Royal Bank of Canada
Annual Report 2017

Annual Report - Part II of IV

To view full Annual Report in PDF, please see the link below:

http://www.rns-pdf.londonstockexchange.com/rns/0700Y_-2017-11-30.pdf

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

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

Risk management

Overview

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

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

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2017 Accomplishments

Throughout 2017, we have:

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

Risk pyramid

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

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Risk Drivers

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

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

Control and Influence

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

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

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

Top and emerging risks

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

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

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

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

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

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

Enterprise risk management

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

Risk governance

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

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Risk appetite

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

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

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

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

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

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

Risk Appetite Statements

Qualitative Statements

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

Quantitative Statements

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

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

Risk measurement

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

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

Risk control

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

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

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Risk review and approval processes

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

Authorities and limits

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

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

Reporting

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

Stress testing

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

- Monitoring our risk profile relative to our risk appetite in terms of earnings and capital at risk;
- Setting limits;
- Identifying key risks to and potential shifts in our capital and liquidity levels, and our financial position;
- Enhancing our understanding of available mitigating actions in response to adverse events; and
- Assessing the adequacy of our target capital and liquidity levels.

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

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

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

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

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

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

Risk behaviour expectations are in place and articulated through:

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

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

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

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

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

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

Transactional/positional risk drivers

Credit risk

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

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

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

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

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

Credit risk measurement

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

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

Measurement of regulatory and economic capital

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

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

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

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

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

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

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

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

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

Gross credit risk exposure

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

Lending-related and other includes:

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

Trading-related credit includes:

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

Credit risk assessment

Wholesale credit risk

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

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

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

Internal ratings map* **Table 46**

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

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

Counterparty credit risk

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

Wrong-way risk

Wrong-way risk is the risk that exposure to a counterparty or obligor is adversely correlated with the credit quality of that counterparty. There are two types of wrong-way risk:

- Specific Wrong-Way Risk, which exists when our exposure to a particular counterparty is positively and highly correlated with the probability of default of the counterparty due to the nature of our transactions with them (e.g., loan collateralized by shares or debt issued by the counterparty or a related party); and
- General Wrong-Way Risk, which exists when there is a positive correlation between the probability of default of counterparties and general macroeconomic or market factors. This typically occurs with derivatives (e.g., the size of the exposure increases) or with collateralized transactions (e.g., the value of the collateral declines).

Retail credit risk

Credit scoring is the primary risk rating system for assessing obligor and transaction risk for retail exposures. Scoring models use internal and external data to assess and "score" borrowers, predict future performance and manage limits for existing loans and collection activities. Credit scores are one of the factors employed in the acquisition of new clients and management of existing clients. The credit score of the borrower is used to assess the predicted risk and revenue for each independent acquisition or account management action, leading to an automated decision or guidance for an adjudicator. Credit scoring improves credit decision quality, adjudication timeframes, consistency in the credit decision process and facilitates risk-based pricing.

Our retail risk rating system is two-dimensional, whereby assessment of internal ratings is based both on PD, which is a borrower risk dimension, and on LGD, which is a facility-specific risk dimension.

The following table maps PD bands to various risk levels:

Internal ratings map* **Table 47**

PD bands	Description
0.000% - 1.718%	Low risk
1.719% - 6.430%	Medium risk
6.431% - 99.99%	High risk
100%	Impaired/Default

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

Credit risk mitigation

Credit risk mitigation policies are an integral component of our Credit Risk Framework and set out the minimum requirements for the mitigation of credit risk.

Structuring of transactions
Specific credit policies and procedures set out the requirements for structuring transactions. Risk mitigants include the use of guarantees, collateral, seniority, loan-to-value requirements and covenants. Product-specific guidelines set out appropriate product structuring as well as client and guarantor criteria.

