23.30		40	31.0	-	
		2.50 to < 10.00	7,537	33	100.00	7,570	4.22	65,354	19.38		4,681	62.0	62	
		10.00 to < 100.00	949	-	-	949	43.99	7,147	18.52		829	87.0	78	
		100.00 (default)	218	-	-	218	100.00	1,143	18.95		118	54.0	35	
	Total Uninsured residential mortgages		143,450	635	100.00	144,085	0.83	787,263	19.01		14,728	10.0	221	37

[1] Refer to "Internal ratings map" under the Credit Risk Assessment section in our 2018 Annual Report MD&A.

[2] Number of obligors is defined as the number of borrowers in each PD band. For Retail exposures, a borrower can appear in multiple PD bands if the borrower has more than one type of product with the bank. Wholesale obligors are reflected as unique borrowers. For example, sovereign obligors include central banks or agencies, public sector entities and multilateral development banks which are each reflected as unique borrowers in the sovereign asset class.

[3] Provisions reflect only IFRS 9 Stage 3 allowances under the IRB portfolio.

[4] Retail insured exposures secured by real estate includes residential mortgages, qualifying revolving retail and other retail. Residential mortgages reflect 98% of this category. Exposures are insured with government and/or private insurance providers.

CR6: IRB – Credit risk exposures by portfolio and PD range (continued)

As at January 31, 2019

			a	b	c	d	e	f	g	h	i	j	k	l
	(Millions of Canadian dollars, except as otherwise noted)	PD scale[1]	Original on-balance sheet gross exposure	Off-balance sheet exposures pre CCF	Average CCF (%)	EAD post CRM and post-CCF	Average PD (%)	Number of obligors[2]	Average LGD (%)	Average maturity (in years)	RWA	RWA density (%)	EL	Provisions[3]
	Asset Classes													
7	**HELOCs**													
		0.00 to < 0.15	23,528	73,567	72.55	76,901	0.05	596,269	21.19		2,354	3.0	8	
		0.15 to < 0.25	8,925	8,407	67.67	14,613	0.21	150,548	21.12		1,347	9.0	6	
		0.25 to < 0.50	-	-	-	-	-	-	-		-	-	-	
		0.50 to < 0.75	4,192	1,940	64.82	5,449	0.73	65,730	21.98		1,285	24.0	9	
		0.75 to < 2.50	-	-	-	-	-	-	-		-	-	-	
		2.50 to < 10.00	2,123	350	61.15	2,338	4.97	30,205	22.04		1,794	77.0	26	
		10.00 to < 100.00	345	84	66.41	401	46.80	3,408	20.98		395	99.0	40	
		100.00 (default)	119	1	-	119	100.00	1,006	23.58		86	72.0	27	
	Total HELOCs		39,232	84,349	71.83	99,821	0.53	847,166	21.24		7,261	7.0	116	27
8	**Qualifying revolving retail**													
		0.00 to < 0.15	8,715	50,499	94.96	56,668	0.08	6,463,782	89.01		2,528	4.0	38	
		0.15 to < 0.25	461	417	109.81	919	0.17	58,106	78.75		70	8.0	1	
		0.25 to < 0.50	1,950	7,181	106.28	9,581	0.34	3,399,360	88.34		1,476	15.0	29	
		0.50 to < 0.75	3,037	4,333	95.07	7,156	0.59	783,278	86.31		1,660	23.0	36	
		0.75 to < 2.50	6,706	8,118	96.74	14,561	1.50	3,591,670	89.63		7,082	49.0	194	
		2.50 to < 10.00	3,494	2,130	96.26	5,545	4.76	1,680,889	90.31		6,160	111.0	236	
		10.00 to < 100.00	595	160	84.97	732	38.96	534,871	89.95		1,877	256.0	258	
		100.00 (default)	66	2	-	66	100.00	46,160	85.76		176	268.0	43	
	Total Qualifying revolving retail		25,025	72,841	96.38	95,228	1.00	16,558,116	88.82		21,028	22.0	836	43
9	**Other retail**													
		0.00 to < 0.15	16,257	6,492	100.01	22,750	0.07	406,047	50.58		2,561	11.0	9	
		0.15 to < 0.25	9,772	1,486	97.66	11,223	0.20	344,079	54.90		2,528	23.0	12	
		0.25 to < 0.50	5,012	759	100.07	5,772	0.45	219,249	67.60		2,788	48.0	18	
		0.50 to < 0.75	2,373	742	118.49	3,252	0.63	144,782	54.14		1,475	45.0	11	
		0.75 to < 2.50	7,853	2,189	98.27	10,005	1.19	527,021	75.80		8,577	86.0	89	
		2.50 to < 10.00	4,791	871	94.54	5,614	4.00	331,884	73.10		6,247	111.0	163	
		10.00 to < 100.00	459	27	92.87	485	43.73	24,815	68.13		835	172.0	148	
		100.00 (default)	91	-	-	91	100.00	3,411	65.56		161	177.0	48	
	Total Other retail		46,609	12,568	100.12	59,192	1.24	2,001,288	59.82		25,170	43.0	498	48
10	**Total retail**		**337,829**	**170,393**	**84.52**	**434,661**	**0.79**	**20,500,453**	**39.63**	**-**	**69,152**	**16.0**	**1,675**	**155**
	Total		**636,312**	**467,552**	**64.53**	**938,040**	**0.76**	**20,588,876**	**38.16**	**1.55**	**257,593**	**27.0**	**3,029**	**659**

[1] Refer to “Internal ratings map” under the Credit Risk Assessment section in our 2018 Annual Report MD&A.

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[3] Provisions reflect only IFRS 9 Stage 3 allowances under the IRB portfolio.

CR6: IRB – Credit risk exposures by portfolio and PD range (continued)

As at October 31, 2018

			a	b	c	d	e	f	g	h	i	j	k	l
	(Millions of Canadian dollars, except as otherwise noted)	PD scale[1]	Original on-balance sheet gross exposure	Off-balance sheet exposures pre CCF	Average CCF (%)	EAD post CRM and post-CCF	Average PD (%)	Number of obligors[2]	Average LGD (%)	Average maturity (in years)	RWA	RWA density (%)	EL	Provisions[3]
	Asset Classes													
1	**Sovereigns**													
		0.00 to < 0.15	102,992	27,007	56.03	171,023	0.03	1,859	19.60	1.34	9,472	6.0	10	
		0.15 to < 0.25	135	408	67.32	375	0.23	101	39.99	2.73	175	47.0	-	
		0.25 to < 0.50	353	110	53.64	402	0.32	81	43.86	1.62	206	51.0	1	
		0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	
		0.75 to < 2.50	67	18	38.01	74	1.15	55	33.45	2.75	56	77.0	-	
		2.50 to < 10.00	10	22	42.94	14	3.19	75	37.15	3.14	17	121.0	-	
		10.00 to < 100.00	-	-	65.00	-	13.37	2	25.00	1.12	-	117.0	-	
		100.00 (default)	1	-	-	1	100.00	3	20.08	2.50	-	2.0	-	
	Total Sovereigns		103,558	27,565	56.17	171,889	0.03	2,176	19.71	1.34	9,926	6.0	11	3
2	**Banks**													
		0.00 to < 0.15	28,277	2,677	44.47	36,548	0.06	238	33.86	2.06	6,980	19.0	7	
		0.15 to < 0.25	1,447	414	45.65	1,863	0.23	44	36.53	1.52	822	44.0	2	
		0.25 to < 0.50	1,160	201	48.70	1,601	0.35	70	45.16	2.40	1,182	74.0	3	
		0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	
		0.75 to < 2.50	396	1,264	42.11	933	0.98	101	30.68	3.18	674	72.0	3	
		2.50 to < 10.00	43	61	34.65	64	5.96	15	42.39	1.51	105	164.0	2	
		10.00 to < 100.00	4	37	35.58	17	22.24	13	44.77	1.00	44	266.0	2	
		100.00 (default)	-	-	-	-	100.00	1	60.00	2.50	-	795.0	-	
	Total Banks		31,327	4,654	43.91	41,026	0.12	482	34.37	2.08	9,807	24.0	19	-
3	**Corporates**													
		0.00 to < 0.15	25,065	109,088	56.77	85,280	0.08	9,097	41.05	2.47	23,322	27.0	30	
		0.15 to < 0.25	10,874	30,119	58.97	27,472	0.23	4,647	41.95	2.79	13,713	50.0	26	
		0.25 to < 0.50	32,542	48,669	51.73	56,269	0.38	14,979	38.55	2.65	31,710	56.0	83	
		0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	
		0.75 to < 2.50	63,194	59,108	43.34	84,500	1.19	30,554	35.41	2.61	64,231	76.0	355	
		2.50 to < 10.00	20,934	25,686	45.21	28,638	3.71	27,533	36.29	2.60	30,251	106.0	384	
		10.00 to < 100.00	1,140	613	47.48	1,267	20.92	1,514	35.37	1.88	2,143	169.0	93	
		100.00 (default)	839	328	14.49	868	100.00	1,163	36.36	1.99	1,867	215.0	287	
	Total Corporates		154,588	273,611	52.07	284,293	1.25	89,487	38.43	2.59	167,237	59.0	1,257	424
4	**Total Wholesale**		**289,473**	**305,830**	**52.83**	**497,212**	**0.74**	**92,145**	**31.63**	**2.12**	**186,969**	**38.0**	**1,288**	**427**

[1] Refer to "Internal ratings map" under the Credit Risk Assessment section in our 2018 Annual Report MD&A.

