Royal Bank of Canada

Pillar 3 Report

As at July 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 our Q3 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 Q3 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 86,000+ 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 more than 16 million clients in Canada, the U.S. and 34 other countries. Learn more at rbc.com.

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 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, 2018, 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 2019 figures reported in this Pillar 3 document reflect the CAR guideline requirements.

Refer to our Q1 2019, Q2 2019 and Q3 2019 Report to Shareholders, Capital, liquidity and other regulatory developments section for further information on upcoming regulatory reforms which were announced during these quarter-end time periods.

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 23.5% (inclusive of the revised domestic stability buffer of 2% in Q4 2019) and a TLAC leverage ratio of 6.75%. We began issuing TLAC eligible debt in Q4 2018 and our TLAC ratio is 17.9% as at July 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. Refer to our TLAC disclosures included in this report as required by OSFI.

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
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				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 semi-annual.

OVERVIEW OF KEY METRICS, RISK MANAGEMENT AND RWA

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

	(Millions of Canadian dollars)	a July 31 2019	b April 30 2019	c Change
	Available capital (amounts)			
1	Common Equity Tier 1 (CET1)	60,938	60,314	624
2	Tier 1	66,615	65,992	623
3	Total capital	76,563	75,491	1,072
	Risk-weighted assets (amounts)			
4	Total risk-weighted assets (RWA)	510,664	510,463	201
	Risk-based capital ratios as a percentage of RWA			
5	Common Equity Tier 1 ratio	11.9%	11.8%	0.1%
6	Tier 1 ratio	13.0%	12.9%	0.1%
7	Total capital ratio	15.0%	14.8%	0.2%
	Additional CET1 buffer requirements as a percentage of RWA			
8	Capital conservation buffer requirement	2.5%	2.5%	-
9	Countercyclical buffer requirement[1]	0.0%	0.0%	-
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%)[2]	3.9%	3.8%	0.1%
	Basel III leverage ratio			
13	Total Basel III leverage ratio exposure measure	1,529,369	1,521,197	8,172
14	Basel III leverage ratio (row 2 / row 13)	4.4%	4.3%	0.1%

[1] Bank specific countercyclical buffer requirement for Q3 2019 was 2bps (Q2 2019 – 2bps) and is determined based on our private sector exposures in jurisdictions identified by BCBS.

[2] 8% reflects minimum capital requirements which includes D-SIB/G-SIB surcharge, and excludes the OSFI Domestic Stability Buffer of 1.75% in Q3 2019 (1.75% in Q2 2019). Refer to our Capital Management section of our 2018 Annual Report and Q3 2019 Report to Shareholders.

Our CET1 ratio was 11.9%, up 10 bps from last quarter, mainly reflecting internal capital generation, partially offset by higher RWA, the impact of lower discount rates in determining our pension and other post-employment benefit obligations, and share repurchases.

Our Tier 1 capital ratio of 13.0% was up 10 bps, reflecting the factors noted above under the CET1 ratio.

Our Total capital ratio of 15.0% was up 20 bps, reflecting the factors noted above under the Tier 1 ratio. Total capital ratio was also favourably impacted by the net issuance of subordinated debentures in the current quarter.

RWA increased $0.2 billion, mainly driven by business growth in wholesale and retail lending, largely offset by lower market risk and the impact of foreign exchange translation.

Our Leverage ratio of 4.4% was up 10 bps from last quarter, mainly reflecting internal capital generation, partially offset by higher leverage exposures and the impact of lower discount rates in determining our pension and other post-employment benefit obligations. The increase in leverage exposure was primarily attributable to lending, repo-style transactions, and other assets, partially offset by lower derivatives.

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)	July 31 2019	April 30 2019	July 31 2019	Change (a-b)
1	**Credit risk (excluding counterparty credit risk)**	**342,700**	**338,099**	**27,416**	**4,601**
2	Of which Standardized approach (SA)	81,699	80,102	6,536	1,597
3	Of which Internal rating-based (IRB) approach	261,001	257,997	20,880	3,004
4	**Counterparty credit risk (CCR)**	**47,478**	**49,656**	**3,799**	**(2,178)**
4a	Of which other CCR	10,895	11,075	872	(180)
4b	Credit valuation adjustment (CVA)	14,211	13,855	1,137	356
5	Of which Standardised approach for counterparty credit risk (SA-CCR)	22,372	24,726	1,790	(2,354)
6	Of which Internal model method (IMM)	-	-	-	-
7	Equity positions in banking book under market-based approach	2,240	2,406	179	(166)
8	Equity investments in funds – look-through approach	-	-	-	-
9	Equity investments in funds – mandate-based approach	2,644	2,293	212	351
10	Equity investments in funds – fall-back approach	17	141	1	(124)
11	Settlement risk	851	283	68	568
12	**Securitisation exposures in banking book**	**7,586**	**9,472**	**607**	**(1,886)**
12a	Of which transitional grandfathering adjustment	(6,888)	(6,888)	(551)	-
13	Of which IRB ratings-based approach (SEC-IRBA)	427	431	34	(4)
14	Of which External ratings-based approach (SEC-ERBA)	11,535	12,464	923	(929)
15	Of which Standardized approach (SEC-SA)[2]	2,512	3,465	201	(953)
16	**Market risk**	**29,425**	**31,453**	**2,354**	**(2,028)**
17	Of which Standardized approach (SA)	12,524	13,334	1,002	(810)
18	Of which Internal model approaches (IMA)	16,901	18,119	1,352	(1,218)
19	**Operational risk**	**65,262**	**64,487**	**5,221**	**775**
20	Of which Basic Indicator Approach	-	-	-	-
21	Of which Standardized Approach	5,483	5,370	439	113
22	Of which Advanced Measurement Approach	59,779	59,117	4,782	662
23	Amounts below the thresholds for deduction (subject to 250% risk weight)	12,461	12,173	997	288
24	Floor adjustment	-	-	-	-
25	**Total (1+4+7+8+9+10+11+12+16+19+23+24)**	**510,664**	**510,463**	**40,854**	**201**

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

[2] Includes exposures that are risk weighted at 1250%.

During the quarter, Total RWA increased by $0.2 billion, driven by the following:

Credit risk
RWA increased $4.6 billion, primarily due to loan growth in all business platforms, offset by foreign exchange translation impact.

Counterparty credit risk
RWA decreased by $2.2 billion, mainly due to increase in application of collateral for certain derivative exposures, which resulted in lower risk weight.

Securitization exposures in banking book
RWA decreased by $1.9 billion, due to reduction in conduit finance exposures, as well as continued effort to optimize RWA through transaction restructuring.

Market risk
RWA decreased by $2 billion, largely due to model updates on certain securitization exposures.

Operational risk
RWA increased by $0.8 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 July 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	26,863	26,860	26,860	-	-	-	-
Interest-bearing deposits with banks	31,553	31,553	31,553	-	-	-	-
Securities							
Trading	140,421	130,575	1,789	-	77	128,709	-
Investment, net of applicable allowance	100,240	98,105	83,959	-	14,146	-	-
	240,661	228,680	85,748	-	14,223	128,709	-
Assets purchased under reverse repurchase agreements and securities borrowed	309,640	309,640	-	309,640	-	-	-
Loans							
Retail	416,583	416,247	407,903	-	-	-	8,344
Wholesale	198,941	196,751	182,125	509	7,705	5,796	616
	615,524	612,998	590,028	509	7,705	5,796	8,960
Allowance for loan losses	(3,131)	(3,131)	-	-	-	-	(3,131)
	612,393	609,867	590,028	509	7,705	5,796	5,829
Segregated fund net assets	1,602	-	-	-	-	-	-
Other							
Customers' liability under acceptances	17,101	17,101	17,101	-	-	-	-
Derivatives[2]	98,774	99,310	-	99,310	-	96,252	-
Premises and equipment, net	3,058	3,055	3,055	-	-	-	-
Goodwill	11,115	11,115	-	-	-	-	11,115
Other intangibles	4,735	4,640	-	-	-	-	4,640
Other assets	49,398	51,160	23,439	24,168	12	3,255	286
	184,181	186,381	43,595	123,478	12	99,507	16,041
Total assets[2]	**1,406,893**	**1,392,981**	**777,784**	**433,627**	**21,940**	**234,012**	**21,870**
Liabilities and equity							
Deposits							
Personal	287,929	287,929	-	-	-	-	287,929
Business and government	563,343	563,781	-	-	-	-	563,781
Bank	29,939	29,939	-	-	-	-	29,939
	881,211	881,649	-	-	-	-	881,649
Segregated fund net liabilities	1,602	-	-	-	-	-	-
Other							
Acceptances	17,124	17,124	-	-	-	-	17,124
Obligations related to securities sold short	33,602	33,602	-	-	-	-	33,602
Obligations related to assets sold under repurchase agreements and securities loaned	220,027	220,027	-	220,027	-	-	-
Derivatives[2]	96,857	96,857	-	96,857	-	94,807	-
Insurance claims and policy benefit liabilities	11,480	-	-	-	-	-	-
Other liabilities	52,794	51,576	-	-	-	-	51,576
	431,884	419,186	-	316,884	-	94,807	102,302
Subordinated debentures	9,818	9,818	-	-	-	-	9,818
Total liabilities[2]	1,324,515	1,310,653	-	316,884	-	94,807	993,769
Equity attributable to shareholders							
Preferred shares	5,705	5,705	-	-	-	-	5,705
Common shares	17,593	17,593	-	-	-	-	17,593
Retained earnings	54,716	54,748	-	-	-	-	54,748
Other components of equity	4,265	4,183	-	-	-	-	4,183
	82,279	82,229	-	-	-	-	82,229
Non-controlling interests	99	99	-	-	-	-	99
Total equity	82,378	82,328	-	-	-	-	82,328
Total liabilities and equity[2]	**1,406,893**	**1,392,981**	**-**	**316,884**	**-**	**94,807**	**1,076,097**