Collateral
We often require obligors to pledge collateral as security when we advance credit. The extent of risk mitigation provided by collateral depends on the amount, type and quality of the collateral taken. Specific requirements relating to collateral valuation and management are set out in our credit risk management policies. The types of collateral used to secure credit or trading facilities within the bank are varied. For example, the majority of our securities financing and over-the-counter (OTC) derivatives activities are secured by cash and liquid government securities such as Organisation for Economic Co-operation and Development (OECD) securities. Wholesale lending is often secured by pledges of the assets of a business, such as accounts receivable, inventory, operating assets and commercial real estate. In our Canadian Banking business and Wealth Management segment, collateral typically consists of a pledge over a real estate property, or a portfolio of debt securities and equities trading on a recognized exchange.

- We employ a risk-based approach to property valuation. Property valuation methods include automated valuation models (AVM) and appraisals. An AVM is a tool that estimates the value of a property by reference to market data including sales of comparable properties and price trends specific to the Metropolitan Statistical Area in which the property being valued is located. Using a risk-based approach, we also employ appraisals which can include drive-by or full on-site appraisals.
- We continue to actively manage our entire mortgage portfolio and perform stress testing, based on a combination of increasing unemployment, rising interest rates and a downturn in real estate markets.
- We are compliant with regulatory requirements that govern residential mortgage underwriting practices, including loan-to-value parameters and property valuation requirements.

Credit risk approval

The Board of Directors and its committees, the Group Executive (GE), the GRC and other senior management risk committees work together to ensure a Credit Risk Framework and supporting policies, processes and procedures exist to manage credit risk and approve related credit risk limits. Reports are distributed to the Board of Directors, the GRC, and senior executives to keep them informed of our risk profile, including trending information and significant credit risk issues and shifts in exposures to ensure appropriate actions can be taken where necessary. Our enterprise-wide credit risk policies set out the minimum requirements for the management of credit risk in a variety of borrower, transactional and portfolio management contexts.

Product approval

- Proposals for credit products and services are comprehensively reviewed and approved under a risk assessment framework. New, amended and existing products must be reviewed relative to all risks in our risk pyramid, including credit risk. All products must be reviewed on a periodic basis, with high risk products being reviewed more frequently.

Credit limits

- Concentration risk is defined as the risk arising from large exposures to borrowers aggregated under one or more single names, industry sectors, countries or credit products within a portfolio that are highly correlated such that their ability to meet contractual obligations could be similarly affected by changes in economic, political or other risk drivers.
- We manage credit exposures and limits to ensure alignment with our risk appetite, to maintain our target business mix and to ensure that there is no undue risk concentration. Credit concentration limits are reviewed on a regular basis after taking into account business, economic, financial and regulatory environments.
- Credit limits are established at the following levels: single name limits (notional and economic capital), underwriting risk limits, leveraged lending limits, geographic (country and region) limits (notional and economic capital), industry sector limits (notional and economic capital), and product and portfolio limits, where deemed necessary.

Credit risk administration

Credit provisioning and allowances

We maintain an Allowance for Credit Losses at an appropriate level to cover identified credit losses in the portfolio as well as losses for loans not yet identified as impaired. In determining the appropriate level of Allowance for Credit Losses, we utilize both quantitative and qualitative assessments using current and historical credit information in accordance with IAS 39 *Financial Instruments: Recognition and Measurement* (IAS 39).

Loan forbearance

In our overall management of borrower relationships, economic or legal reasons may necessitate forbearance to certain clients with respect to the original terms and conditions of their loans. We have specialized groups and formalized policies that direct the management of delinquent or defaulted borrowers. We strive to identify borrowers in financial difficulty early and modify their loan terms in order to maximize collection and to avoid foreclosure, repossession, or other legal remedies. In these circumstances, a borrower may be granted concessions that would not otherwise be considered. Examples of such concessions to retail borrowers may include rate reduction, principal forgiveness, and term extensions. Concessions to wholesale borrowers may include restructuring the agreements, modifying the original terms of the agreement and/or relaxation of covenants. For both retail and wholesale loans, the appropriate remediation techniques are based on the individual borrower's situation, RBC's policy and the customer's willingness and capacity to meet the new arrangement.