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[3] Provisions reflect only IFRS 9 Stage 3 allowances under the IRB portfolio.

CR6: IRB – Credit risk exposures by portfolio and PD range (continued)

As at October 31, 2018

			a	b	c	d	e	f	g	h	i	j	k	l
	(Millions of Canadian dollars, except as otherwise noted)	PD scale[1]	Original on-balance sheet gross exposure	Off-balance sheet exposures pre CCF	Average CCF (%)	EAD post CRM and post-CCF	Average PD (%)	Number of obligors[2]	Average LGD (%)	Average maturity (in years)	RWA	RWA density (%)	EL	Provisions[3]
	Asset Classes													
5	**Retail insured exposure secured by real estate[4]**													
		0.00 to < 0.15	37,542			35,148	0.09	103,984	10.07		791	2.0	3	
		0.15 to < 0.25	12,185			1,043	0.17	56,764	11.39		44	4.0	-	
		0.25 to < 0.50	14,905			410	0.38	16,201	12.83		36	9.0	-	
		0.50 to < 0.75	2,767			190	0.65	5,615	10.20		19	10.0	-	
		0.75 to < 2.50	9,150			331	1.05	65,768	10.19		42	13.0	-	
		2.50 to < 10.00	7,315			197	3.18	26,801	10.01		54	27.0	1	
		10.00 to < 100.00	1,073			-	68.86	21,023	10.01		-	32.0	-	
		100.00 (default)	246			-	-	3,958	-		-	-	-	
	Total Retail insured exposure secured by real estate[4]		85,183			37,318	0.12	300,114	10.10		986	3.0	5	-
6	**Uninsured residential mortgages**													
		0.00 to < 0.15	79,182	238	100.00	79,420	0.06	458,212	18.82		2,498	3.0	9	
		0.15 to < 0.25	34,467	153	100.00	34,620	0.23	122,744	19.21		3,123	9.0	15	
		0.25 to < 0.50	2,116	167	100.00	2,284	0.45	56,563	21.41		376	16.0	2	
		0.50 to < 0.75	15,238	47	100.00	15,286	0.65	68,117	19.66		2,982	20.0	20	
		0.75 to < 2.50	40	107	100.00	147	1.10	303	25.54		50	34.0	1	
		2.50 to < 10.00	7,577	46	100.00	7,623	4.22	66,335	19.48		4,737	62.0	63	
		10.00 to < 100.00	978	-	-	978	42.71	7,553	18.47		860	88.0	77	
		100.00 (default)	194	-	-	193	100.00	1,049	19.49		111	57.0	32	
	Total Uninsured residential mortgages		139,792	757	100.00	140,551	0.72	780,876	18.70		14,737	10.0	219	33

[1] Refer to "Internal ratings map" under the Credit Risk Assessment section in our 2018 Annual Report MD&A.

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[3] Provisions reflect only IFRS 9 Stage 3 allowances under the IRB portfolio.

[4] Retail insured exposures secured by real estate includes residential mortgages, qualifying revolving retail and other retail. Residential mortgages reflect 98% of this category. Exposures are insured with government and/or private insurance providers.

CR6: IRB – Credit risk exposures by portfolio and PD range (continued)

As at October 31, 2018

	(Millions of Canadian dollars, except as otherwise noted)	PD scale[1]	a Original on-balance sheet gross exposure	b Off-balance sheet exposures pre CCF	c Average CCF (%)	d EAD post CRM and post-CCF	e Average PD (%)	f Number of obligors[2]	g Average LGD (%)	h Average maturity (in years)	i RWA	j RWA density (%)	k EL	l Provisions[3]
	Asset Classes													
7	**HELOCs**													
		0.00 to < 0.15	23,667	71,383	72.42	75,363	0.05	586,545	21.26		2,314	3.0	8	
		0.15 to < 0.25	9,206	8,556	67.53	14,984	0.21	153,544	21.25		1,389	9.0	7	
		0.25 to < 0.50	-	-	-	-	-	-	-		-	-	-	
		0.50 to < 0.75	4,339	2,033	64.84	5,657	0.73	67,949	22.04		1,338	24.0	9	
		0.75 to < 2.50	-	-	-	-	-	-	-		-	-	-	
		2.50 to < 10.00	2,203	361	61.05	2,423	4.97	31,099	22.08		1,862	77.0	27	
		10.00 to < 100.00	362	100	67.44	430	44.24	3,764	21.22		440	103.0	41	
		100.00 (default)	108	1	-	108	100.00	925	23.96		81	74.0	25	
	Total HELOCs		39,885	82,435	71.67	98,965	0.53	843,826	21.33		7,424	8.0	116	25
8	**Qualifying revolving retail**													
		0.00 to < 0.15	8,483	46,719	95.10	52,915	0.08	6,345,031	88.71		2,383	5.0	36	
		0.15 to < 0.25	464	403	109.58	906	0.17	57,029	78.54		69	8.0	1	
		0.25 to < 0.50	1,828	6,613	107.42	8,932	0.34	3,371,429	87.84		1,367	15.0	27	
		0.50 to < 0.75	3,048	4,282	95.12	7,121	0.59	784,376	86.21		1,650	23.0	36	
		0.75 to < 2.50	6,438	7,706	97.12	13,923	1.50	3,590,109	89.29		6,761	49.0	186	
		2.50 to < 10.00	3,342	2,010	96.75	5,286	4.80	1,686,755	89.97		5,887	111.0	226	
		10.00 to < 100.00	555	158	86.55	692	38.74	551,565	89.12		1,755	254.0	241	
		100.00 (default)	66	2	-	66	100.00	45,703	85.78		182	274.0	43	
	Total Qualifying revolving retail		24,224	67,893	96.65	89,841	1.01	16,431,997	88.49		20,054	22.0	796	43
9	**Other retail**													
		0.00 to < 0.15	15,671	5,742	99.00	21,377	0.08	481,274	47.74		2,408	11.0	9	
		0.15 to < 0.25	9,719	1,353	98.00	11,042	0.20	338,873	54.41		2,457	22.0	11	
		0.25 to < 0.50	4,966	715	100.00	5,681	0.45	217,618	66.84		2,720	48.0	17	
		0.50 to < 0.75	2,251	720	117.00	3,092	0.63	136,800	53.72		1,398	45.0	10	
		0.75 to < 2.50	7,849	1,918	99.00	9,805	1.18	518,091	72.99		8,327	85.0	86	
		2.50 to < 10.00	4,517	789	95.00	5,331	4.00	331,274	73.08		5,932	111.0	155	
		10.00 to < 100.00	438	25	94.00	470	43.41	23,829	66.66		793	169.0	140	
		100.00 (default)	76	1	-	80	100.00	3,086	65.46		142	178.0	42	
	Total Other retail		45,487	11,263	100.00	56,878	1.22	2,050,845	58.88		24,177	43.0	470	42
10	**Total retail**		**334,571**	**162,348**	**92.66**	**423,554**	**0.85**	**20,303,242**	**38.96**	**-**	**67,378**	**16.0**	**1,605**	**143**
	Total		**624,044**	**468,178**	**63.37**	**920,766**	**0.79**	**20,395,387**	**35.00**	**2.12**	**254,347**	**27.6**	**2,893**	**570**

[1] Refer to "Internal ratings map" under the Credit Risk Assessment section in our 2018 Annual Report MD&A.

[2] Number of obligors is defined as the number of borrowers in each PD band. For Retail exposures, a borrower can appear in multiple PD bands if the borrower has more than one type of product with the bank. Wholesale obligors are reflected as unique borrowers. For example, sovereign obligors include central banks or agencies, public sector entities and multilateral development banks which are each reflected as unique borrowers in the sovereign asset class.

[3] Provisions reflect only IFRS 9 Stage 3 allowances under the IRB portfolio.

CR7: IRB – Effect on RWA of credit derivatives used as CRM techniques

The following table provides the effect of credit derivatives used as mitigation techniques in determining RWA amounts.

As at January 31, 2019

		a	b
	(Millions of Canadian dollars)	**Pre-credit derivatives RWA**	**Actual RWA**
2	Sovereign - AIRB	-	-
4	Banks - AIRB	-	-
6	Corporate - AIRB	87	85
8	Specialised lending - AIRB	-	-
9	Retail - qualifying revolving (QRRE)	-	-
10	Retail - residential mortgage exposures	-	-
11	Retail - SME	-	-
12	Other retail exposures	-	-
14	Equity - AIRB	-	-
16	Purchased receivables - AIRB	-	-
17	**Total**	**87**	**85**

As at October 31, 2018

		a	b
	(Millions of Canadian dollars)	**Pre-credit derivatives RWA**	**Actual RWA**
2	Sovereign - AIRB	-	-
4	Banks - AIRB	-	-
6	Corporate - AIRB	95	90
8	Specialised lending - AIRB	-	-
9	Retail - qualifying revolving (QRRE)	-	-
10	Retail - residential mortgage exposures	-	-
11	Retail - SME	-	-
12	Other retail exposures	-	-
14	Equity - AIRB	-	-
16	Purchased receivables - AIRB	-	-
17	**Total**	**95**	**90**

CR8: RWA flow statements of credit risk exposures

The following table presents the changes in Standardized and IRB RWA amounts over the reporting period for the key drivers of credit risk.