[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 April 30, 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	33,041	33,039	33,039	-	-	-	-
Interest-bearing deposits with banks	26,718	26,718	26,718	-	-	-	-
Securities							
Trading	138,916	129,593	1,481	-	83	128,029	-
Investment, net of applicable allowance	102,075	100,057	86,441	-	13,616	-	-
	240,991	229,650	87,922	-	13,699	128,029	-
Assets purchased under reverse repurchase agreements and securities borrowed	309,520	309,520	-	309,520	-	-	-
Loans							
Retail	407,222	406,930	398,586	-	-	-	8,344
Wholesale	198,263	196,041	181,214	532	8,697	4,836	762
	605,485	602,971	579,800	532	8,697	4,836	9,106
Allowance for loan losses	(3,093)	(3,093)	-	-	-	-	(3,093)
	602,392	599,878	579,800	532	8,697	4,836	6,013
Segregated fund net assets	1,561	-	-	-	-	-	-
Other							
Customers' liability under acceptances	16,073	16,073	16,073	-	-	-	-
Derivatives[2]	84,812	85,173	-	85,173	-	82,766	-
Premises and equipment, net	3,014	3,012	3,012	-	-	-	-
Goodwill	11,289	11,289	-	-	-	-	11,289
Other intangibles	4,758	4,667	-	-	-	-	4,667
Other assets	44,707	46,343	23,460	19,686	7	2,874	316
	164,653	166,557	42,545	104,859	7	85,640	16,272
Total assets[2]	**1,378,876**	**1,365,362**	**770,024**	**414,911**	**22,403**	**218,505**	**22,285**
Liabilities and equity							
Deposits							
Personal	286,495	286,494	-	-	-	-	286,494
Business and government	544,667	544,910	-	-	-	-	544,910
Bank	32,939	32,939	-	-	-	-	32,939
	864,101	864,343	-	-	-	-	864,343
Segregated fund net liabilities	1,561	-	-	-	-	-	-
Other							
Acceptances	16,099	16,099	-	-	-	-	16,099
Obligations related to securities sold short	34,049	34,049	-	-	-	-	34,049
Obligations related to assets sold under repurchase agreements and securities loaned	223,980	223,980	-	223,980	-	-	-
Derivatives[2]	82,168	82,168	-	82,168	-	80,006	-
Insurance claims and policy benefit liabilities	11,006	-	-	-	-	-	-
Other liabilities	54,606	53,434	-	-	-	-	53,431
	421,908	409,730	-	306,148	-	80,006	103,579
Subordinated debentures	9,360	9,360	-	-	-	-	9,360
Total liabilities[2]	1,296,930	1,283,433	-	306,148	-	80,006	977,282
Equity attributable to shareholders							
Preferred shares	5,706	5,706	-	-	-	-	5,706
Common shares	17,534	17,534	-	-	-	-	17,534
Retained earnings	53,640	53,656	-	-	-	-	53,656
Other components of equity	4,965	4,932	-	-	-	-	4,932
	81,845	81,828	-	-	-	-	81,828
Non-controlling interests	101	101	-	-	-	-	101
Total equity	81,946	81,929	-	-	-	-	81,929
Total liabilities and equity[2]	**1,378,876**	**1,365,362**	**-**	**306,148**	**-**	**80,006**	**1,059,211**

[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 July 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]**	**1,371,111**	**777,784**	**21,940**	**433,627**	**234,012**
2	Liabilities carrying value amount under regulatory scope of consolidation (as per template LI1)[1]	316,884	-	-	316,884	94,807
3	Total net amount under regulatory scope of consolidation	1,054,227	777,784	21,940	116,743	139,205
4	Off-balance sheet amounts[2]	1,242,398	318,268	41,151	882,979	-
5	Differences due to Fair Value adjustment	(492)	(492)	-	-	(1,445)
6	Differences due to different netting rules, other than those already included in row 2	911	911	-	-	-
7	Differences due to consideration of provisions	359	359	-	-	-
8	Differences due to prudential filters	-	-	-	-	-
9	Difference due to accounting and risk treatment of securitizations and other items	3,573	2,297	1,276	-	-
10	**Exposure amounts considered for regulatory purposes**	**2,300,976**	**1,099,127**	**64,367**	**999,722**	**137,760**

[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 April 30, 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]**	**1,343,077**	**770,024**	**22,403**	**414,911**	**218,505**
2	Liabilities carrying value amount under regulatory scope of consolidation (as per template LI1)[1]	306,151	-	-	306,148	80,006
3	Total net amount under regulatory scope of consolidation	1,036,926	770,024	22,403	108,763	138,499
4	Off-balance sheet amounts[2]	1,203,934	314,862	43,250	845,820	-
5	Differences due to Fair Value adjustment	(230)	(230)	-	-	(2,760)
6	Differences due to different netting rules, other than those already included in row 2	925	925	-	-	-
7	Differences due to consideration of provisions	368	368	-	-	-
8	Differences due to prudential filters	-	-	-	-	-
9	Difference due to accounting and risk treatment of securitizations and other items	3,798	2,521	1,277	-	-
10	**Exposure amounts considered for regulatory purposes**	**2,245,721**	**1,088,470**	**66,930**	**954,583**	**135,739**

[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 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), 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

<table>
<tr><th colspan="2">Pillar 3 disclosures requirement</th><th>RBC 2018 Annual Report section</th><th>Sub-section</th></tr>
<tr><td rowspan="2">a)</td><td rowspan="2">Translation of the business model into the components of the bank's credit risk profile</td><td rowspan="2">Credit risk</td><td>Overview</td></tr>
<tr><td>Gross credit risk exposure</td></tr>
<tr><td rowspan="8">b)</td><td rowspan="8">Criteria and approach used for defining credit risk management policy and for setting credit risk limits</td><td rowspan="4">Enterprise risk management</td><td>Risk governance</td></tr>
<tr><td>Risk appetite</td></tr>
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<tr><td>Risk control - Authorities and limits</td></tr>
<tr><td rowspan="4">Credit risk</td><td>Overview</td></tr>
<tr><td>Credit risk assessment</td></tr>
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<tr><td>Credit risk approval</td></tr>
<tr><td rowspan="2">c)</td><td rowspan="2">Structure and organization of the credit risk management and control function</td><td rowspan="2">Enterprise risk management</td><td>Risk governance</td></tr>
<tr><td>Risk control</td></tr>
<tr><td>d)</td><td>Interaction between the credit risk management, risk control, compliance and internal audit functions</td><td>Enterprise risk management</td><td>Risk governance</td></tr>
<tr><td rowspan="2">e)</td><td rowspan="2">Scope and content of the reporting on credit risk exposure to the executive management and to the board of directors</td><td rowspan="2">Enterprise risk management</td><td>Risk governance</td></tr>
<tr><td>Risk control - Reporting</td></tr>
</table>

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 July 31, 2019

		a	b	c	d
		Gross carrying values of		Allowances/impairments[2]	Net values (a+b-c)
	(Millions of Canadian dollars)	Defaulted exposures[1]	Non-defaulted exposures		
1	Loans	2,898	587,130	3,131	586,897
2	Debt Securities	-	83,152	27	83,125
3	Off-Balance Sheet exposures[3]	563	254,337	189	254,711
4	**Total**	**3,461**	**924,619**	**3,347**	**924,733**

[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 April 30, 2019

		a	b	c	d
		Gross carrying values of		Allowances/impairments[2]	Net values (a+b-c)
	(Millions of Canadian dollars)	Defaulted exposures[1]	Non-defaulted exposures		
1	Loans	2,886	576,914	3,093	576,707
2	Debt Securities	-	86,214	31	86,183
3	Off-Balance Sheet exposures[3]	537	249,023	195	249,365
4	**Total**	**3,423**	**912,151**	**3,319**	**912,255**

[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.

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 industry, geographical areas 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 July 31, 2019

	a	b	c	d	e
	Credit Risk[1,2]			Counterparty Credit Risk[5]	
	On-balance sheet	Off-balance sheet amount[3]		Repo-style Transaction	Derivatives
(Millions of Canadian dollars)	amount	Undrawn	Other[4]		
Retail					
Residential secured[6]	310,116	64,094			
Qualifying revolving	26,307	71,488			
Other retail	59,175	15,290	72		
Total Retail	**395,598**	**150,872**	**72**		
Wholesale					
Agriculture	8,979	1,874	38	-	72
Automotive	10,541	6,605	362	-	998
Banking	43,334	1,938	600	47,177	16,742
Consumer Discretionary	15,558	8,691	557	-	461
Consumer Staples	5,078	7,162	360	-	1,100
Oil & Gas	7,678	11,057	1,386	-	1,682
Financial Services	27,610	20,892	2,670	118,117	18,431
Financing Products	320	860	504	119	599
Forest Products	1,472	681	116	-	33
Governments	101,038	7,499	1,431	3,920	6,888
Industrial Products	7,582	8,721	570	-	652
Information Technology	5,351	5,349	214	-	2,945
Investments	16,135	907	402	12	261
Mining & Metals	1,977	4,234	883	-	212
Public Works & Infrastructure	2,040	1,712	488	-	193
Real Estate & Related	59,676	11,807	1,342	-	695
Other Services	24,683	11,046	1,030	35	1,483
Telecommunication & Media	8,605	9,782	111	-	1,842
Transportation	5,845	6,549	2,102	-	1,667
Utilities	8,766	19,758	4,231	-	3,056
Other Sectors	1,794	453	1	14	19,384
Total Wholesale	**364,062**	**147,577**	**19,398**	**169,394**	**79,396**
Total Exposure[1]	**759,660**	**298,449**	**19,470**	**169,394**	**79,396**
By Geography[7]					
Canada	542,331	217,583	9,771	66,205	36,072
United States	140,146	59,667	8,099	54,374	17,211
Europe	45,605	18,232	1,439	43,443	21,938
Other International	31,578	2,967	161	5,372	4,175
Total Exposure[1,7]	**759,660**	**298,449**	**19,470**	**169,394**	**79,396**
By Maturity					
Unconditionally cancellable	367,163	148,847	63	-	-
Within 1 year	161,366	48,819	10,535	169,394	41,543
1 to 5 year	193,498	94,294	7,515	-	23,236
Over 5 years	37,633	6,489	1,357	-	14,617
Total Exposure[1]	**759,660**	**298,449**	**19,470**	**169,394**	**79,396**