Gross credit risk exposure by portfolio, sector and geography* **Table 48**

	As at											
	October 31 2017						October 31 2016					
	Lending-related and other			**Trading-related**			Lending-related and other			Trading-related		
	Loans and acceptances						Loans and acceptances					
(Millions of Canadian dollars)	**Outstanding**	**Undrawn commitments** (1)	**Other** (2)	**Repo-style transactions**	**Derivatives** (3)	**Total exposure** (4)	Outstanding	Undrawn commitments (1)	Other (2)	Repo-style transactions	Derivatives (3)	Total exposure (4)
By portfolio												
Residential mortgages	**$ 270,348**	**$ 818**	**$ 269**	**$ -**	**$ -**	**$ 271,435**	$ 254,998	$ 1,063	$ 214	$ -	$ -	$ 256,275
Personal	**92,294**	**88,120**	**176**	**-**	**-**	**180,590**	93,466	82,527	145	-	-	176,138
Credit cards	**18,035**	**21,826**	**-**	**-**	**-**	**39,861**	17,128	24,571	-	-	-	41,699
Small business (5)	**4,493**	**6,888**	**6**	**-**	**-**	**11,387**	3,878	6,188	5	-	-	10,071
Retail	**$ 385,170**	**$ 117,652**	**$ 451**	**$ -**	**$ -**	**$ 503,273**	$ 369,470	$ 114,349	$ 364	$ -	$ -	$ 484,183
Business (5)												
Agriculture	**$ 7,380**	**$ 1,338**	**$ 78**	**$ -**	**$ 63**	**$ 8,859**	$ 6,515	$ 1,310	$ 74	$ -	$ 109	$ 8,008
Automotive	**8,248**	**6,026**	**376**	**-**	**417**	**15,067**	7,279	5,785	567	-	497	14,128
Consumer goods	**11,387**	**8,872**	**605**	**-**	**525**	**21,389**	10,052	9,562	756	-	551	20,921
Energy												
Oil & Gas	**6,743**	**10,322**	**1,810**	**-**	**960**	**19,835**	6,259	10,747	1,656	-	1,198	19,860
Utilities	**5,614**	**14,867**	**3,689**	**37**	**1,347**	**25,554**	7,680	13,694	3,496	-	1,748	26,618
Financing products	**6,556**	**2,062**	**425**	**730**	**628**	**10,401**	8,840	2,649	421	494	611	13,015
Forest products	**911**	**635**	**85**	**-**	**16**	**1,647**	1,099	561	85	-	27	1,772
Health services	**6,998**	**4,602**	**1,800**	**1**	**522**	**13,923**	7,763	4,085	1,684	-	469	14,001
Holding and investments	**8,803**	**929**	**566**	**-**	**203**	**10,501**	7,195	2,270	637	-	279	10,381
Industrial products	**5,581**	**7,533**	**447**	**-**	**692**	**14,253**	5,508	7,757	546	-	632	14,443
Mining & metals	**1,113**	**3,816**	**1,027**	**-**	**101**	**6,057**	1,455	3,640	1,135	-	144	6,374
Non-bank financial services	**10,744**	**14,263**	**15,597**	**329,214**	**38,477**	**408,295**	8,408	13,149	15,830	249,732	41,381	328,500
Other services	**14,757**	**7,529**	**4,024**	**950**	**654**	**27,914**	11,582	9,848	10,049	1,410	1,525	34,414
Real estate & related	**46,197**	**11,267**	**1,603**	**3**	**443**	**59,513**	40,419	11,215	1,847	4	499	53,984
Technology & media	**8,890**	**14,129**	**633**	**305**	**2,456**	**26,413**	11,019	14,758	873	470	1,832	28,952
Transportation & environment	**5,950**	**5,712**	**3,300**	**-**	**841**	**15,803**	6,060	4,393	3,603	-	1,637	15,693