		RWA amounts[1]	
	(Millions of Canadian dollars)	**As at January 31, 2019**	**As at October 31, 2018**
1	**RWA as at end of previous reporting period**	**361,392**	**366,581**
2	Asset size[2]	7,557	3,359
3	Asset quality[3]	(1,220)	286
4	Model updates[4]	-	(8,709)
5	Methodology and policy[5]	(3,930)	-
6	Acquisitions and disposals	-	-
7	Foreign exchange movements	361	2,212
8	Other	1,690	(2,337)
9	**RWA as at end of reporting period**	**365,850**	**361,392**

[1] RWA flow amounts include both IRB and Standardized Approach figures reflecting our approved roll-out plan for transition to IRB.

[2] Organic changes in portfolio size and composition (including new business and maturing loans).

[3] Quality of book changes caused by experience such as underlying customer behaviour or demographics and credit mitigation.

[4] Updates to the model to reflect recent experience, model implementation, change in model scope or any change to address model malfunctions including changes through model calibrations/realignments.

[5] Methodology changes to the calculations driven by regulatory policy changes.

COUNTERPARTY CREDIT RISK

CCRA: Qualitative disclosure related to counterparty credit risk

The table below presents an overview of Pillar 3 disclosure requirements that have been met within our 2018 Annual Report and incorporated by reference into this Pillar 3 report. Our 2018 Annual Report is available free of charge on our website at http://www.rbc.com/investorrelations

Pillar 3 disclosures requirement		RBC 2018 Annual Report section	Sub-section
a)	Risk management objectives and policies related to counterparty credit risk	Credit Risk	Credit risk assessment – *Counterparty credit risk*
		Consolidated Financial Statements	Note 8 - Derivative financial instruments and hedging activities – *Derivative-related credit risk*
			Note 2 - Summary of significant accounting policies, estimates and judgements – *Derivatives*
b)	The method used to assign the operating limits defined in terms of internal capital for counterparty credit exposures and for CCP exposures	Credit Risk	Credit risk assessment – *Counterparty credit risk*
c)	Policies relating to guarantees and other risk mitigants and assessments concerning counterparty credit risk, including exposures towards CCPs	Credit Risk	Credit risk assessment – *Counterparty credit risk*
		Consolidated Financial Statements	Note 8 - Derivative financial instruments and hedging activities – *Derivative-related credit risk*
			Note 30 - Offsetting financial assets and financial liabilities
d)	Policies with respect to wrong-way risk exposures	Credit Risk	Credit risk assessment – *Counterparty credit risk*
e)	The impact in terms of the amount of collateral that the bank would be required to provide given a credit rating downgrade	Liquidity and funding risk	Credit ratings

CCR1: Analysis of counterparty credit risk (CCR) exposure by approach

The following table provides a comprehensive view of the methods used to calculate counterparty credit risk exposures and the main parameters used within each method, if applicable. Refer to CCR 8 for our central counterparty clearing house exposures. Figures below reflect both house and client trades.

As at January 31, 2019

		a	b	c	d	e	f
	(Millions of Canadian dollars, except as otherwise noted)	Replacement Cost	Potential future exposure	EEPE	Alpha used for computing regulatory EAD	EAD post-CRM[1]	RWA[2]
1	SA-CCR (for derivatives)[1,2]	11,897	30,542		1.4	59,256	22,944
1a	Current Exposure Method (CEM - for derivatives)						
2	Internal Model Method (for derivatives and SFTs)						
3	Simple Approach for credit risk mitigation (for SFTs)						
4	Comprehensive Approach for credit risk mitigation (for SFTs)					167,739	10,409
5	VaR for SFTs						
6	**Total**						**33,353**

[1] Effective Q1 2019, OSFI adopted the BCBS Standardized approach for measuring counterparty credit risk. EAD post CRM is calculated as 1.4 times the sum of replacement cost and potential future exposure less associated CVA losses.

[2] RWA includes a calibration adjustment of 1.06% as prescribed by OSFI under the Basel III framework.

As at October 31, 2018

		a	b	c	d	e	f
	(Millions of Canadian dollars, except as otherwise noted)	Replacement Cost	Potential future exposure	EEPE	Alpha used for computing regulatory EAD	EAD post-CRM	RWA[1]
1	SA-CCR (for derivatives)				1.4		
1a	Current Exposure Method (CEM - for derivatives)	27,702	37,877			63,903	19,234
2	Internal Model Method (for derivatives and SFTs)						
3	Simple Approach for credit risk mitigation (for SFTs)						
4	Comprehensive Approach for credit risk mitigation (for SFTs)					170,562	10,254
5	VaR for SFTs						
6	**Total**						**29,488**

[1] RWA includes a calibration adjustment of 1.06% as prescribed by OSFI under the Basel III framework.

CCR2: Credit valuation adjustment (CVA) capital charge

The following table presents a breakdown of the CVA capital charge by advanced and standardized approaches.

As at January 31, 2019

		a	b
	(Millions of Canadian dollars)	EAD post-CRM[2]	RWA[1,2]
	Total portfolios subject to the Advanced CVA capital charge		
1	(i) VaR component (including the 3x multiplier)		
2	(ii) Stressed VaR component (including the 3x multiplier)		
3	All portfolios subject to the Standardized CVA capital Charge	59,415	13,580
4	**Total subject to the CVA capital charge**	**59,415**	**13,580**

[1] CVA phase-in is no longer applicable in 2019 and not reflected in RWA.

[2] Effective Q1 2019, OSFI has allowed a 0.7 scalar to be applied to the exposure amount determined under SA-CCR for the purpose of determining CVA.

As at October 31, 2018

		a	b
	(Millions of Canadian dollars)	EAD post-CRM	RWA[1]
	Total portfolios subject to the Advanced CVA capital charge		
1	(i) VaR component (including the 3x multiplier)		
2	(ii) Stressed VaR component (including the 3x multiplier)		
3	All portfolios subject to the Standardized CVA capital Charge	64,008	13,335
4	**Total subject to the CVA capital charge**	**64,008**	**13,335**

[1] RWA reflects OSFI permitted CVA phase-in of 86% for Total Capital in 2018. CVA phase-in is no longer applicable in 2019.

CCR3: Standardized approach – CCR exposures by regulatory portfolio and risk weights

The following table presents a breakdown of counterparty credit risk exposures calculated according to the standardized approach by portfolio and risk weight.

As at January 31, 2019

	a	b	c	d	e	f	g	h	i
Regulatory portfolio / Risk weight (Millions of Canadian dollars)	0%	10%	20%	50%	75%	100%	150%	Others	Total credit exposure
Sovereigns	-	-	-	-	-	-	-	-	-
Non-central government public sector entities (PSEs)	-	-	-	-	-	-	-	-	-
Multilateral development banks (MDBs)	-	-	-	-	-	-	-	-	-
Banks	-	-	-	-	-	20	-	-	20
Securities firms	-	-	-	-	-	8	-	-	8
Corporates	-	-	380	-	-	573	-	-	953
Regulatory retail portfolios	-	-	-	-	-	-	-	-	-
Other assets	-	-	-	-	-	-	-	-	-
Total	**-**	**-**	**380**	**-**	**-**	**601**	**-**	**-**	**981**

As at October 31, 2018

	a	b	c	d	e	f	g	h	i
Regulatory portfolio / Risk weight (Millions of Canadian dollars)	0%	10%	20%	50%	75%	100%	150%	Others	Total credit exposure
Sovereigns	-	-	-	-	-	-	-	-	-
Non-central government public sector entities (PSEs)	-	-	-	-	-	-	-	-	-
Multilateral development banks (MDBs)	-	-	-	-	-	-	-	-	-
Banks	-	-	30	-	-	27	-	-	57
Securities firms	-	-	-	-	-	7	-	-	7
Corporates	-	-	625	-	-	626	-	-	1,251
Regulatory retail portfolios	-	-	-	-	-	-	-	-	-
Other assets	-	-	-	-	-	-	-	-	-
Total	**-**	**-**	**655**	**-**	**-**	**660**	**-**	**-**	**1,315**

CCR4: IRB – CCR exposures by portfolio and PD scale

The following table presents a detailed view of CCR exposures subject to IRB approach by asset classes and PD scale.

As at January 31, 2019

(Millions of Canadian dollars, except as otherwise noted)	PD scale[1]	a EAD post-CRM	b Average PD (%)	c Number of obligors	d Average LGD (%)	e Average maturity (in years)	f RWA	g RWA density (%)
Asset classes								
Sovereigns	0.00 to < 0.15	21,741	0.04	326	17.57	1.66	1,311	6
	0.15 to < 0.25	26	0.23	10	38.00	2.34	11	42
	0.25 to < 0.50	392	0.32	25	45.00	1.06	176	45
	0.50 to < 0.75	-	-	-	-	-	-	-
	0.75 to < 2.50	10	0.95	7	45.00	1.00	8	76
	2.50 to < 10.00	16	2.64	2	45.00	1.62	20	120
	10.00 to < 100.00	-	-	-	-	-	-	-
	100.00 (default)	-	-	-	-	-	-	-
Total sovereigns		22,185	0.05	370	18.11	1.65	1,526	7
Banks								
	0.00 to < 0.15	100,186	0.09	211	14.47	0.31	7,071	7
	0.15 to < 0.25	17,487	0.23	51	10.24	0.16	1,636	9
	0.25 to < 0.50	11,306	0.32	75	18.93	0.42	2,618	23
	0.50 to < 0.75	-	-	-	-	-	-	-
	0.75 to < 2.50	1,249	0.88	46	6.93	0.14	168	13
	2.50 to < 10.00	58	3.27	4	45.00	1.09	71	123
	10.00 to < 100.00	-	-	-	-	-	-	-
	100.00 (default)	-	-	-	-	-	-	-
Total banks		130,286	0.14	387	14.23	0.30	11,564	9
Corporates								
	0.00 to < 0.15	56,144	0.07	3,621	37.53	0.72	7,910	14
	0.15 to < 0.25	5,854	0.23	768	41.84	1.63	2,729	47
	0.25 to < 0.50	6,152	0.34	1,029	42.91	1.37	3,228	52
	0.50 to < 0.75	-	-	-	-	-	-	-
	0.75 to < 2.50	4,219	1.07	821	44.69	2.26	4,060	96
	2.50 to < 10.00	1,123	3.16	386	45.00	1.87	1,456	130
	10.00 to < 100.00	28	18.85	13	45.00	2.34	67	241
	100.00 (default)	22	100.00	2	45.00	1.40	134	596
Total corporates		73,542	0.25	6,640	38.86	0.95	19,584	27
Total		**226,013**	**0.17**	**7,397**	**22.63**	**0.64**	**32,674**	**14**

[1] Refer to "Internal ratings map" in the Credit risk assessment section in our 2018 Annual Report MD&A.