[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 April 30, 2019

(Millions of Canadian dollars)	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
		Undrawn	Other[4]		
Retail					
Residential secured[6]	303,318	62,677			
Qualifying revolving	25,682	70,125			
Other retail	57,211	14,417	73		
Total Retail	**386,211**	**147,219**	**73**		
Wholesale					
Agriculture	9,005	1,691	40	-	72
Automotive	10,678	6,551	340	-	1,253
Banking	45,599	1,880	542	54,340	19,736
Consumer Discretionary	15,745	8,447	784	2	464
Consumer Staples	5,026	6,844	513	-	1,022
Oil & Gas	7,198	10,883	1,547	-	1,969
Financial Services	25,307	21,633	3,243	116,252	18,961
Financing Products	701	1,421	511	128	771
Forest Products	1,490	593	95	-	51
Governments	102,858	7,765	1,508	4,460	5,982
Industrial Products	7,459	8,333	585	1	644
Information Technology	5,143	6,485	173	16	3,649
Investments	16,410	952	403	13	210
Mining & Metals	1,915	4,516	816	-	197
Public Works & Infrastructure	1,895	1,769	463	-	181
Real Estate & Related	59,170	11,495	1,370	-	666
Other Services	24,718	10,617	888	-	1,152
Telecommunication & Media	9,404	9,324	151	-	1,741
Transportation	6,008	5,875	2,225	-	1,574
Utilities	9,006	19,238	4,128	-	3,069
Other Sectors	2,512	439	1	13	18,685
Total Wholesale	**367,247**	**146,751**	**20,326**	**175,225**	**82,049**
Total Exposure[1]	**753,458**	**293,970**	**20,399**	**175,225**	**82,049**
By Geography[7]					
Canada	532,143	212,727	9,636	72,993	35,196
United States	135,962	59,127	9,285	46,550	19,210
Europe	50,627	19,420	1,397	52,302	23,043
Other International	34,726	2,696	81	3,380	4,600
Total Exposure[1,7]	**753,458**	**293,970**	**20,399**	**175,225**	**82,049**
By Maturity					
Unconditionally cancellable	358,740	145,347	65	-	-
Within 1 year	161,944	49,385	11,279	175,225	42,628
1 to 5 year	194,656	93,386	8,111	-	25,030
Over 5 years	38,118	5,852	944	-	14,391
Total Exposure[1]	**753,458**	**293,970**	**20,399**	**175,225**	**82,049**

[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 July 31, 2019

Impaired exposures by geography[1] and portfolio (Millions of Canadian dollars)	Gross impaired exposures	Allowance[2]	Net impaired exposures
Canada			
Retail	727	174	553
Wholesale	664	163	501
Securities	-	-	-
Total - Canada	**1,391**	**337**	**1,054**
United States			
Retail	31	2	29
Wholesale	929	137	792
Securities	-	-	-
Total - United States	**960**	**139**	**821**
Other International			
Retail	302	168	134
Wholesale	337	160	177
Securities	144	(6)	150
Total - Other International	**783**	**322**	**461**
Total			
Retail	1,060	344	716
Wholesale	1,930	460	1,470
Securities	144	(6)	150
Total impaired exposures	**3,134**	**798**	**2,336**

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

[2] Allowance reflects only Stage 3 IFRS 9 allowances and includes allowances on acquired credit-impaired loans and securities.

As at April 30, 2019

Impaired exposures by geography[1] and portfolio (Millions of Canadian dollars)	Gross impaired exposures	Allowance[2]	Net impaired exposures
Canada			
Retail	763	169	594
Wholesale	630	192	438
Securities	-	-	-
Total - Canada	**1,393**	**361**	**1,032**
United States			
Retail	31	-	31
Wholesale	969	141	828
Securities	-	-	-
Total - United States	**1,000**	**141**	**859**
Other International			
Retail	324	169	155
Wholesale	325	124	201
Securities	139	(4)	143
Total - Other International	**788**	**289**	**499**
Total			
Retail	1,118	338	780
Wholesale	1,924	457	1,467
Securities	139	(4)	143
Total impaired exposures	**3,181**	**791**	**2,390**

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

[2] Allowance reflects only Stage 3 IFRS 9 allowances and includes allowances on acquired credit-impaired loans and securities.

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 July 31, 2019	For the three months ended April 30, 2019
Canada		
Retail	253	253
Wholesale	78	25
Total Canada	**331**	**278**
United States[2]		
Retail	1	3
Wholesale	11	128
Total United States	**12**	**131**
Other International		
Retail	9	10
Wholesale[2]	-	2
Total Other International	**9**	**12**
Total		
Retail	263	266
Wholesale	89	155
Total net write-offs	**352**	**421**

[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 July 31, 2019

Impaired exposures by portfolio and sector (Millions of Canadian dollars)	Gross impaired exposures	Allowance[1]	Net impaired exposures
Retail			
Residential mortgages	709	195	514
Personal	300	129	171
Small business	51	20	31
Total Retail	**1,060**	**344**	**716**
Wholesale			
Agriculture	48	3	45
Automotive	34	6	28
Banking	11	-	11
Consumer Discretionary	113	14	99
Consumer Staples	47	6	41
Oil and Gas	468	120	348
Financial Services	80	20	60
Financial Products	-	-	-
Forest Products	31	9	22
Governments	12	6	6
Industrial Products	84	65	19
Information Technology	48	34	14
Investments	16	6	10
Mining and Metals	1	1	-
Public Works and Infrastructure	9	1	8
Real Estate and Related	396	62	334
Other Services	154	51	103
Telecommunication and Media	25	13	12
Transportation	12	8	4
Utilities	281	8	273
Other	60	27	33
Total Wholesale	**1,930**	**460**	**1,470**
Total impaired loans and acceptances	**2,990**	**804**	**2,186**
Securities	144	(6)	150
Total impaired exposures	**3,134**	**798**	**2,336**

[1] Allowance reflects only Stage 3 IFRS 9 allowances and includes allowances on acquired credit-impaired loans and securities.

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

As at April 30, 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	316	129	187
Small business	48	17	31
Total Retail	**1,118**	**338**	**780**
Wholesale			
Agriculture	28	4	24
Automotive	40	7	33
Banking	14	-	14
Consumer Discretionary	129	11	118
Consumer Staples	25	2	23
Oil and Gas	506	108	398
Financial Services	85	21	64
Financial Products	-	-	-
Forest Products	33	7	26
Governments	9	5	4
Industrial Products	60	36	24
Information Technology	42	34	8
Investments	12	4	8
Mining and Metals	2	1	1
Public Works and Infrastructure	57	42	15
Real Estate and Related	413	76	337
Other Services	103	38	65
Telecommunication and Media	8	6	2
Transportation	12	6	6
Utilities	283	24	259
Other	63	25	38
Total Wholesale	**1,924**	**457**	**1,467**
Total impaired loans and acceptances	**3,042**	**795**	**2,247**
Securities	139	(4)	143
Total impaired exposures	**3,181**	**791**	**2,390**

[1] Allowance reflects only Stage 3 IFRS 9 allowances and includes allowances on acquired credit-impaired loans and securities.

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 July 31, 2019

(Millions of Canadian dollars)	1 to 29 days	30 to 89 days	90 days and greater	Total
Retail	3,025	1,285	186	4,496
Wholesale	1,301	405	21	1,727
Total	**4,326**	**1,690**	**207**	**6,223**

As at April 30, 2019

(Millions of Canadian dollars)	1 to 29 days	30 to 89 days	90 days and greater	Total
Retail	2,779	1,333	190	4,302
Wholesale	1,408	334	-	1,742
Total	**4,187**	**1,667**	**190**	**6,044**

(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

<table>
<tr><th colspan="2">Pillar 3 disclosures requirement</th><th>RBC 2018 Annual Report section</th><th>Sub-section</th></tr>
<tr><td rowspan="3">a)</td><td rowspan="3">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</td><td>Credit risk</td><td>Counterparty credit risk</td></tr>
<tr><td rowspan="2">Consolidated Financial Statements</td><td>Note 8 - Derivative financial instruments and hedging activities – Derivative-related credit risk</td></tr>
<tr><td>Note 30 - Offsetting financial assets and financial liabilities</td></tr>
<tr><td>b)</td><td>Core features of policies and processes for collateral evaluation and management</td><td>Credit risk</td><td>Credit risk mitigation - Collateral</td></tr>
<tr><td rowspan="3">c)</td><td rowspan="3">Information about market or credit risk concentrations under the credit risk mitigation instruments used</td><td rowspan="2">Credit risk</td><td>Credit risk mitigation</td></tr>
<tr><td>Credit risk approval – Credit risk limits</td></tr>
<tr><td>Consolidated Financial Statements</td><td>Note 8 - Derivative financial instruments and hedging activities</td></tr>
</table>

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 July 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]	21,137	382	39,024	10	302	0.8%
2	Non-central government public sector entities	5,446	30	5,476	13	677	12.3%
3	Multilateral development banks	381	-	381	-	-	-
4	Banks	3,468	391	3,468	148	881	24.4%
5	Securities firms[1]	2,078	933	3,140	421	1,101	30.9%
6	Corporates[1]	49,887	30,770	44,073	7,198	49,776	97.0%
7	Regulatory retail portfolios	7,736	4,666	7,736	1,846	7,500	78.3%
8	Secured by residential property[1]	37,746	-	18,833	-	7,345	39.0%
9	Secured by commercial real estate	-	-	-	-	-	-
10	Equity	-	-	-	-	-	-
11	Past-due loans	468	1	467	1	647	138.2%
12	Higher-risk categories	161	346	161	172	500	150.0%
13	Other assets	12,018	-	12,018	-	12,970	107.9%
14	**Total**	**140,526**	**37,519**	**134,777**	**9,809**	**81,699**	**56.5%**