Other sectors	**4,570**	**17**	**4,694**	**3,018**	**563**	**12,862**	7,568	755	5,856	882	507	15,568
Sovereign (5)	**11,362**	**11,406**	**110,581**	**35,228**	**14,356**	**182,933**	10,581	6,972	84,017	38,707	17,319	157,596
Bank (5)	**4,261**	**1,423**	**132,644**	**106,346**	**23,735**	**268,409**	1,930	1,815	119,324	104,314	25,600	252,983
Wholesale	**$ 176,065$**	**126,748$**	**283,984**	**$ 475,832 $**	**86,999**	**$ 1,149,628**	$ 167,212 $	124,965 $	252,456	$ 396,013 $	96,565	$ 1,037,211
Total exposure	**$ 561,235$**	**244,400$**	**284,435**	**$ 475,832 $**	**86,999**	**$ 1,652,901**	$ 536,682 $	239,314 $	252,820	$ 396,013 $	96,565	$ 1,521,394
By geography (6)												
Canada	**$ 458,963$**	**156,249$**	**100,740**	**$ 68,279 $**	**24,018**	**$ 808,249**	$ 430,616 $	151,481 $	81,800	$ 76,094 $	27,647	$ 767,638
U.S.	**73,137**	**64,439**	**79,782**	**258,883**	**14,333**	**490,574**	76,481	69,006	81,168	208,759	14,315	449,729
Europe	**13,979**	**17,934**	**80,319**	**87,158**	**43,312**	**242,702**	14,886	15,367	74,547	71,722	48,318	224,840
Other International	**15,156**	**5,778**	**23,594**	**61,512**	**5,336**	**111,376**	14,699	3,460	15,305	39,438	6,285	79,187
Total Exposure	**$ 561,235$**	**244,400$**	**284,435**	**$ 475,832 $**	**86,999**	**$ 1,652,901**	$ 536,682 $	239,314 $	252,820	$ 396,013 $	96,565 $	1,521,394

* This table represents an integral part of our 2017 Annual Consolidated Financial Statements.
(1) Undrawn commitments represent an estimate of the contractual amount that may be drawn upon at the time of default of an obligor.
(2) Includes credit equivalent amounts for contingent liabilities such as letters of credit and guarantees, outstanding amounts for AFS debt securities, deposits with financial institutions and other assets.
(3) Credit equivalent amount after factoring in master netting agreements.
(4) Gross credit risk exposure is before allowance for loan losses. Exposures under Basel III asset classes of qualifying revolving retail and other retail are largely included within Personal and Credit cards, while home equity lines of credit are included in Personal.
(5) For further information, refer to Note 5 of our 2017 Annual Consolidated Financial Statements.
(6) Geographic profile is based on country of residence of the borrower.

2017 vs. 2016

Total gross credit risk exposure increased $132 billion or 9% from last year, primarily due to growth in repo-style transactions, cash and due from banks, interest-bearing deposits with banks, as well as loans & acceptances. These increases were partially offset by a decrease in derivative exposures and the impact of foreign exchange translation.

Retail exposure increased $19 billion or 4%, largely driven by volume growth in residential mortgages and personal loans, partially offset by a decrease in credit cards related to undrawn commitments.

Wholesale exposure increased $112 billion or 11%, primarily attributable to growth in repo-style transactions, cash and due from banks, interest-bearing deposits with banks largely reflecting higher deposits with central banks, as well as loans and acceptances. These increases were partially offset by a decrease in derivative exposures and the impact of foreign exchange translation. Wholesale loan utilization remained stable compared to the prior year at 39%.

The geographic mix of our gross credit risk exposure remained relatively unchanged from the prior year. Our exposure in Canada, the U.S., Europe and Other International was 49%, 30%, 15% and 6%, respectively (October 31, 2016 - 50%, 30%, 15% and 5%, respectively).