CCR4: IRB – CCR exposures by portfolio and PD scale (continued)

As at October 31, 2018

		a	b	c	d	e	f	g
(Millions of Canadian dollars, except as otherwise noted)	PD scale[1]	EAD post-CRM	Average PD (%)	Number of obligors	Average LGD (%)	Average maturity (in years)	RWA	RWA density
Asset classes								
Sovereigns	0.00 to < 0.15	24,736	0.03	385	10.68	1.83	709	3
	0.15 to < 0.25	40	0.23	15	22.30	1.74	9	21
	0.25 to < 0.50	166	0.34	29	39.49	1.57	67	41
	0.50 to < 0.75	-	-	-	-	-	-	-
	0.75 to < 2.50	5	0.88	6	45.00	1.00	3	73
	2.50 to < 10.00	5	2.73	3	45.00	1.17	6	115
	10.00 to <	-	-	-	-	-	-	-
	100.00 (default)	-	-	-	-	-	-	-
Total sovereigns		24,952	0.04	438	10.90	1.83	794	3
Banks								
	0.00 to < 0.15	106,888	0.09	377	12.68	0.53	7,677	7
	0.15 to < 0.25	17,942	0.23	71	10.45	0.28	1,913	11
	0.25 to < 0.50	11,921	0.33	108	15.19	0.71	2,255	19
	0.50 to < 0.75	-	-	-	-	-	-	-
	0.75 to < 2.50	1,007	0.89	56	5.71	0.16	106	11
	2.50 to < 10.00	4	3.13	10	45.00	1.00	5	126
	10.00 to <	-	-	-	-	-	-	-
	100.00 (default)	-	-	-	-	-	-	-
Total banks		137,762	0.13	622	12.55	0.51	11,956	9
Corporates								
	0.00 to < 0.15	53,670	0.07	6,288	35.29	0.83	7,111	13
	0.15 to < 0.25	6,490	0.23	1,194	35.27	1.63	2,495	38
	0.25 to < 0.50	5,999	0.34	1,410	36.95	1.09	2,601	43
	0.50 to < 0.75	-	-	-	-	-	-	-
	0.75 to < 2.50	3,623	1.08	936	35.86	1.73	2,855	79
	2.50 to < 10.00	624	3.18	506	42.96	1.99	761	122
	10.00 to <	13	14.80	11	45.00	1.50	27	218
	100.00 (default)	15	100.00	5	45.00	1.20	91	596
Total corporates		70,434	0.21	10,350	35.53	0.98	15,941	23
Total		**233,148**	**0.15**	**11,410**	**19.23**	**0.79**	**28,691**	**12**

[1] Refer to “Internal ratings map” in the Credit risk assessment section in our 2018 Annual Report MD&A.

CCR8: Exposures to central counterparties

The following table presents a comprehensive view of our exposures to central counterparty clearing houses (CCPs), including due to operations, margins and contributions to default funds, and related RWA.

As at January 31, 2019

		a	b
	(Millions of Canadian dollars)	EAD (post-CRM)	RWA
1	**Exposures to QCCPs (total)**	**28,714**	**442**
2	Exposures for trades at QCCPs (excluding initial margin and default fund contributions); of which	19,823	406
3	(i) OTC derivatives	1,146	33
4	(ii) Exchange-traded derivatives	16,555	331
5	(iii) Securities financing transactions	2,122	42
6	(iv) Netting sets where cross-product netting has been approved	-	-
7	Segregated initial margin	2,830	
8	Non-segregated initial margin	1,435	-
9	Pre-funded default fund contributions	986	36
10	Unfunded default fund contributions[1]	3,640	-
11	**Exposures to non-QCCPs (total)**		
12	Exposures for trades at non-QCCPs (excluding initial margin and default fund contributions); of which		
13	(i) OTC derivatives		
14	(ii) Exchange-traded derivatives		
15	(iii) Securities financing transactions		
16	(iv) Netting sets where cross-product netting has been approved		
17	Segregated initial margin		
18	Non-segregated initial margin		
19	Pre-funded default fund contributions		
20	Unfunded default fund contributions		

[1] Unfunded default fund contributions are risk weighted at 0%.

CCR8: Exposures to central counterparties (continued)

As at October 31, 2018

	(Millions of Canadian dollars)	a EAD (post-CRM)	b RWA
1	**Exposures to QCCPs (total)**	**35,301**	**620**
2	Exposures for trades at QCCPs (excluding initial margin and default fund contributions); of which	26,582	543
3	(i) OTC derivatives	13,590	283
4	(ii) Exchange-traded derivatives	11,285	226
5	(iii) Securities financing transactions	1,707	34
6	(iv) Netting sets where cross-product netting has been approved	-	-
7	Segregated initial margin	2,396	
8	Non-segregated initial margin	1,875	37
9	Pre-funded default fund contributions	889	40
10	Unfunded default fund contributions[1]	3,559	-
11	**Exposures to non-QCCPs (total)**		
12	Exposures for trades at non-QCCPs (excluding initial margin and default fund contributions); of which		
13	(i) OTC derivatives		
14	(ii) Exchange-traded derivatives		
15	(iii) Securities financing transactions		
16	(iv) Netting sets where cross-product netting has been approved		
17	Segregated initial margin		
18	Non-segregated initial margin		
19	Pre-funded default fund contributions		
20	Unfunded default fund contributions		

[1] Unfunded default fund contributions are risk weighted at 0%.

SECURITIZATION

SECA: Qualitative disclosure requirements related to securitization exposures

The table below presents an overview of Pillar 3 disclosure requirements that have been met within our 2018 Annual Report and incorporated by reference into this Pillar 3 report. Our 2018 Annual Report is available free of charge on our website at http://www.rbc.com/investorrelations

Pillar 3 disclosures requirement		RBC 2018 Annual Report section	Sub-section
a)	Objectives in relation to securitization activities	Off-balance sheet arrangements	"Off-balance sheet arrangements"
		Consolidated Financial Statements	Note 6 - Derecognition of financial assets
		Consolidated Financial Statements	Note 7 - Structured entities
b)	List of SPEs where RBC is sponsor / provides implicit support	Consolidated Financial Statements	Note 7 - Structured entities
c)	Accounting policies for securitization	Consolidated Financial Statements	Note 2 - Summary of significant accounting policies, estimates and judgments - Basis of consolidation - Derecognition of financial assets
		Critical accounting policies and estimates	Consolidation of structured entities
d)	The names of external credit assessment institution (ECAIs) used for securitizations and the types of securitization exposure for which each agency is used	Capital Management (also refer to CRD in this document)	Regulatory capital approach for securitization exposures
e)	Use of Basel IAA for capital purposes	Credit risk	n/a
		Capital Management	Regulatory capital approach for securitization exposures
f)	Use of other internal assessment for capital purposes	Credit risk	Credit risk assessment

SEC1: IRB – Securitization exposures in the banking book

The following table presents the breakdown of our balance sheet banking book carrying values by our role and type.

As at January 31, 2019

		a	b	c	e	f	g	i	j	k
		Bank acts as originator[1]			Bank acts as sponsor[2]			Bank acts as investor[3]		
(Millions of Canadian dollars)		Traditional	Synthetic	Sub-total	Traditional	Synthetic	Sub-total	Traditional	Synthetic	Sub-total
1	**Retail (total) - of which**	**1,422**	**-**	**1,422**	**40,275**	**-**	**40,275**	**5,439**	**-**	**5,439**
2	residential mortgage	-	-	-	1,820	-	1,820	3,312	-	3,312
3	credit card	1,394	-	1,394	7,791	-	7,791	520	-	520
4	other retail exposures	28	-	28	30,664	-	30,664	1,607	-	1,607
4a	of which student loans	-	-	-	4,668	-	4,668	1,070	-	1,070
4b	of which auto loans and leases	-	-	-	21,295	-	21,295	429	-	429
4c	of which consumer loans	-	-	-	4,701	-	4,701	-	-	-
4d	of which other retail	28	-	28	-	-	-	108	-	108
5	re-securitization	-	-	-	-	-	-	-	-	-
6	**Wholesale (total) – of which**	**-**	**-**	**-**	**11,375**	**-**	**11,375**	**7,685**	**-**	**7,685**
7	loans to corporates	-	-	-	2,601	-	2,601	6,498	-	6,498
8	commercial mortgage	-	-	-	-	-	-	907	-	907
9	lease and receivables	-	-	-	-	-	-	-	-	-
10	other wholesale	-	-	-	8,774	-	8,774	280	-	280
10a	of which dealer floor plan receivable	-	-	-	2,103	-	2,103	-	-	-
10b	of which equipment receivable	-	-	-	2,715	-	2,715	-	-	-
10c	of which trade receivable	-	-	-	134	-	134	-	-	-
10d	of which other wholesale	-	-	-	3,822	-	3,822	280	-	280
11	re-securitization	-	-	-	-	-	-	-	-	-

[1] Bank acts as originator reflects securitization activities in which we securitize our own assets (e.g. Golden credit card securitization).
[2] Bank acts as sponsor reflects securitization activities in which RBC works with its client to originate securitization transactions. RBC provides the liquidity and credit enhancement facilities to the SPE.
[3] Bank acts as investor reflects purchases of securitization assets from the market.