[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 April 30, 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]	20,005	346	37,567	9	231	0.6%
2	Non-central government public sector entities	5,304	32	5,320	14	649	12.2%
3	Multilateral development banks	350	-	350	-	-	-
4	Banks	3,879	379	3,879	141	971	24.2%
5	Securities firms[1]	1,723	921	2,744	407	1,054	33.4%
6	Corporates[1]	49,024	30,337	43,035	7,121	48,837	97.0%
7	Regulatory retail portfolios	7,594	4,797	7,594	1,694	7,448	80.2%
8	Secured by residential property[1]	36,742	-	18,193	-	7,119	39.1%
9	Secured by commercial real estate	-	-	-	-	-	-
10	Equity	-	-	-	-	-	-
11	Past-due loans	472	1	470	1	642	136.3%
12	Higher-risk categories	312	363	312	181	741	150.0%
13	Other assets	11,346	-	11,346	-	12,410	109.4%
14	**Total**	**136,751**	**37,176**	**130,810**	**9,568**	**80,102**	**57.1%**

[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 July 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	37,653	-	1,300	-	78	-	3	-	-	39,034
2	Non-central government public sector entities	2,486	-	2,905	-	4	-	94	-	-	5,489
3	Multilateral development banks	381	-	-	-	-	-	-	-	-	381
4	Banks	-	-	3,406	-	20	-	190	-	-	3,615
5	Securities firms	-	-	2,532	-	867	-	161	-	-	3,560
6	Corporates	-	-	856	1,207	46	-	49,165	-	-	51,274
7	Regulatory retail portfolios	-	-	-	-	-	8,326	1,256	-	-	9,582
8	Secured by residential property	-	-	-	16,949	-	1,884	-	-	-	18,833
9	Secured by commercial real estate	-	-	-	-	-	-	-	-	-	-
10	Equity	-	-	-	-	-	-	-	-	-	-
11	Past-due loans	-	-	-	-	-	-	108	359	-	467
12	Higher-risk categories	-	-	-	-	-	-	-	333	-	333
13	Other assets	2,055	-	-	-	-	-	9,702	-	261	12,018
14	**Total**	**42,575**	**-**	**10,999**	**18,156**	**1,015**	**10,210**	**60,679**	**692**	**261**	**144,586**

As at April 30, 2019

	Asset Classes (Millions of Canadian dollars) / Risk weight	a 0%	b 10%	c 20%	d 35%	e 50%	f 75%	g 100%	h 150%	i Others	j Total credit exposures amount (post CCF and post-CRM)
1	Sovereigns and their central banks	36,556	-	934	-	84	-	3	-	-	37,576
2	Non-central government public sector entities	2,415	-	2,836	-	3	-	80	-	-	5,334
3	Multilateral development banks	350	-	-	-	-	-	-	-	-	350
4	Banks	-	-	3,805	-	10	-	205	-	-	4,020
5	Securities firms	-	-	2,088	-	853	-	210	-	-	3,151
6	Corporates	-	-	488	1,399	34	-	48,232	-	-	50,154
7	Regulatory retail portfolios	-	-	-	-	-	7,342	1,946	-	-	9,288
8	Secured by residential property	-	-	-	16,315	-	1,878	-	-	-	18,193
9	Secured by commercial real estate	-	-	-	-	-	-	-	-	-	-
10	Equity	-	-	-	-	-	-	-	-	-	-
11	Past-due loans	1	-	-	-	-	-	129	342	-	472
12	Higher-risk categories	-	-	-	-	-	-	-	494	-	494
13	Other assets	1,851	-	-	-	-	-	9,241	-	254	11,346
14	**Total**	**41,173**	**-**	**10,151**	**17,714**	**984**	**9,220**	**60,046**	**836**	**254**	**140,378**

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 July 31, 2019

EAD (in %)	EAD covered by the various approaches		
	Standardized Approach[1]	IRB Approach	Other
Retail			
Residential secured	14%	86%	-
Qualifying revolving	-	100%	-
Other retail	5%	95%	-
Wholesale	-	-	-
Corporate	16%	84%	-
Sovereign	20%	80%	-
Bank	5%	95%	-
Equity	-	100%	-
Other assets not subject to Standardized or IRB Approaches	-	-	100%
Total	**12%**	**86%**	**2%**

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

As at April 30, 2019

EAD (in %)	EAD covered by the various approaches		
	Standardized Approach[1]	IRB Approach	Other
Retail			
Residential secured	14%	86%	-
Qualifying revolving	-	100%	-
Other retail	5%	95%	-
Wholesale	-	-	-
Corporate	16%	84%	-
Sovereign	19%	81%	-
Bank	5%	95%	-
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.

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 July 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	91,059	28,852	54.70	159,488	0.03	1,493	19.85	1.31	8,698	5.0	9	
		0.15 to < 0.25	102	563	57.09	450	0.23	104	40.62	2.33	194	43.0	-	
		0.25 to < 0.50	301	179	50.05	382	0.34	138	39.01	1.64	173	45.0	-	
		0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	
		0.75 to < 2.50	192	36	36.86	205	1.05	310	26.51	2.89	125	61.0	1	
		2.50 to < 10.00	6	19	40.77	11	2.76	17	36.79	2.80	12	112.0	-	
		10.00 to < 100.00	-	-	65.00	-	25.94	2	45.02	1.03	-	248.0	-	
		100.00 (default)	-	-	-	-	-	-	-	-	-	-	-	
	Total Sovereigns		91,660	29,649	54.69	160,536	0.03	2,064	19.96	1.32	9,202	6.0	10	-
2	**Banks**													
		0.00 to < 0.15	23,602	2,854	44.11	31,717	0.05	204	30.99	2.13	5,545	17.0	5	
		0.15 to < 0.25	484	462	41.01	882	0.23	30	38.98	1.96	471	53.0	1	
		0.25 to < 0.50	113	246	49.19	276	0.62	43	44.47	2.03	196	71.0	1	
		0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	
		0.75 to < 2.50	313	516	40.12	523	1.01	51	40.20	1.18	418	80.0	2	
		2.50 to < 10.00	43	80	35.14	71	4.72	15	44.01	2.67	121	171.0	1	
		10.00 to < 100.00	4	33	32.24	14	21.47	12	44.68	0.99	38	263.0	1	
		100.00 (default)	5	-	-	5	100.00	2	60.00	1.30	-	2.0	4	
	Total Banks		24,564	4,191	43.31	33,488	0.11	357	31.49	2.11	6,789	20.0	15	4
3	**Corporates**													
		0.00 to < 0.15	25,326	100,008	58.91	83,547	0.09	10,212	40.54	2.43	22,938	27.0	30	
		0.15 to < 0.25	10,767	31,407	58.42	27,889	0.23	5,103	42.05	2.83	14,099	51.0	26	
		0.25 to < 0.50	34,195	51,304	52.13	59,067	0.39	15,933	38.56	2.66	33,467	57.0	88	
		0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	
		0.75 to < 2.50	70,020	57,940	43.39	90,251	1.20	33,350	34.32	2.57	65,825	73.0	369	
		2.50 to < 10.00	21,835	25,263	43.99	29,760	3.69	19,499	34.83	2.67	30,153	101.0	381	
		10.00 to < 100.00	1,088	513	48.09	1,222	20.19	1,228	34.78	1.92	2,046	167.0	87	
		100.00 (default)	1,751	601	17.08	1,820	100.00	1,091	37.64	2.03	5,446	299.0	425	
	Total Corporates		164,982	267,036	52.80	293,557	1.57	86,416	37.75	2.58	173,974	59.0	1,406	569
4	**Total Wholesale**		**281,206**	**300,876**	**52.85**	**487,581**	**0.96**	**88,837**	**31.46**	**2.13**	**189,965**	**39.0**	**1,431**	**573**

[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 July 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	36,542			32,306	0.09	104,449	10.09		729	2.0	3	
		0.15 to < 0.25	11,685			1,031	0.17	56,107	12.09		46	4.0	-	
		0.25 to < 0.50	14,304			417	0.38	17,087	13.65		39	9.0	-	
		0.50 to < 0.75	2,238			156	0.65	6,641	10.26		16	10.0	-	
		0.75 to < 2.50	8,944			358	1.08	67,359	10.27		46	13.0	-	
		2.50 to < 10.00	6,736			165	3.18	26,899	10.01		45	27.0	1	
		10.00 to < 100.00	1,096			-	68.42	21,766	10.00		-	32.0	-	
		100.00 (default)	251			-	-	3,759	-		-	-	-	
	Total Retail insured exposure secured by real estate		81,796			34,434	0.12	304,067	10.19		921	3.0	4	-
6	**Uninsured residential mortgages**													
		0.00 to < 0.15	89,997	438	100.00	90,435	0.06	485,629	18.42		2,786	3.0	10	
		0.15 to < 0.25	35,937	237	100.00	36,174	0.23	124,335	18.75		3,183	9.0	15	
		0.25 to < 0.50	2,656	300	100.00	2,956	0.45	55,383	19.57		445	15.0	3	
		0.50 to < 0.75	15,575	77	100.00	15,653	0.65	65,830	19.10		2,966	19.0	19	
		0.75 to < 2.50	31	197	100.00	228	1.12	267	17.13		53	23.0	-	
		2.50 to < 10.00	7,552	69	100.00	7,621	4.21	63,384	19.01		4,621	61.0	61	
		10.00 to < 100.00	1,064	-	-	1,064	41.74	7,326	18.17		918	86.0	82	
		100.00 (default)	210	-	-	210	100.00	1,041	19.22		121	57.0	34	
	Total Uninsured residential mortgages		153,022	1,319	100.00	154,340	0.80	803,195	18.61		15,094	10.0	224	36