Our exposure in Canada increased $41 billion or 5% compared to the prior year, primarily due to growth in business loans and acceptances, and residential mortgages.

Our exposure in the U.S. increased $41 billion or 9% compared to the prior year, mainly due to repo-style transactions largely attributable to higher client and business activities, partially offset by the impact of foreign exchange translation.

Our exposure in Europe increased $18 billion or 8% compared to the prior year, primarily due to growth in repo-style transactions and increased deposits with central banks.

Our exposure in Other International increased $32 billion or 41% compared to the prior year, primarily due to growth in repo style transactions and increased deposits with central banks.

Loans and acceptances outstanding and undrawn commitments* (1) **Table 49**

As at	
October 31 2017	October 31 2016 (2)

(Millions of Canadian dollars)	**Low risk**	**Medium risk**	**High risk**	**Impaired**	**Standardized and Non-Rated**	**Total**	Low risk (3)	Medium risk	High risk	Impaired (3)	Standardized and Non-Rated (3), (4)	Total
Retail (5)												
Residential mortgages	**$ 221,911**	**$ 12,388**	**$ 2,383**	**$ 284**	**$ 34,200**	**$ 271,166**	$ 209,532	$ 12,750	$ 2,090	$ 337	$ 22,197	$ 246,906
Personal	**161,484**	**12,238**	**2,736**	**193**	**3,763**	**180,414**	158,498	10,624	2,768	222	1,421	173,533
Credit cards	**31,883**	**5,320**	**1,396**	**-**	**1,262**	**39,861**	34,116	5,342	1,437	-	642	41,537
Small business	**7,770**	**1,908**	**433**	**31**	**1,239**	**11,381**	5,822	1,201	1,671	36	1,336	10,066
	$ 423,048	**$ 31,854**	**$ 6,948**	**$ 508**	**$ 40,464**	**$ 502,822**	$ 407,968	$ 29,917	$ 7,966	$ 595	$ 25,596	$ 472,042

	As at							
	October 31 2017				October 31 2016 (2)			
(Millions of Canadian dollars)	**Investment grade**	**Non-investment grade**	**Impaired**	**Total**	Investment grade	Non-investment grade	Impaired	Total
Wholesale (6)								
Business	**$ 108,733**	**$ 164,256**	**$ 1,372**	**$ 274,361**	$ 107,510	$ 132,967	$ 2,339	$ 242,816
Sovereign	**21,457**	**1,311**	**-**	**22,768**	15,939	786	-	16,725
Bank	**3,519**	**2,165**	**-**	**5,684**	1,881	943	2	2,826
Total	**$ 133,709**	**$ 167,732**	**$ 1,372**	**$ 302,813**	$ 125,330	$ 134,696	$ 2,341	$ 262,367

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

(1) This table represents our retail and wholesale loans and acceptances outstanding and undrawn commitments by portfolio and risk category. The amounts in the table are before allowance for impaired loans.

(2) City National exposures of $41.6 billion are excluded as at October 31, 2016.

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

(4) Under the standardized approach, credit risk exposure is based on risk weights prescribed by OSFI.

(5) Includes undrawn commitments of $1.0 billion, $88.1 billion, $21.8 billion, and $6.9 billion for Residential mortgages, Personal, Credit cards and Small business, respectively (October 31, 2016 - $1.0 billion, $82.4 billion, $24.6 billion and $6.2 billion, respectively).

(6) Includes undrawn commitments of $113.9 billion, $11.4 billion, and $1.4 billion for Business, Sovereign and Bank, respectively (October 31, 2016 - $111.3 billion, $7.0 billion, and $1.2 billion, respectively).

2017 vs. 2016

Growth in retail exposures was largely attributable to volume growth in residential mortgages and personal loans. Growth in wholesale exposures mainly reflects increased volumes in non-investment grade categories across various industry sectors, slightly offset by the impact of foreign exchange.