SEC1: IRB – Securitization exposures in the banking book (continued)

As at October 31, 2018

		a	b	c	e	f	g	i	j	k
		Bank acts as originator[1]			Bank acts as sponsor[2]			Bank acts as investor[3]		
(Millions of Canadian dollars)		Traditional	Synthetic	Sub-total	Traditional	Synthetic	Sub-total	Traditional	Synthetic	Sub-total
1	**Retail (total) - of which**	**1,598**	**-**	**1,598**	**35,753**	**-**	**35,753**	**5,573**	**-**	**5,573**
2	residential mortgage	-	-	-	1,671	-	1,671	3,291	-	3,291
3	credit card	1,569	-	1,569	7,487	-	7,487	586	-	586
4	other retail exposures	29	-	29	26,595	-	26,595	1,696	-	1,696
4a	of which student loans	-	-	-	4,204	-	4,204	1,212	-	1,212
4b	of which auto loans and leases	-	-	-	18,664	-	18,664	484	-	484
4c	of which consumer loans	-	-	-	3,727	-	3,727	-	-	-
4d	of which other retail	29	-	29	-	-	-	-	-	-
5	re-securitization	-	-	-	-	-	-	-	-	-
6	**Wholesale (total) – of which**	**-**	**-**	**-**	**12,934**	**-**	**12,934**	**7,478**	**-**	**7,478**
7	loans to corporates	-	-	-	1,939	-	1,939	6,239	-	6,239
8	commercial mortgage	-	-	-	-	-	-	957	-	957
9	lease and receivables	-	-	-	-	-	-	-	-	-
10	other wholesale	-	-	-	8,892	-	8,892	282	-	282
10a	of which dealer floor plan receivable	-	-	-	1,839	-	1,839	-	-	-
10b	of which equipment receivable	-	-	-	2,463	-	2,463	-	-	-
10c	of which trade receivable	-	-	-	668	-	668	-	-	-
10d	of which other wholesale	-	-	-	3,922	-	3,922	282	-	282
11	re-securitization	-	-	-	2,103	-	2,103	-	-	-

[1] Bank acts as originator reflects securitization activities in which we securitize our own assets (e.g. Golden credit card securitization).
[2] Bank acts as sponsor reflects securitization activities in which RBC works with its client to originate securitization transactions. RBC provides the liquidity and credit enhancement facilities to the SPE.
[3] Bank acts as investor reflects purchases of securitization assets from the market.

SEC2: IRB – Securitization exposures in the trading book

The following table presents the breakdown of our balance sheet trading book carrying values by our role and type.

As at January 31, 2019

		a	b	c	e	f	g	i	j	k
		Bank acts as originator[1]			Bank acts as sponsor[2]			Bank acts as investor[3]		
	(Millions of Canadian dollars)	Traditional	Synthetic	Sub-total	Traditional	Synthetic	Sub-total	Traditional	Synthetic	Sub-total
1	**Retail (total) - of which**	**-**	**-**	**-**	**-**	**-**	**-**	**1,709**	**-**	**1,709**
2	residential mortgages	-	-	-	-	-	-	720	-	720
3	asset-backed securities	-	-	-	-	-	-	45	-	45
4	commercial mortgages	-	-	-	-	-	-	1	-	1
5	other retail exposure	-	-	-	-	-	-	943	-	943
6	re-securitization	-	-	-	-	-	-	-	-	-
7	**Wholesale (total) - of which**	**-**	**-**	**-**	**-**	**-**	**-**	**4,328**	**-**	**4,328**
8	loans to corporates	-	-	-	-	-	-	172	-	172
8a	of which residential mortgages	-	-	-	-	-	-	-	-	-
8b	of which consumer loans	-	-	-	-	-	-	48	-	48
8c	of which credit cards	-	-	-	-	-	-	43	-	43
8d	of which student loans	-	-	-	-	-	-	46	-	46
8e	of which other	-	-	-	-	-	-	35	-	35
9	commercial mortgages	-	-	-	-	-	-	3,735	-	3,735
10	leases and receivables	-	-	-	-	-	-	376	-	376
11	other wholesale	-	-	-	-	-	-	45	-	45
11a	of which dealer floor plan receivables	-	-	-	-	-	-	41	-	41
11b	of which equipment receivables	-	-	-	-	-	-	4	-	4
12	re-securitization	-	-	-	-	-	-	-	-	-
13	asset-backed securities	-	-	-	-	-	-	-	-	-

[1] Bank acts as originator reflects securitization activities in which we securitize our own assets.

[2] Bank acts as sponsor reflects securitization activities in which RBC works with its client to originate securitization transactions. RBC provides the liquidity and credit enhancement facilities to the SPE.

[3] Bank acts as investor reflects purchases of securitization assets from the market.

SEC2: IRB – Securitization exposures in the trading book (continued)

As at October 31, 2018

		a	b	c	e	f	g	i	j	k
		Bank acts as originator[1]			Bank acts as sponsor[2]			Bank acts as investor[3]		
	(Millions of Canadian dollars)	Traditional	Synthetic	Sub-total	Traditional	Synthetic	Sub-total	Traditional	Synthetic	Sub-total
1	**Retail (total) - of which**	**-**	**-**	**-**	**-**	**-**	**-**	**800**	**-**	**800**
2	residential mortgages	-	-	-	-	-	-	760	-	760
3	asset-backed securities	-	-	-	-	-	-	37	-	37
4	commercial mortgages	-	-	-	-	-	-	3	-	3
5	re-securitization	-	-	-	-	-	-	-	-	-
6	**Wholesale (total) - of which**	**-**	**-**	**-**	**-**	**-**	**-**	**9,210**	**-**	**9,210**
7	loans to corporates	-	-	-	-	-	-	853	-	853
7a	of which residential mortgages	-	-	-	-	-	-	74	-	74
7b	of which consumer loans	-	-	-	-	-	-	61	-	61
7c	of which credit cards	-	-	-	-	-	-	45	-	45
7d	of which student loans	-	-	-	-	-	-	45	-	45
7e	of which other	-	-	-	-	-	-	628	-	628
8	commercial mortgages	-	-	-	-	-	-	7,127	-	7,127
9	leases and receivables	-	-	-	-	-	-	448	-	448
10	other wholesale	-	-	-	-	-	-	90	-	90
10a	of which dealer floor plan receivables	-	-	-	-	-	-	42	-	42
10b	of which equipment receivables	-	-	-	-	-	-	48	-	48
11	re-securitization	-	-	-	-	-	-	-	-	-
12	asset-backed securities	-	-	-	-	-	-	692	-	692

[1] Bank acts as originator reflects securitization activities in which we securitize our own assets.

[2] Bank acts as sponsor reflects securitization activities in which RBC works with its client to originate securitization transactions. RBC provides the liquidity and credit enhancement facilities to the SPE.

[3] Bank acts as investor reflects purchases of securitization assets from the market.

SEC3: Securitization exposures in the banking book and associated regulatory capital requirements – bank acting as originator or as sponsor

The following table presents a breakdown of securitization exposures in the banking book by risk weight and by regulatory approach when we act as originator or sponsor, and the associated capital requirements.

As at January 31, 2019

		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q
		Exposure values (by RW bands)					Exposure values (by regulatory approach)				RWA[3] (by regulatory approach)				Capital charge after cap (by regulatory approach)			
	(Millions of Canadian dollars)	≤20% RW	>20% to 50% RW	>50% to 100% RW	>100% to <1250% RW	1250% RW	SEC – IRBA [1,4]	SEC – ERBA[1,2]	SEC – SA[1]	1250%	SEC – IRBA[1,4]	SEC – ERBA[1,2]	SEC – SA[1]	1250%	SEC – IRBA[1,4]	SEC – ERBA[1,2]	SEC – SA[1]	1250%
1	**Total exposures**	**41,713**	**6,649**	**3,368**	**1,314**	**27**	**1,394**	**45,071**	**6,578**	**27**	**480**	**8,183**	**2,583**	**342**	**38**	**654**	**207**	**27**
2	Traditional securitization	41,713	6,649	3,368	1,314	27	1,394	45,071	6,578	27	480	8,183	2,583	342	38	654	207	27
3	Of which securitization	41,713	6,649	3,368	1,314	27	1,394	45,071	6,578	27	480	8,183	2,583	342	38	654	207	27
4	Of which retail underlying	34,007	4,676	2,292	694	27	1,394	36,566	3,708	27	480	6,754	558	342	38	540	45	27
5	Of which wholesale	7,706	1,973	1,076	620	-	-	8,505	2,870	-	-	1,429	2,025	-	-	114	162	-
6	Of which re-securitization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	Of which senior	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	Of which non-senior	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	Synthetic securitization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	Of which securitization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	Of which retail underlying	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	Of which wholesale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	Of which re-securitization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	Of which senior	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	Of which non-senior	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	Total before Transitional grandfathering adjustment	-	-	-	-	-	-	-	-	-	480	8,183	2,583	342	-	-	-	-
17	Transitional grandfathering adjustment	-	-	-	-	-	-	-	-	-	308	3,672	(1,199)	-	-	-	-	-
18	Total after Transitional grandfathering adjustment	-	-	-	-	-	-	-	-	-	172	4,511	3,782	342	-	-	-	-

[1] OSFI adopted BCBS Revised Securitization Framework in Q1 2019. Column headings have been revised to reflect the new methodology.