[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 July 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	24,322	76,940	72.66	80,224	0.05	612,757	21.08		2,443	3.0	8	
		0.15 to < 0.25	8,451	7,889	67.73	13,794	0.21	142,552	21.04		1,266	9.0	6	
		0.25 to < 0.50	-	-	-	-	-	-	-		-	-	-	
		0.50 to < 0.75	3,948	1,909	65.63	5,200	0.73	63,132	21.73		1,212	23.0	8	
		0.75 to < 2.50	-	-	-	-	-	-	-		-	-	-	
		2.50 to < 10.00	2,024	342	62.04	2,236	4.97	28,710	21.86		1,701	76.0	24	
		10.00 to < 100.00	355	98	66.54	420	44.50	3,468	21.41		432	103.0	41	
		100.00 (default)	114	1	-	114	100.00	913	22.99		78	68.0	26	
	Total HELOCs		39,214	87,179	72.01	101,988	0.51	851,532	21.13		7,132	7.0	113	26
8	**Qualifying revolving retail**													
		0.00 to < 0.15	9,530	52,742	94.98	59,622	0.08	6,704,656	89.83		2,666	4.0	40	
		0.15 to < 0.25	465	410	110.62	918	0.17	57,588	79.13		70	8.0	1	
		0.25 to < 0.50	2,038	6,567	102.76	8,786	0.35	3,785,811	89.80		1,401	16.0	28	
		0.50 to < 0.75	3,114	4,353	95.47	7,270	0.59	790,904	87.43		1,712	24.0	37	
		0.75 to < 2.50	6,899	8,172	96.28	14,767	1.49	3,518,031	90.29		7,213	49.0	198	
		2.50 to < 10.00	3,583	2,107	94.89	5,582	4.73	1,564,107	90.81		6,214	111.0	238	
		10.00 to < 100.00	616	197	86.49	786	38.51	585,025	89.30		2,002	255.0	273	
		100.00 (default)	63	2	-	63	100.00	38,339	85.69		174	275.0	41	
	Total Qualifying revolving retail		26,307	74,551	95.89	97,795	0.99	17,044,461	89.67		21,453	22.0	856	41
9	**Other retail**													
		0.00 to < 0.15	17,958	7,202	99.62	25,132	0.07	421,194	49.92		2,791	11.0	10	
		0.15 to < 0.25	10,411	1,506	98.22	11,891	0.20	348,778	55.29		2,698	23.0	12	
		0.25 to < 0.50	5,058	766	100.08	5,824	0.45	212,329	67.69		2,816	48.0	18	
		0.50 to < 0.75	2,547	816	117.03	3,502	0.63	152,105	53.78		1,580	45.0	11	
		0.75 to < 2.50	8,186	2,283	98.08	10,425	1.20	542,178	76.70		9,059	87.0	94	
		2.50 to < 10.00	4,862	951	92.02	5,738	4.00	372,202	73.73		6,438	112.0	168	
		10.00 to < 100.00	498	28	94.10	525	43.05	25,692	67.81		898	171.0	159	
		100.00 (default)	86	3	-	86	100.00	3,252	64.93		155	181.0	45	
	Total Other retail		49,607	13,555	99.71	63,123	1.20	2,077,730	59.54		26,436	42.0	518	45
10	**Total retail**		**349,946**	**176,604**	**84.43**	**451,680**	**0.78**	**21,080,985**	**39.64**	**-**	**71,036**	**16.0**	**1,715**	**148**
	Total		**631,152**	**477,480**	**64.53**	**939,261**	**0.87**	**21,169,822**	**35.39**	**2.13**	**261,001**	**28.0**	**3,146**	**721**

[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 April 30, 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	94,911	29,860	53.93	163,136	0.03	1,478	20.26	1.36	9,305	6.0	10	
		0.15 to < 0.25	143	415	70.13	428	0.23	116	37.60	2.49	179	42.0	-	
		0.25 to < 0.50	324	224	50.64	428	0.33	128	42.56	1.42	206	48.0	1	
		0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	
		0.75 to < 2.50	204	16	53.94	211	1.08	313	27.55	3.04	138	65.0	1	
		2.50 to < 10.00	16	18	42.04	20	3.00	20	36.93	2.91	23	116.0	-	
		10.00 to < 100.00	-	-	65.00	-	25.94	1	45.00	1.39	-	251.0	-	
		100.00 (default)	-	-	-	-	-	-	-	-	-	-	-	
	Total Sovereigns		95,598	30,533	54.12	164,223	0.03	2,056	20.38	1.36	9,851	6.0	12	-
2	**Banks**													
		0.00 to < 0.15	25,971	2,798	43.90	34,153	0.05	217	31.31	2.15	5,846	17.0	6	
		0.15 to < 0.25	194	565	40.44	636	0.23	31	38.19	1.86	329	52.0	1	
		0.25 to < 0.50	590	209	53.99	757	0.51	41	44.42	3.31	632	84.0	1	
		0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	
		0.75 to < 2.50	1,045	675	41.35	1,328	0.98	91	30.53	3.14	961	72.0	4	
		2.50 to < 10.00	39	89	35.31	69	4.81	15	44.23	2.64	119	173.0	1	
		10.00 to < 100.00	4	38	32.68	16	21.75	13	44.76	1.00	43	264.0	2	
		100.00 (default)	18	-	-	18	100.00	2	40.02	1.51	-	1.0	12	
	Total Banks		27,861	4,374	43.26	36,977	0.16	410	31.71	2.21	7,930	21.0	27	12
3	**Corporates**													
		0.00 to < 0.15	25,961	101,783	59.90	85,878	0.09	10,173	40.67	2.40	23,399	27.0	30	
		0.15 to < 0.25	10,442	30,236	59.21	27,267	0.23	5,014	42.16	2.85	13,841	51.0	26	
		0.25 to < 0.50	34,503	50,075	52.30	59,046	0.39	15,713	39.06	2.66	33,962	58.0	88	
		0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	
		0.75 to < 2.50	68,057	55,431	43.46	87,211	1.19	33,211	34.47	2.55	63,643	73.0	356	
		2.50 to < 10.00	21,150	24,431	44.19	28,643	3.72	20,493	34.62	2.60	28,607	100.0	367	
		10.00 to < 100.00	1,051	591	47.02	1,217	19.71	1,217	34.78	1.97	2,008	165.0	84	
		100.00 (default)	1,722	575	20.63	1,809	100.00	1,079	38.55	1.91	5,089	281.0	452	
	Total Corporates		162,887	263,122	53.51	291,072	1.55	86,900	37.99	2.56	170,549	59.0	1,404	553
4	**Total Wholesale**		**286,346**	**298,029**	**53.42**	**492,272**	**0.94**	**89,366**	**31.64**	**2.13**	**188,330**	**38.0**	**1,443**	**565**

[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 April 30, 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	36,638			33,143	0.09	108,190	10.09		749	2.0	3	
		0.15 to < 0.25	11,626			1,013	0.17	58,247	11.86		44	4.0	-	
		0.25 to < 0.50	14,436			409	0.38	18,350	13.48		37	9.0	-	
		0.50 to < 0.75	2,359			161	0.65	7,974	10.25		16	10.0	-	
		0.75 to < 2.50	8,680			341	1.06	66,487	10.30		44	13.0	-	
		2.50 to < 10.00	6,938			175	3.18	28,547	10.01		48	27.0	1	
		10.00 to < 100.00	1,041			1	65.82	22,120	10.00		-	32.0	-	
		100.00 (default)	248			-	-	5,795	-		-	-	-	
	Total Retail insured exposure secured by real estate		81,965			35,241	0.12	315,710	10.18		939	3.0	4	-
6	**Uninsured residential mortgages**													
		0.00 to < 0.15	85,823	272	100.00	86,095	0.06	477,668	18.50		2,663	3.0	9	
		0.15 to < 0.25	35,330	188	100.00	35,518	0.23	123,978	18.88		3,148	9.0	15	
		0.25 to < 0.50	1,649	247	100.00	1,896	0.45	53,538	19.59		285	15.0	2	
		0.50 to < 0.75	15,381	52	100.00	15,433	0.65	66,767	19.30		2,955	19.0	19	
		0.75 to < 2.50	32	173	100.00	205	1.13	280	18.69		53	26.0	-	
		2.50 to < 10.00	7,549	60	100.00	7,610	4.21	64,906	19.13		4,642	61.0	61	
		10.00 to < 100.00	984	-	-	984	42.85	6,423	18.57		868	88.0	80	
		100.00 (default)	203	-	-	203	100.00	1,046	19.06		113	56.0	33	
	Total Uninsured residential mortgages		146,950	992	100.00	147,942	0.80	794,606	18.72		14,726	10.0	220	34

[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 April 30, 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	23,939	75,342	72.59	78,631	0.05	601,390	21.12		2,398	3.0	8	
		0.15 to < 0.25	8,752	8,139	67.66	14,259	0.21	145,034	21.07		1,311	9.0	6	
		0.25 to < 0.50	-	-	-	-	-	-	-		-	-	-	
		0.50 to < 0.75	4,073	1,874	64.94	5,291	0.73	62,733	21.91		1,244	24.0	8	
		0.75 to < 2.50	-	-	-	-	-	-	-		-	-	-	
		2.50 to < 10.00	2,086	341	61.28	2,295	4.97	29,398	21.90		1,749	76.0	25	
		10.00 to < 100.00	342	89	66.84	402	45.98	3,242	21.10		401	100.0	40	
		100.00 (default)	112	1	-	112	100.00	939	23.37		79	70.0	26	
	Total HELOCs		39,304	85,786	71.90	100,990	0.51	842,736	21.17		7,182	7.0	113	26
8	**Qualifying revolving retail**													
		0.00 to < 0.15	9,140	51,432	94.92	57,958	0.08	6,582,334	89.79		2,593	4.0	39	
		0.15 to < 0.25	458	418	110.11	918	0.17	58,182	78.95		70	8.0	1	
		0.25 to < 0.50	1,996	6,517	102.75	8,692	0.35	3,749,793	89.74		1,386	16.0	27	
		0.50 to < 0.75	3,062	4,277	95.17	7,132	0.59	787,235	87.32		1,675	23.0	37	
		0.75 to < 2.50	6,814	8,148	96.29	14,659	1.49	3,522,132	90.22		7,163	49.0	196	
		2.50 to < 10.00	3,567	2,161	95.67	5,634	4.73	1,578,811	90.81		6,277	111.0	240	
		10.00 to < 100.00	583	191	87.35	750	38.49	558,284	89.09		1,909	254.0	260	
		100.00 (default)	63	2	-	63	100.00	40,201	85.53		169	268.0	41	
	Total Qualifying revolving retail		25,682	73,146	95.87	95,808	1.00	16,876,972	89.61		21,242	22.0	842	41
9	**Other retail**													
		0.00 to < 0.15	17,092	6,609	100.10	23,707	0.07	416,718	50.01		2,634	11.0	10	
		0.15 to < 0.25	10,031	1,504	98.13	11,507	0.20	351,869	55.31		2,615	23.0	12	
		0.25 to < 0.50	4,926	741	100.08	5,668	0.45	215,545	68.35		2,768	49.0	17	
		0.50 to < 0.75	2,465	761	119.25	3,373	0.63	150,589	54.09		1,530	45.0	11	
		0.75 to < 2.50	7,906	2,225	98.37	10,095	1.20	531,892	75.99		8,680	86.0	90	
		2.50 to < 10.00	4,838	886	94.53	5,676	4.00	333,994	73.38		6,340	112.0	166	
		10.00 to < 100.00	461	31	92.67	491	43.29	25,309	68.82		854	174.0	150	
		100.00 (default)	87	1	-	87	100.00	3,207	65.89		158	182.0	46	
	Total Other retail		47,807	12,758	100.30	60,603	1.21	2,029,123	59.65		25,578	42.0	502	46
10	**Total retail**		**341,708**	**172,682**	**84.31**	**440,584**	**0.78**	**20,859,147**	**39.64**	**-**	**69,667**	**16.0**	**1,681**	**147**
	Total		**628,054**	**470,711**	**64.75**	**932,856**	**0.86**	**20,948,513**	**35.42**	**2.13**	**257,997**	**28.0**	**3,124**	**712**