[2] As per disclosure requirements Internal assessment approach (IAA) exposures have been included with securitization external rating based approach.

[3] Under the revised securitization framework, OSFI has removed the 1.06% IRB scalar for securitization exposures not risk weighted at 1250%.

[4] SEC-IRBA exposures reflect exposures where we have underlying IRB approval currently.

As at October 31, 2018

		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q
		Exposure values (by RW bands)					Exposure values (by regulatory approach)				RWA (by regulatory approach)				Capital charge after cap (by regulatory approach)			
(Millions of Canadian dollars)		≤20% RW	>20% to 50% RW	>50% to 100% RW	>100% to <1250% RW	1250% RW	RBA (incl. IAA)	IRB SFA	SA/SSFA	1250%	RBA (incl. IAA)	IRB SFA	SA/SSFA	1250%	RBA (incl. IAA)	IRB SFA	SA/SSFA	1250%
1	**Total exposures**	**45,729**	**815**	**1,874**	**1,841**	**28**	**50,258**	**-**	**-**	**28**	**8,146**	**-**	**-**	**349**	**652**	-	-	**28**
2	Traditional securitization	45,729	815	1,874	1,841	28	50,258	-	-	28	8,146	-	-	349	652	-	-	28
3	Of which securitization	45,729	305	281	1,841	28	48,155	-	-	28	6,832	-	-	349	547	-	-	28
4	Of which retail underlying	37,019	305	-	-	28	37,323	-	-	28	3,508	-	-	349	281	-	-	28
5	Of which wholesale	8,710	-	281	1,841	-	10,832	-	-	-	3,324	-	-	-	266	-	-	-
6	Of which re-securitization	-	510	1,593	-	-	2,103	-	-	-	1,314	-	-	-	105	-	-	-
7	Of which senior	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	Of which non-senior	-	510	1,593	-	-	2,103	-	-	-	1,314	-	-	-	105	-	-	-
9	Synthetic securitization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	Of which securitization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	Of which retail underlying	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	Of which wholesale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	Of which re-securitization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	Of which senior	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	Of which non-senior	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SEC4: Securitization exposures in the banking book and associated capital requirements – bank acting as investor

The following table presents a breakdown of securitization exposures in the banking book by risk weight and by regulatory approach when we act as investor, and the associated capital requirements.

As at January 31, 2019

	(Millions of Canadian dollars)	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q
		Exposure values (by RW bands)					Exposure values (by regulatory approach)				RWA[3] (by regulatory approach)				Capital charge after cap (by regulatory approach)			
		≤20% RW	>20% to 50% RW	>50% to 100% RW	>100% to <1250% RW	1250% RW	SEC – IRBA[1,4]	SEC – ERBA[1,2]	SEC – SA[1]	1250%	SEC – IRBA[1,4]	SEC – ERBA[1,2]	SEC – SA[1]	1250%	SEC – IRBA[1,4]	SEC – ERBA[1,2]	SEC – SA[1]	1250%
1	**Total exposures**	**7,767**	**1,092**	**3,441**	**824**	**-**	**-**	**13,124**	**-**	**-**	**-**	**5,372**	**-**	**-**	**-**	**430**	**-**	**-**
2	Traditional securitization	7,767	1,092	3,441	824	-	-	13,124	-	-	-	5,372	-	-	-	430	-	-
3	Of which securitization	7,767	1,092	3,441	824	-	-	13,124	-	-	-	5,372	-	-	-	430	-	-
4	Of which retail underlying	938	1,088	3,396	17	-	-	5,439	-	-	-	3,102	-	-	-	248	-	-
5	Of which wholesale	6,829	4	45	807	-	-	7,685	-	-	-	2,270	-	-	-	182	-	-
6	Of which re-securitization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	Of which senior	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	Of which non-senior	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	Synthetic securitization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	Of which securitization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	Of which retail underlying	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	Of which wholesale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	Of which re-securitization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	Of which senior	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	Of which non-senior	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	Total before Transitional grandfathering adjustment	-	-	-	-	-	-	-	-	-	-	5,372	-	-	-	-	-	-
17	Transitional grandfathering adjustment	-	-	-	-	-	-	-	-	-	-	4,106	-	-	-	-	-	-
18	Total after Transitional grandfathering adjustment	-	-	-	-	-	-	-	-	-	-	1,266	-	-	-	-	-	-

[1] OSFI adopted BCBS Revised Securitization Framework in Q1 2019. Column headings have been revised to reflect the new methodology.

[2] As per disclosure requirements Internal assessment approach (IAA) exposures have been included with securitization external rating based approach.

[3] Under the revised securitization framework, OSFI has removed the 1.06% IRB scalar for securitization exposures not risk weighted at 1,250%.

[4] SEC-IRBA exposures reflect exposures where we have underlying IRB approval currently.

As at October 31, 2018

		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q
		Exposure values (by RW bands)					Exposure values (by regulatory approach)				RWA (by regulatory approach)				Capital charge after cap			
(Millions of Canadian dollars)		≤20% RW	>20% to 50% RW	>50% to 100% RW	>100% to <1250% RW	1250% RW	RBA (including IAA)	IRB SFA	SA/SSFA	1250%	RBA (including IAA)	IRB SFA	SA/SSFA	1250%	RBA (including IAA)	IRB SFA	SA/SSFA	1250%
1	**Total exposures**	**12,940**	**83**	**7**	**-**	**23**	**13,030**	**-**	**-**	**23**	**1,542**	**-**	**-**	**284**	**123**	**-**	**-**	**23**
2	Traditional securitization	12,940	83	7	-	23	13,030	-	-	23	1,542	-	-	284	123	-	-	23
3	Of which securitization	12,940	83	7	-	23	13,030	-	-	23	1,542	-	-	284	123	-	-	23
4	Of which retail underlying	5,461	83	7	-	23	5,551	-	-	23	964	-	-	284	77	-	-	23
5	Of which wholesale	7,479	-	-	-	-	7,479	-	-	-	578	-	-	-	46	-	-	-
6	Of which re-securitization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	Of which senior	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	Of which non-senior	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	Synthetic securitization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	Of which securitization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	Of which retail underlying	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	Of which wholesale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	Of which re-securitization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	Of which senior	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	Of which non-senior	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MARKET RISK

MRA: Qualitative disclosure requirements related to market risk

Market risk management strategies and processes

Market risk arises from our trading and non-trading portfolios. The primary objective of trading is to generate an optimal return on our capital while ensuring that risks remain within our risk appetite. Trading activities involve market making, facilitating client transactions and hedging risks generated from these activities.

Market risk also arises from our non-trading portfolio as a result of: interest rate risk from client-originating banking products (such as loans and deposits) and related hedge transactions, corporate treasury portfolio used for asset-liability management and liquidity management, exposures designated as Fair Value through Other Comprehensive Income (FVOCI), and exposures from our insurance operations.

To ensure that market risk remains within our risk appetite, we hedge our market risk exposures where appropriate. We use cash and derivative financial instruments, as permitted by regulatory and jurisdictional requirements, to manage the market risk related to our trading and non-trading activities.

The table below presents an overview of Pillar 3 disclosure requirements that have been met within our 2018 Annual Report and incorporated by reference into this Pillar 3 report. Our 2018 Annual Report is available free of charge on our website at http://www.rbc.com/investorrelations

Pillar 3 disclosures requirement		RBC 2018 Annual Report section	Sub-Section
a)	Processes implemented to identify, measure, monitor and control the bank's market risks	Market Risk	Market Risk Controls – FVTPL positions
			Stress Tests
			Market Risk Measures – FVTPL positions
			Market Risk Measures for other FVTPL positions – Assets and liabilities of RBC Insurance
			Market Risk Controls – Structural Interest Rate Risk (SIRR) positions
			SIRR Measurement
			Market Risk Measures – Structural Interest Rate Sensitivities
			Market risk measures for other material non-trading portfolios
	Policies for hedging risk and strategies/processes for monitoring the continuing effectiveness of hedges	Consolidated Financial Statements	Note 2 - Summary of significant accounting policies, estimates and judgements – Hedge accounting

Market risk management structure and organization

The Enterprise Market Risk Management Framework is the governance and control framework for the management of market risk within the bank. The market risk management structure is designed to ensure strong corporate governance over all market risk in the context of each business considering operating environment, industry best practices, and regulatory requirements. Drivers of market risk are considered in the bank's policies, practices and standards which are continuously updated given dynamic market and regulatory conditions.