[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 July 31, 2019

		a	b
	(Millions of Canadian dollars)	**Pre-credit derivatives RWA**	**Actual RWA**
2	Sovereign - AIRB	-	-
4	Banks - AIRB	-	-
6	Corporate - AIRB	-	-
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**	**-**	**-**

As at April 30, 2019

		a	b
	(Millions of Canadian dollars)	**Pre-credit derivatives RWA**	**Actual RWA**
2	Sovereign - AIRB	-	-
4	Banks - AIRB	-	-
6	Corporate - AIRB	-	-
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**	**-**	**-**

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 July 31, 2019**	**As at April 30, 2019**
1	**RWA as at end of previous reporting period**	**368,072**	**365,850**
2	Asset size[2]	6,117	(719)
3	Asset quality[3]	585	767
4	Model updates[4]	-	-
5	Methodology and policy[5]	-	-
6	Acquisitions and disposals	-	-
7	Foreign exchange movements	(3,581)	2,828
8	Other	375	(654)
9	**RWA as at end of reporting period**	**371,568**	**368,072**

[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 July 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]	14,360	28,103		1.4	59,274	21,934
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)					162,568	10,758
5	VaR for SFTs						
6	**Total**						**32,692**

[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 April 30, 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]	12,616	31,873		1.4	62,138	24,294
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)					170,352	10,978
5	VaR for SFTs						
6	**Total**						**35,272**

[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.

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 July 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	59,448	14,211
4	**Total subject to the CVA capital charge**	**59,448**	**14,211**

[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 April 30, 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	62,290	13,855
4	**Total subject to the CVA capital charge**	**62,290**	**13,855**

[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.

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 July 31, 2019

	a	b	c	d	e	f	g	h	i
Risk weight / Regulatory portfolio (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	-	-	-	-	-	44	-	-	44
Securities firms	-	-	23	-	-	110	-	-	133
Corporates	-	-	516	-	-	1,246	-	-	1,762
Regulatory retail portfolios	-	-	-	-	-	-	-	-	-
Other assets	-	-	-	-	-	-	-	-	-
Total	**-**	**-**	**539**	**-**	**-**	**1,400**	**-**	**-**	**1,939**

As at April 30, 2019

	a	b	c	d	e	f	g	h	i
Risk weight / Regulatory portfolio (Millions of Canadian dollars)	0%	10%	20%	50%	75%	100%	150%	Others	Total credit exposure
Sovereigns	-	-	-	-	-	-	-	-	-
Non-central government public sector entities (PSEs)	-	-	-	-	-	29	-	-	29
Multilateral development banks (MDBs)	-	-	-	-	-	-	-	-	-
Banks	-	-	-	-	-	28	-	-	28
Securities firms	-	-	-	-	-	25	-	-	25
Corporates	-	-	520	-	-	645	-	-	1,165
Regulatory retail portfolios	-	-	-	-	-	-	-	-	-
Other assets	-	-	-	-	-	-	-	-	-
Total	**-**	**-**	**520**	**-**	**-**	**727**	**-**	**-**	**1,247**

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 July 31, 2019

		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	17,762	0.04	339	23.44	2.20	1,477	8
	0.15 to < 0.25	34	0.23	11	44.98	1.98	15	44
	0.25 to < 0.50	351	0.30	26	43.38	0.97	140	40
	0.50 to < 0.75	-	-	-	-	-	-	-
	0.75 to < 2.50	26	0.96	7	37.65	2.93	25	97
	2.50 to < 10.00	32	2.65	3	43.72	1.55	37	115
	10.00 to < 100.00	-	-	-	-	-	-	-
	100.00 (default)	-	-	-	-	-	-	-
Total sovereigns		18,205	0.05	386	23.92	2.18	1,694	9
Banks								
	0.00 to < 0.15	99,477	0.09	217	13.87	0.26	6,272	6
	0.15 to < 0.25	11,729	0.23	57	10.30	0.16	1,068	9
	0.25 to < 0.50	6,449	0.37	71	20.58	0.47	1,562	24
	0.50 to < 0.75	-	-	-	-	-	-	-
	0.75 to < 2.50	1,742	0.86	43	6.17	0.12	195	11
	2.50 to < 10.00	29	3.08	4	45.00	1.08	34	120
	10.00 to < 100.00	-	13.37	1	45.00	1.00	-	241
	100.00 (default)	-	-	-	-	-	-	-
Total banks		119,426	0.13	393	13.77	0.26	9,131	8
Corporates								
	0.00 to < 0.15	63,794	0.07	4,465	34.82	0.65	8,572	13
	0.15 to < 0.25	6,097	0.23	834	41.06	1.45	2,536	42
	0.25 to < 0.50	7,122	0.35	1,069	43.79	1.45	3,881	55
	0.50 to < 0.75	-	-	-	-	-	-	-
	0.75 to < 2.50	3,560	1.11	785	40.09	2.32	3,165	89
	2.50 to < 10.00	1,562	3.49	473	37.93	1.77	1,743	112
	10.00 to < 100.00	108	14.27	12	53.62	4.32	323	301
	100.00 (default)	29	100.00	8	36.45	1.25	138	483
Total corporates		82,272	0.27	7,646	36.37	0.88	20,358	25
Total		**219,903**	**0.18**	**8,425**	**23.07**	**0.65**	**31,183**	**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 April 30, 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	21,021	0.03	335	25.68	1.72	1,416	7
	0.15 to < 0.25	54	0.23	13	29.87	1.56	15	28
	0.25 to < 0.50	296	0.30	26	44.98	1.00	123	41
	0.50 to < 0.75	-	-	-	-	-	-	-
	0.75 to < 2.50	17	0.86	6	45.00	4.20	25	143
	2.50 to < 10.00	30	3.69	4	45.00	1.42	39	130
	10.00 to < 100.00	-	-	-	-	-	-	-
	100.00 (default)	-	-	-	-	-	-	-
Total sovereigns		21,418	0.04	384	26.00	1.72	1,618	8
Banks								
	0.00 to < 0.15	109,273	0.09	215	13.59	0.27	7,067	6
	0.15 to < 0.25	7,015	0.23	55	18.09	0.34	1,221	17
	0.25 to < 0.50	12,065	0.32	78	19.35	0.41	2,818	23
	0.50 to < 0.75	-	-	-	-	-	-	-
	0.75 to < 2.50	1,304	0.92	50	9.11	0.13	222	17
	2.50 to < 10.00	81	2.91	6	45.00	1.10	95	117
	10.00 to < 100.00	-	100.00	1	45.00	1.00	1	596
	100.00 (default)	-	-	-	-	-	-	-
Total banks		129,738	0.13	405	14.35	0.29	11,424	9
Corporates								
	0.00 to < 0.15	61,998	0.07	3,664	37.64	0.71	8,884	14
	0.15 to < 0.25	5,637	0.23	782	42.94	1.51	2,485	44
	0.25 to < 0.50	6,809	0.34	1,053	44.44	1.38	3,689	54
	0.50 to < 0.75	-	-	-	-	-	-	-
	0.75 to < 2.50	3,951	1.13	773	44.67	2.35	3,910	99
	2.50 to < 10.00	1,596	3.18	418	43.63	1.66	1,971	124
	10.00 to < 100.00	35	20.63	12	45.00	2.42	86	247
	100.00 (default)	63	100.00	7	45.00	1.25	375	596
Total corporates		80,089	0.31	6,709	39.07	0.93	21,400	27
Total		**231,245**	**0.18**	**7,498**	**23.99**	**0.64**	**34,442**	**15**

[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 July 31, 2019

		a	b
	(Millions of Canadian dollars)	EAD (post-CRM)	RWA
1	**Exposures to QCCPs (total)**	**37,226**	**575**
2	Exposures for trades at QCCPs (excluding initial margin and default fund contributions); of which	26,948	550
3	(i) OTC derivatives	1,180	34
4	(ii) Exchange-traded derivatives	18,942	379
5	(iii) Securities financing transactions	6,826	137
6	(iv) Netting sets where cross-product netting has been approved	-	-
7	Segregated initial margin	2,302	
8	Non-segregated initial margin	2,525	-
9	Pre-funded default fund contributions	742	25
10	Unfunded default fund contributions[1]	4,709	-
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 April 30, 2019