The table below presents an overview of Pillar 3 disclosure requirements that have been met within our 2018 Annual Report and incorporated by reference into this Pillar 3 report. Our 2018 Annual Report is available free of charge on our website at http://www.rbc.com/investorrelations

Pillar 3 disclosures requirement		RBC 2018 Annual Report section	Sub-Section
b)	Description of the market risk governance structure established to implement the strategies and processes of the bank	Enterprise Risk Management	Risk Governance
			Risk Appetite
			Risk Measurement
			Risk Control
			Stress Testing
			Risk Conduct and Culture
	Description of the relationships and the communication mechanisms between the different parties involved in market risk management	Enterprise Risk Management	Risk Governance
			Risk Control

MRA: qualitative disclosure requirements related to market risk (continued)

Scope and nature of risk reporting and/or measurement systems

The table below presents an overview of Pillar 3 disclosure requirements that have been met within our 2018 Annual Report and incorporated by reference into this Pillar 3 report. Our 2018 Annual Report is available free of charge on our website at http://www.rbc.com/investorrelations

Pillar 3 disclosures requirement		RBC 2018 Annual Report section	Sub-Section
c)	Scope and nature of risk reporting and/or measurement systems	Enterprise Risk Management	Risk Measurement
			Risk Control
			Stress Testing
		Market Risk	Market Risk Controls – FVTPL positions
			Stress Tests
			Market Risk Measures – FVTPL positions
			Market Risk Measures for other FVTPL positions – Assets and liabilities of RBC Insurance
			Market Risk Controls – Structural Interest Rate Risk (SIRR) positions
			SIRR Measurement
			Market Risk Measures – Structural Interest Rate Sensitivities
			Market Risk Measures for other material non-trading portfolios

MRB: Qualitative disclosures for banks using the internal models approach (IMA)

Internal models used for measuring Market Risk

Measure	Description	Percentage of market risk regulatory capital[1]
Regulatory Value at Risk (VaR)	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 a one-day holding period, and then scale up to a ten-day holding period for regulatory capital measurement. The measure is computed daily, using a full-revaluation approach to generate potential profit or loss values arising from historically observed daily market movements. The historical period used to compute VaR is comprised of the recent two years of equally weighted market data, and is rolled forward at least monthly. A mix of absolute and relative returns are used in generating the historical market changes.	11%
Stressed VaR (SVaR)	SVaR is calculated daily in a similar manner as VaR, but based on a ten-day holding period directly and using a one year period of heightened volatility. We currently use the historical period from September 2008 to August 2009, given the market volatility during that time in relation to the risks within our portfolio. This historical period is assessed quarterly to ensure that it continues to reflect the one year period of greatest potential loss for our portfolio.	25%
Incremental Risk Charge (IRC)	IRC captures the risk of losses under default or rating changes for issuers of traded instruments. IRC is measured over a one-year horizon at a 99.9% confidence level, and captures different liquidity horizons for instruments and concentrations in issuers under a constant level of risk assumption.	27%

[1] As at January 31, 2019.

VaR and SVaR

The VaR and SVaR models are used for computing regulatory capital for trading book positions across the enterprise, where we have obtained approval from our regulator. We model a general market risk measure, a debt specific risk measure, and an equity total risk measure; along with a total correlated risk measure which combines the above distributions. For portions of our portfolio for which we do not have regulatory approval for models based capital, we use the Standardized Approach to compute regulatory capital.

For management purposes, VaR and SVaR are both computed with one-day holding periods and are applied to all positions that impact the bank’s revenue across the trading book and non-trading book. A sensitivity-ladder interpolation approach is applied for some positions instead of full-revaluation, and inactive non-trading book positions are refreshed monthly.

MRB: Qualitative disclosures for banks using the internal models approach (continued)

The table below presents an overview of Pillar 3 disclosure requirements that have been met within our 2018 Annual Report and incorporated by reference into this Pillar 3 report. Our 2018 Annual Report is available free of charge on our website at http://www.rbc.com/investorrelations

Pillar 3 disclosures requirement		RBC 2018 Annual Report section	Sub-Section
c)	General description of the models (VaR/stressed VaR)	Market Risk	Market Risk Controls – FVTPL positions
g)	Description of stress testing applied to the modelling parameters	Market Risk	Stress Tests

The VaR and SVaR models are governed by the Enterprise Market Risk Framework, which requires that models are validated on a regular basis by a model validation group that is independent of the model developers. The VaR and SVaR models are also subject to ongoing model performance monitoring. The VaR model is back tested by comparing marked-to-market revenue to the computed VaR on a daily basis, in order to ensure that actual outcomes in trading revenue do not exceed the VaR projections beyond the expectations of the applied confidence interval. Backtesting is also performed using a hypothetical profit and loss calculation which allows for comparisons to the total correlated VaR, the general market risk VaR, and asset class VaR measures separately.

While the majority of market risks are reflected in our VaR models, there is the potential for certain risks to be inadequately captured. This can occur due to infrastructure limitations, lack of historical market data or missing risk factors within our VaR models. These Risks Not in VaR (RNIV) are identified through backtesting and other model monitoring processes, and are incorporated into the VaR models, where possible. An assessment of residual RNIV materiality is reviewed and monitored against thresholds regularly.

Incremental Risk Charge

Our IRC model is applied to debt instruments, credit products, and credit derivatives within our trading portfolios. A probability modelling technique known as the Monte Carlo simulation process is used to generate a statistically relevant number of loss scenarios due to issuer ratings migration and default in order to establish the losses at a given confidence level. These scenarios are determined using a transition probability matrix which is calibrated using a recent 20 years of historical issuer ratings migration and default observations. Correlations between issuer regions and sectors are calibrated using five years of historical equity time series data. For the Monte Carlo process, each position is assigned a liquidity horizon (the length of time to close out a position) of three months, six months, or one year, depending on its issuer type, credit rating, and maturity profile.

The IRC model is also subject to the same independent vetting, validation procedures and model risk governance framework as the VaR and SVaR models. Model performance monitoring includes reviews and stress testing of model assumptions, which includes stress testing the historical correlation and liquidity assumptions. Due to the long time horizon and high confidence level of the risk measure, we do not perform back-testing of the IRC model as we do for the VaR measure.

MR1: Market risk under standardized approach

The following table presents the components of the capital requirement under the standardized approach for Market risk.

	(Millions of Canadian dollars)	RWA	
		As at January 31, 2019	As at October 31, 2018
	Outright products		
1	Interest rate risk (general and specific)	5,762	3,774
2	Equity risk (general and specific)	341	186
3	Foreign exchange risk	1,237	857
4	Commodity risk	190	158
	Options		
5	Simplified approach	-	-
6	Delta-plus method	-	-
7	Scenario approach	3,280	3,973
8	**Securitization**	2,169	4,028
9	**Total**	**12,979**	**12,976**

Reduction in Securitization RWA and a commensurate increase in Interest Rate risk RWA is due to a one time change in categorization of securitization exposures coincident with the implementation of BCBS Revised Securitization Framework effective Q1 2019.

FX RWA increased in Q1 2019 due to increased non-trading FX exposures.

MR2: RWA flow statements of market risk exposures under an IMA

The following table presents variations in the Market RWA determined under an internal model approach.

As at January 31, 2019

		a	b	c	d	e	f
	(Millions of Canadian dollars)	VaR	Stressed VaR	IRC	CRM	Other	Total RWA
1	**RWA at previous quarter end**	**2,593**	**6,950**	**9,690**	**-**	**-**	**19,233**
2	Movement in risk levels[1]	484	1,353	(898)	-	-	939
3	Model updates/changes[2]	307	(39)	500	-	-	768
4	Methodology and policy[3]	-	-	-	-	-	-
5	Acquisitions and disposals	-	-	-	-	-	-
6	Foreign exchange movements	334	622	(13)	-	-	943
7	Other	-	-	-	-	-	-
8	**RWA at end of Reporting Period**	**3,718**	**8,886**	**9,279**	**-**	**-**	**21,883**

[1] Change in risk due to position changes and market movements.

[2] Updates to the model to reflect recent experience, model implementation, change in model scope or any change to address model malfunctions including changes through model calibrations/realignments.

[3] Methodology changes to the calculations driven by regulatory policy changes.

As at October 31, 2018

		a	b	c	d	e	f
	(Millions of Canadian dollars)	VaR	Stressed VaR	IRC	CRM	Other	Total RWA
1	**RWA at previous quarter end**	**2,798**	**6,658**	**8,332**	**-**	**-**	**17,788**
2	Movement in risk levels[1]	25	85	329	-	-	439
3	Model updates/changes[2]	(184)	151	650	-	-	617
4	Methodology and policy[3]	-	-	-	-	-	-
5	Acquisitions and disposals	-	-	-	-	-	-
6	Foreign exchange movements	(46)	56	379	-	-	389
7	Other	-	-	-	-	-	-
8	**RWA at end of Reporting Period**	**2,593**	**6,950**	**9,690**	**-**	**-**	**19,233**

[1] Change in risk due to position changes and market movements

[2] Updates to the model to reflect recent experience, model implementation, change in model scope or any change to address model malfunctions including changes through model calibrations/realignments

[3] Methodology changes to the calculations driven by regulatory policy changes

MR3: IMA values for trading portfolios

The following table presents minimum, maximum, average and period-end regulatory 10 day VaR, regulatory 10 day stressed VaR, incremental risk charge and comprehensive risk capital charge. These measures are based on the scope of the global trading book with internal models approach (IMA) approval from OSFI for calculating regulatory market risk capital.

As at January 31, 2019

(Millions of Canadian dollars)		Value	
VaR (10 day 99%)[1]		As at January 31, 2019	As at October 31, 2018
1	Maximum value	119	86
2	Average value	97	67
3	Minimum value	72	46
4	Period end	88	83
Stressed VaR (10 day 99%)[1]			
5	Maximum value	303	227
6	Average value	230	184
7	Minimum value	148	140
8	Period end	207	152
Incremental Risk Charge (99.9%)			
9	Maximum value	948	801
10	Average value	746	637
11	Minimum value	584	503
12	Period end	616	775
Comprehensive Risk capital charge (99.9%)			
13	Maximum value	-	-
14	Average value	-	-
15	Minimum value	-	-
16	Period end	-	-
17	Floor (standardized measurement method)	-	-

[1] The portfolio included in regulatory VaR and SVaR represents a subset of the portfolio captured in management VaR and SVaR reported in the Market Risk section of the 2018 Annual Report.