	(Millions of Canadian dollars)	a EAD (post-CRM)	b RWA
1	**Exposures to QCCPs (total)**	**34,368**	**529**
2	Exposures for trades at QCCPs (excluding initial margin and default fund contributions); of which	24,784	509
3	(i) OTC derivatives	1,359	41
4	(ii) Exchange-traded derivatives	18,552	371
5	(iii) Securities financing transactions	4,873	97
6	(iv) Netting sets where cross-product netting has been approved	-	-
7	Segregated initial margin	2,316	
8	Non-segregated initial margin	1,859	-
9	Pre-funded default fund contributions	761	20
10	Unfunded default fund contributions[1]	4,648	-
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

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

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 July 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**	**1,291**	**-**	**1,291**	**37,468**	**-**	**37,468**	**4,588**	**-**	**4,588**
2	residential mortgage	-	-	-	1,668	-	1,668	3,733	-	3,733
3	credit card	1,274	-	1,274	8,289	-	8,289	379	-	379
4	other retail exposures	17	-	17	27,511	-	27,511	476	-	476
4a	of which student loans	-	-	-	4,053	-	4,053	126	-	126
4b	of which auto loans and leases	-	-	-	18,410	-	18,410	350	-	350
4c	of which consumer loans	-	-	-	5,046	-	5,046	-	-	-
4d	of which other retail	17	-	17	2	-	2	-	-	-
5	re-securitization	-	-	-	-	-	-	-	-	-
6	**Wholesale (total) – of which**	**-**	**-**	**-**	**11,389**	**-**	**11,389**	**9,631**	**-**	**9,631**
7	loans to corporates	-	-	-	2,426	-	2,426	7,724	-	7,724
8	commercial mortgage	-	-	-	-	-	-	769	-	769
9	lease and receivables	-	-	-	-	-	-	-	-	-
10	other wholesale	-	-	-	8,963	-	8,963	1,138	-	1,138
10a	of which dealer floor plan receivable	-	-	-	2,090	-	2,090	-	-	-
10b	of which equipment receivable	-	-	-	2,897	-	2,897	-	-	-
10c	of which trade receivable	-	-	-	-	-	-	-	-	-
10d	of which other wholesale	-	-	-	3,976	-	3,976	1,138	-	1,138
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 April 30, 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**	**1,286**	**-**	**1,286**	**38,993**	**-**	**38,993**	**4,351**	**-**	**4,351**
2	residential mortgage	-	-	-	1,820	-	1,820	3,375	-	3,375
3	credit card	1,274	-	1,274	8,380	-	8,380	457	-	457
4	other retail exposures	12	-	12	28,793	-	28,793	519	-	519
4a	of which student loans	-	-	-	4,195	-	4,195	134	-	134
4b	of which auto loans and leases	-	-	-	19,645	-	19,645	385	-	385
4c	of which consumer loans	-	-	-	4,953	-	4,953	-	-	-
4d	of which other retail	12	-	12	-	-	-	-	-	-
5	re-securitization	-	-	-	-	-	-	-	-	-
6	**Wholesale (total) – of which**	**-**	**-**	**-**	**12,955**	**-**	**12,955**	**9,344**	**-**	**9,344**
7	loans to corporates	-	-	-	2,954	-	2,954	7,005	-	7,005
8	commercial mortgage	-	-	-	-	-	-	914	-	914
9	lease and receivables	-	-	-	989	-	989	-	-	-
10	other wholesale	-	-	-	9,012	-	9,012	1,425	-	1,425
10a	of which dealer floor plan receivable	-	-	-	2,126	-	2,126	-	-	-
10b	of which equipment receivable	-	-	-	2,934	-	2,934	-	-	-
10c	of which trade receivable	-	-	-	-	-	-	-	-	-
10d	of which other wholesale	-	-	-	3,952	-	3,952	1,425	-	1,425
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.

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 July 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**	**-**	**-**	**-**	**-**	**-**	**-**	**1,076**	**-**	**1,076**
2	residential mortgages	-	-	-	-	-	-	608	-	608
3	credit cards	-	-	-	-	-	-	26	-	26
4	other retail exposures	-	-	-	-	-	-	442	-	442
4a	of which student loans	-	-	-	-	-	-	48	-	48
4b	of which auto loans and leases	-	-	-	-	-	-	278	-	278
4c	of which consumer loans	-	-	-	-	-	-	80	-	80
4d	of which other retail	-	-	-	-	-	-	36	-	36
5	re-securitization	-	-	-	-	-	-	-	-	-
6	**Wholesale (total) - of which**	**-**	**-**	**-**	**-**	**-**	**-**	**5,903**	**-**	**5,903**
7	loans to corporates	-	-	-	-	-	-	240	-	240
8	commercial mortgages	-	-	-	-	-	-	5,123	-	5,123
9	leases and receivables	-	-	-	-	-	-	-	-	-
10	other wholesale exposures	-	-	-	-	-	-	540	-	540
10a	of which dealer floor plan receivables	-	-	-	-	-	-	2	-	2
10b	of which equipment receivables	-	-	-	-	-	-	11	-	11
10c	of which trade receivables	-	-	-	-	-	-	-	-	-
10d	of which other wholesale	-	-	-	-	-	-	527	-	527
11	re-securitization	-	-	-	-	-	-	-	-	-

[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 April 30, 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**	**-**	**-**	**-**	**-**	**-**	**-**	**1,309**	**-**	**1,309**
2	residential mortgages	-	-	-	-	-	-	658	-	658
3	credit cards	-	-	-	-	-	-	149	-	149
4	other retail exposures	-	-	-	-	-	-	502	-	502
4a	of which student loans	-	-	-	-	-	-	58	-	58
4b	of which auto loans and leases	-	-	-	-	-	-	298	-	298
4c	of which consumer loans	-	-	-	-	-	-	4	-	4
4d	of which other retail	-	-	-	-	-	-	142	-	142
5	re-securitization	-	-	-	-	-	-	-	-	-
6	**Wholesale (total) - of which**	**-**	**-**	**-**	**-**	**-**	**-**	**5,418**	**-**	**5,418**
7	loans to corporates	-	-	-	-	-	-	299	-	299
8	commercial mortgages	-	-	-	-	-	-	5,040	-	5,040
9	leases and receivables	-	-	-	-	-	-	-	-	-
10	other wholesale exposures	-	-	-	-	-	-	79	-	79
10a	of which dealer floor plan receivables	-	-	-	-	-	-	55	-	55
10b	of which equipment receivables	-	-	-	-	-	-	7	-	7
10c	of which trade receivables	-	-	-	-	-	-	-	-	-
10d	of which other wholesale	-	-	-	-	-	-	17	-	17
11	re-securitization	-	-	-	-	-	-	-	-	-

[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 July 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**	**44,410**	**3,114**	**1,769**	**841**	**14**	**1,279**	**41,102**	**7,753**	**14**	**427**	**5,914**	**2,336**	**176**	**34**	**473**	**187**	**14**
2	Traditional securitization	44,410	3,114	1,769	841	14	1,279	41,102	7,753	14	427	5,914	2,336	176	34	473	187	14
3	Of which securitization	44,410	3,114	1,769	841	14	1,279	41,102	7,753	14	427	5,914	2,336	176	34	473	187	14
4	Of which retail underlying	36,350	1,078	1,097	219	14	1,279	32,504	4,962	14	427	4,503	635	176	34	360	51	14
5	Of which wholesale	8,060	2,036	672	622	-	-	8,598	2,791	-	-	1,411	1,701	-	-	113	136	-
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	-	-	-	-	-	-	-	-	-	427	5,914	2,336	176	-	-	-	-
17	Transitional grandfathering adjustment	-	-	-	-	-	-	-	-	-	(308)	(3,673)	1,199	-	-	-	-	-
18	Total after Transitional grandfathering adjustment	-	-	-	-	-	-	-	-	-	119	2,241	3,535	176	-	-	-	-

[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 April 30, 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**	**44,062**	**5,573**	**2,758**	**831**	**10**	**1,279**	**43,168**	**8,778**	**10**	**431**	**6,803**	**3,343**	**122**	**34**	**544**	**268**	**10**
2	Traditional securitization	44,062	5,573	2,758	831	10	1,279	43,168	8,778	10	431	6,803	3,343	122	34	544	268	10
3	Of which securitization	44,062	5,573	2,758	831	10	1,279	43,168	8,778	10	431	6,803	3,343	122	34	544	268	10
4	Of which retail underlying	35,010	3,600	1,461	199	10	1,279	33,530	5,460	10	431	5,218	1,020	122	34	417	82	10
5	Of which wholesale	9,052	1,973	1,297	632	-	-	9,638	3,318	-	-	1,585	2,323	-	-	127	186	-
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	-	-	-	-	-	-	-	-	-	431	6,803	3,343	122	-	-	-	-
17	Transitional grandfathering adjustment	-	-	-	-	-	-	-	-	-	(308)	(3,673)	1,199	-	-	-	-	-
18	Total after Transitional grandfathering adjustment	-	-	-	-	-	-	-	-	-	123	3,130	4,542	122	-	-	-	-

[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.