Q1 2019 vs. Q4 2018

Average VaR of $97 million increased $30 million from Q4 2018, mainly due to growth in fixed income portfolios. The impact of foreign exchange translation also contributed to the VaR increase.

Average Stressed VaR of $230 million increased $46 million from the prior quarter due to the aforementioned drivers of VaR increase.

Average Incremental Risk Charge of $746 million increased $109 million from the prior quarter due to increased fixed income bond exposures during the quarter. The impact of foreign exchange translation also contributed to the increase.

TOTAL LOSS ABSORBING CAPACITY (TLAC) DISCLOSURE REQUIREMENTS

KM2: Key metrics – TLAC requirements (at resolution group level)

The following summary table provides information about our total loss-absorbing capacity (TLAC) available, and TLAC requirements applied, at the resolution group level under a Single Point of Entry. TLAC requirements establish two minimum standards; which are required to be met effective November 1, 2021: the risk-based TLAC ratio, which builds on the risk-based capital ratios described in the CAR guideline, and the TLAC leverage ratio, which builds on the leverage ratio described in OSFI's Leverage Requirements guideline. The risk-based TLAC ratio is defined as TLAC divided by Total risk-weighted assets (RWA) while the TLAC leverage ratio is defined as TLAC divided by the Leverage ratio exposure. OSFI has provided notification requiring systemically important banks to maintain a minimum TLAC ratio of 23.25% (inclusive of the revised domestic stability buffer of 1.75% which is effective Q2 2019) and a TLAC leverage ratio of 6.75%. Our TLAC ratio is expected to increase through normal course refinancing of maturing debt through the effective date of the TLAC requirements.

	(Millions of Canadian dollars, except as otherwise noted)	a January 31, 2019[1]
Resolution group[1]		
1	Total loss-absorbing capacity (TLAC) available	79,794
2	Total RWA at the level of the resolution group	508,512
3	TLAC ratio: TLAC as a percentage of RWA (row 1/row 2) (%)	15.7%
4	Leverage ratio exposure measure at the level of the resolution group	1,501,831
5	TLAC Leverage Ratio: TLAC as a percentage of leverage ratio exposure measure (row 1/row 4) (%)	5.3%
6a	Does the subordination exemption in the antepenultimate paragraph of Section 11 of the FSB TLAC Term Sheet apply?	Yes
6b	Does the subordination exemption in the penultimate paragraph of Section 11 of the FSB TLAC Term Sheet apply?	No
6c	If the capped subordination exemption applies, the amount of funding issued that ranks pari passu with Excluded Liabilities and that is recognized as external TLAC, divided by funding issued that ranks pari passu with Excluded Liabilities and that would recognized as external TLAC if no cap was applied (%)	N/A

[1] OSFI's TLAC ratio disclosure requirement became effective Q1 2019.

TLAC1: TLAC composition (at resolution group level)

The following table presents details of the composition of our TLAC.

As at January 31, 2019

	(Millions of Canadian dollars, except as otherwise noted)	Amount[1]
	Regulatory capital elements of TLAC and adjustments	
1	Common Equity Tier 1 capital (CET1)	57,963
2	Additional Tier 1 capital (AT1) before TLAC adjustments	6,378
3	AT1 ineligible as TLAC as issued out of subsidiaries to third parties	-
4	Other adjustments	-
5	AT1 instruments eligible under the TLAC framework	6,378
6	Tier 2 capital (T2) before TLAC adjustments	9,417
7	Amortised portion of T2 instruments where remaining maturity > 1 year	22
8	T2 capital ineligible as TLAC as issued out of subsidiaries to third parties	-
9	Other adjustments	-
10	T2 instruments eligible under the TLAC framework	9,439
11	TLAC arising from regulatory capital	73,780
	Non-regulatory capital elements of TLAC	
12	External TLAC instruments issued directly by the bank and subordinated to excluded liabilities	-
13	External TLAC instruments issued directly by the bank which are not subordinated to excluded liabilities but meet all other TLAC term sheet requirements	6,071
14	Of which: amount eligible as TLAC after application of the caps	-
15	External TLAC instruments issued by funding vehicles prior to January 1, 2022	-
16	Eligible ex ante commitments to recapitalise a G-SIB in resolution	-
17	TLAC arising from non-regulatory capital instruments before adjustments	6,071
	Non-regulatory capital elements of TLAC: adjustments	
18	TLAC before deductions	79,851
19	Deductions of exposures between MPE resolution groups that correspond to items eligible for TLAC (not applicable to SPE G-SIBs and D-SIBs)	-
20	Deduction of investments in own other TLAC liabilities	(58)
21	Other adjustments to TLAC	-
22	TLAC available after deductions	79,794
	Risk-weighted assets and leverage exposure measure for TLAC purposes	
23	Total risk-weighted assets adjusted as permitted under the TLAC regime	508,512
24	Leverage exposure measure	1,501,831
	TLAC ratios and buffers	
25	TLAC Ratio (as a percentage of risk-weighted assets adjusted as permitted under the TLAC regime, row 22 / row 23)	15.7%
26	TLAC Leverage Ratio (as a percentage of leverage exposure)	5.3%
27	CET1 (as a percentage of risk-weighted assets) available after meeting the resolution group's minimum capital and TLAC requirements	N/A
28	Institution-specific buffer (capital conservation buffer plus countercyclical buffer plus higher loss absorbency, expressed as a percentage of risk-weighted assets)	3.5%
29	Of which: capital conservation buffer	2.5%
30	Of which: bank specific countercyclical buffer	0.0%
31	Of which: higher loss absorbency	1.0%

[1] OSFI's TLAC ratio disclosure requirement became effective Q1 2019.

TLAC2 – Material subgroup entity – creditor ranking at legal entity level (G-SIBs only)

TLAC 2 is a G-SIB disclosure requirement to provide the ranking of the liability structure of all our material subsidiaries in foreign jurisdictions as defined by the FSB TLAC term sheet. RBC US Group Holdings LLC ("RBC IHC") is a material subsidiary entity for which TLAC 2 disclosure would be required. However, RBC IHC has been granted an extension to comply with TLAC rules by the Board of Governors of the Federal Reserve System until January 1, 2021. As such, OSFI has granted us an exemption for TLAC 2 disclosure until January 1, 2021. OSFI does require us to disclose TLAC 2 for any other material subsidiary identified, however, at this time RBC IHC is our only material subsidiary.

TLAC3 – Resolution entity – creditor ranking at legal entity level

The following table provides information regarding the ranking of our unsecured liabilities structure at the resolution entity level.

As at January 31, 2019

		Creditor ranking					
		1	2	3	4	5	Sum
(Millions of Canadian dollars, except as otherwise noted)		(most junior)					
1	Description of creditor ranking	Common shares	Preferred shares	Subordinated Debt	Bail-in Debt[1]	Other Liabilities excluding Bail-in Debt and Subordinated Debt [2]	
2	Total capital and liabilities net of credit risk mitigation	17,600	6,406	9,386	6,339	-	39,731
3	Subset of row 2 that are excluded liabilities	36	-	7	58	-	101
4	Total capital and liabilities less excluded liabilities (row 2 minus row 3)	17,565	6,406	9,379	6,281	-	39,631
5	Subset of row 4 that are *potentially* eligible as TLAC	17,565	6,375	9,025	6,281	-	39,246
6	Subset of row 5 with 1 year ≤ residual maturity < 2 years			-	1,528	-	1,528
7	Subset of row 5 with 2 years ≤ residual maturity < 5 years			110	4,421	-	4,531
8	Subset of row 5 with 5 years ≤ residual maturity < 10 years			8,463	2	-	8,465
9	Subset of row 5 with residual maturity ≥ 10 years, but excluding perpetual securities			452	330	-	782
10	Subset of row 5 that is perpetual securities	17,565	6,375	-	-	-	23,940

[1] Under the Bail-in Regime, Bail-in Debt which would ordinarily rank equally to Other Liabilities in liquidation, is subject to conversion under statutory resolution powers whereas Other Liabilities are not subject to such conversion.
[2] Completion of this column is not required by OSFI at this time.

OPERATIONAL RISK

The table below presents an overview of Pillar 3 disclosure requirements that have been met within our 2018 Annual Report and incorporated by reference into this Pillar 3 report. Our 2018 Annual Report is available free of charge on our website at http://www.rbc.com/investorrelations

	Pillar 3 disclosures requirement	RBC 2018 Annual Report section	Sub-section
a)	Details of the approach for operational risk capital assessment for which the bank qualifies	Operational risk	Operational risk capital
		Capital management	Attributed capital in the context of our business activities
b)	Description of the advanced measurement approaches for operational risk (AMA)	Operational risk	Operational risk capital
		Capital management	Attributed capital in the context of our business activities
c)	Description of the use of insurance for the purpose of mitigating operational risk	Operational risk	Operational risk capital

INTEREST RATE RISK IN THE BANKING BOOK

The table below presents an overview of Pillar 3 disclosure requirements that have been met within our 2018 Annual Report and incorporated by reference into this Pillar 3 report. Our 2018 Annual Report is available free of charge on our website at http://www.rbc.com/investorrelations

Pillar 3 disclosures requirement	RBC 2018 Annual Report section	Sub-section
Interest rate risk in the banking book	Market Risk	Market Risk