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 July 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**	**8,556**	**935**	**4,055**	**673**	**-**	**-**	**14,219**	**-**	**-**	**-**	**5,621**	**-**	**-**	**-**	**449**	**-**	**-**
2	Traditional securitization	8,556	935	4,055	673	-	-	14,219	-	-	-	5,621	-	-	-	449	-	-
3	Of which securitization	8,556	935	4,055	673	-	-	14,219	-	-	-	5,621	-	-	-	449	-	-
4	Of which retail underlying	77	769	3,735	8	-	-	4,588	-	-	-	2,955	-	-	-	236	-	-
5	Of which wholesale	8,479	166	320	665	-	-	9,631	-	-	-	2,666	-	-	-	213	-	-
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	-	-	-	-	-	-	-	-	-	-	5,621	-	-	-	-	-	-
17	Transitional grandfathering adjustment	-	-	-	-	-	-	-	-	-	-	(4,106)	-	-	-	-	-	-
18	Total after Transitional grandfathering adjustment	-	-	-	-	-	-	-	-	-	-	1,515	-	-	-	-	-	-

[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 April 30, 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**	**7,910**	**1,058**	**3,924**	**803**	**-**	**-**	**13,694**	**-**	**-**	**-**	**5,661**	**-**	**-**	**-**	**453**	**-**	**-**
2	Traditional securitization	7,910	1,058	3,924	803	-	-	13,694	-	-	-	5,661	-	-	-	453	-	-
3	Of which securitization	7,910	1,058	3,924	803	-	-	13,694	-	-	-	5,661	-	-	-	453	-	-
4	Of which retail underlying	83	882	3,372	13	-	-	4,350	-	-	-	2,808	-	-	-	225	-	-
5	Of which wholesale	7,827	176	552	790	-	-	9,344	-	-	-	2,853	-	-	-	228	-	-
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	-	-	-	-	-	-	-	-	-	-	5,661	-	-	-	-	-	-
17	Transitional grandfathering adjustment	-	-	-	-	-	-	-	-	-	-	(4,106)	-	-	-	-	-	-
18	Total after Transitional grandfathering adjustment	-	-	-	-	-	-	-	-	-	-	1,555	-	-	-	-	-	-

[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.

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 remains 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: managing 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 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

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

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

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.	7%
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.	25%

[1] As at July 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 a model risk governance 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 that confidence level. These scenarios are determined using a transition probability matrix which is calibrated using 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.

		RWA	
	(Millions of Canadian dollars)	As at July 31, 2019	As at April 30, 2019
	Outright products		
1	Interest rate risk (general and specific)	4,743	5,424
2	Equity risk (general and specific)	444	412
3	Foreign exchange risk	1,700	1,318
4	Commodity risk	200	300
	Options		
5	Simplified approach	-	-
6	Delta-plus method	-	-
7	Scenario approach	3,767	3,573
8	**Securitization**	1,670	2,307
9	**Total**	**12,524**	**13,334**

Outright Products Interest Rate Risk and Securitization RWAs decreased over the quarter primarily due to the integration of certain fixed income products into the Internal Model Approach.

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 July 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**	**2,435**	**7,609**	**8,075**	**-**	**-**	**18,119**
2	Movement in risk levels[1]	126	(566)	(823)	-	-	(1,263)
3	Model updates/changes[2]	(423)	460	81	-	-	118
4	Methodology and policy[3]	-	-	-	-	-	-
5	Acquisitions and disposals	-	-	-	-	-	-
6	Foreign exchange movements[4]	-	-	(73)	-	-	(73)
7	Other	-	-	-	-	-	-
8	**RWA at end of Reporting Period**	**2,138**	**7,503**	**7,260**	**-**	**-**	**16,901**

[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.

[4] Foreign exchange movements for VaR and Stressed VaR are embedded within movement in risk levels.

As at April 30, 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**	**3,718**	**8,886**	**9,279**	**-**	**-**	**21,883**
2	Movement in risk levels[1]	(1,234)	(1,728)	(572)	-	-	(3,534)
3	Model updates/changes[2]	(49)	451	(635)	-	-	(233)
4	Methodology and policy[3]	-	-	-	-	-	-
5	Acquisitions and disposals	-	-	-	-	-	-
6	Foreign exchange movements[4]	-	-	3	-	-	3
7	Other	-	-	-	-	-	-
8	**RWA at end of Reporting Period**	**2,435**	**7,609**	**8,075**	**-**	**-**	**18,119**

[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.

[4] Foreign exchange movements for VaR and Stressed VaR are embedded within movement in risk levels.

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 July 31, 2019

(Millions of Canadian dollars)		Value	
VaR (10 day 99%)[1]		As at July 31, 2019	As at April 30, 2019
1	Maximum value	75	85
2	Average value	57	66
3	Minimum value	39	53
4	Period end	45	65
Stressed VaR (10 day 99%)[1]			
5	Maximum value	287	270
6	Average value	206	203
7	Minimum value	136	138
8	Period end	197	270
Incremental Risk Charge (99.9%)			
9	Maximum value	665	781
10	Average value	570	648
11	Minimum value	496	507
12	Period end	581	560
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.

Average VaR of $57 million decreased $9 million due to the integration of certain fixed income products into the Internal Model Approach.

Average Stressed VaR did not change materially.

Average Incremental Risk Charge decreased from the prior quarter due to a reduction in fixed income exposure.

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 23.5% (inclusive of the revised domestic stability buffer of 2% in Q4 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.

		a	b	c	d
(Millions of Canadian dollars, except as otherwise noted)		July 31 2019	April 30 2019	January 31 2019[1]	Change (a) - (b)
Resolution group[1]					
1	Total loss-absorbing capacity (TLAC) available	91,324	83,985	79,794	7,339
2	Total RWA at the level of the resolution group	510,664	510,463	508,512	201
3	TLAC ratio: TLAC as a percentage of RWA (row 1/row 2) (%)	17.9%	16.5%	15.7%	1.4%
4	Leverage ratio exposure measure at the level of the resolution group	1,529,369	1,521,197	1,501,831	8,172
5	TLAC Leverage Ratio: TLAC as a percentage of leverage ratio exposure measure (row 1/row 4) (%)	6.0%	5.5%	5.3%	0.5%
6a	Does the subordination exemption in the antepenultimate paragraph of Section 11 of the FSB TLAC Term Sheet apply?	Yes	Yes	Yes	-
6b	Does the subordination exemption in the penultimate paragraph of Section 11 of the FSB TLAC Term Sheet apply?	No	No	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	N/A	N/A	-

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

Our TLAC ratio of 17.9% was up 140 bps reflecting a $7 billion increase in available TLAC consisting of $1 billion from regulatory capital and $6 billion from external TLAC instruments issued directly by the bank. TLAC leverage ratio of 6% was up 50 bps reflecting the above noted increase in available TLAC partly offset by higher leverage exposure.

TLAC1: TLAC composition (at resolution group level)

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

As at July 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)	60,938
2	Additional Tier 1 capital (AT1) before TLAC adjustments	5,677
3	AT1 ineligible as TLAC as issued out of subsidiaries to third parties	-
4	Other adjustments	-
5	AT1 instruments eligible under the TLAC framework	5,677
6	Tier 2 capital (T2) before TLAC adjustments	9,948
7	Amortised portion of T2 instruments where remaining maturity > 1 year	44
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	9,992
11	TLAC arising from regulatory capital	76,607
	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	14,783
14	Of which: amount eligible as TLAC after application of the caps	14,783
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	14,783
	Non-regulatory capital elements of TLAC: adjustments	
18	TLAC before deductions	91,390
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	(66)
21	Other adjustments to TLAC	
22	TLAC available after deductions	91,324
	Risk-weighted assets and leverage exposure measure for TLAC purposes	
23	Total risk-weighted assets adjusted as permitted under the TLAC regime	510,664
24	Leverage exposure measure	1,529,369
	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)	17.9%
26	TLAC Leverage Ratio (as a percentage of leverage exposure)	6.0%
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.

TLAC1: TLAC composition (at resolution group level) (continued)

As at April 30, 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)	60,314
2	Additional Tier 1 capital (AT1) before TLAC adjustments	5,678
3	AT1 ineligible as TLAC as issued out of subsidiaries to third parties	-
4	Other adjustments	-
5	AT1 instruments eligible under the TLAC framework	5,678
6	Tier 2 capital (T2) before TLAC adjustments	9,500
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	9,522
11	TLAC arising from regulatory capital	75,513
	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	8,492
14	Of which: amount eligible as TLAC after application of the caps	8,492
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	8,492
	Non-regulatory capital elements of TLAC: adjustments	
18	TLAC before deductions	84,005
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	(21)
21	Other adjustments to TLAC	
22	TLAC available after deductions	83,985
	Risk-weighted assets and leverage exposure measure for TLAC purposes	
23	Total risk-weighted assets adjusted as permitted under the TLAC regime	510,463
24	Leverage exposure measure	1,521,197
	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)	16.5%
26	TLAC Leverage Ratio (as a percentage of leverage exposure)	5.5%
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 July 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	17,652	5,706	9,900	14,869	-	48,127
3	Subset of row 2 that are excluded liabilities	59	1	70	66	-	196
4	Total capital and liabilities less excluded liabilities (row 2 minus row 3)	17,593	5,705	9,830	14,803	-	47,931
5	Subset of row 4 that are *potentially* eligible as TLAC	17,593	5,674	9,474	14,803	-	47,544
6	Subset of row 5 with 1 year ≤ residual maturity < 2 years			-	1,899	-	1,899
7	Subset of row 5 with 2 years ≤ residual maturity < 5 years			110	12,392	-	12,502
8	Subset of row 5 with 5 years ≤ residual maturity < 10 years			8,910	38	-	8,948
9	Subset of row 5 with residual maturity ≥ 10 years, but excluding perpetual securities			454	474	-	928
10	Subset of row 5 that is perpetual securities	17,593	5,674	-	-	-	23,267

[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.

TLAC3: Resolution entity – creditor ranking at legal entity level (continued)

As at April 30, 2019

(Millions of Canadian dollars, except as otherwise noted)		Creditor ranking					
		1	2	3	4	5	Sum
		(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	17,637	5,706	9,437	8,533	-	41,313
3	Subset of row 2 that are excluded liabilities	103	-	-	21	-	124
4	Total capital and liabilities less excluded liabilities (row 2 minus row 3)	17,534	5,706	9,437	8,512	-	41,189
5	Subset of row 4 that are *potentially* eligible as TLAC	17,534	5,675	9,077	8,512	-	40,798
6	Subset of row 5 with 1 year ≤ residual maturity < 2 years			-	1,571	-	1,571
7	Subset of row 5 with 2 years ≤ residual maturity < 5 years			110	6,535	-	6,645
8	Subset of row 5 with 5 years ≤ residual maturity < 10 years			8,510	37	-	8,547
9	Subset of row 5 with residual maturity ≥ 10 years, but excluding perpetual securities			457	369	-	826
10	Subset of row 5 that is perpetual securities	17,534	5,675	-	-	-	23,209

[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