Net European exposure by country and client type (1), (2)

Table 50

(Millions of Canadian dollars)	Loans Outstanding (October 31 2017, Asset type)	Securities (3)	Repo-style transactions	Derivatives	Financials (Client type)	Sovereign	Corporate	Total	October 31 2016 Total
U.K.	**$ 7,925**	**$ 10,428**	**$ 909**	**$ 1,241**	**$ 8,050**	**$ 4,871**	**$ 7,582**	**$ 20,503**	$ 17,956
Germany	**1,626**	**12,308**	**1**	**260**	**6,686**	**5,001**	**2,508**	**14,195**	11,273
France	**615**	**9,650**	**2**	**453**	**1,909**	**8,249**	**562**	**10,720**	8,398
Total U.K., Germany, France	**$ 10,166**	**$ 32,386**	**$ 912**	**$ 1,954**	**$ 16,645**	**$ 18,121**	**$ 10,652**	**$ 45,418**	$ 37,627
Ireland	**$ 412**	**$ 30**	**$ 100**	**$ 44**	**$ 142**	**$ 12**	**$ 432**	**$ 586**	$ 880
Italy	**105**	**116**	**-**	**5**	**143**	**9**	**74**	**226**	120
Portugal	**-**	**16**	**-**	**1**	**1**	**-**	**16**	**17**	16
Spain	**359**	**404**	**-**	**14**	**408**	**-**	**369**	**777**	446
Total Peripheral (4)	**$ 876**	**$ 566**	**$ 100**	**$ 64**	**$ 694**	**$ 21**	**$ 891**	**$ 1,606**	$ 1,462
Luxembourg (5)	**$ 939**	**$ 5,541**	**$ 2**	**$ 85**	**$ 507**	**$ 5,029**	**$ 1,031**	**$ 6,567**	$ 6,054
Netherlands (5)	**895**	**2,304**	**26**	**246**	**2,493**	**-**	**978**	**3,471**	3,904
Norway	**239**	**4,169**	**-**	**5**	**3,889**	**247**	**277**	**4,413**	3,945
Sweden	**109**	**4,599**	**5**	**13**	**3,017**	**1,585**	**124**	**4,726**	4,168
Switzerland	**413**	**2,813**	**168**	**139**	**847**	**2,579**	**107**	**3,533**	2,271
Other	**1,262**	**2,160**	**7**	**81**	**735**	**1,601**	**1,174**	**3,510**	2,982
Total Other Europe	**$ 3,857**	**$ 21,586**	**$ 208**	**$ 569**	**$ 11,488**	**$ 11,041**	**$ 3,691**	**$ 26,220**	$ 23,324
Net exposure to Europe (6), (7)	**$ 14,899**	**$ 54,538**	**$ 1,220**	**$ 2,587**	**$ 28,827**	**$ 29,183**	**$ 15,234**	**$ 73,244**	$ 62,413

(1) Geographic profile is based on country of risk, which reflects our assessment of the geographic risk associated with a given exposure. Typically, this is the residence of the borrower.
(2) Exposures are calculated on a fair value basis and net of collateral, which includes $77.7 billion against repo-style transactions (October 31, 2016 - $64.0 billion) and $12.6 billion against derivatives (October 31, 2016 - $15.7 billion).
(3) Securities include $20.0 billion of trading securities (October 31, 2016 - $11.1 billion), $19.7 billion of deposits (October 31, 2016 - $12.3 billion), and $14.8 billion of AFS securities (October 31, 2016 - $15.9 billion).
(4) Gross credit risk exposure to peripheral Europe is comprised of Ireland $19.3 billion (October 31, 2016 - $18.9 billion), Italy $0.4 billion (October 31, 2016 - $0.3 billion), Portugal $nil (October 31, 2016 - $0.1 billion), and Spain $1.0 billion (October 31, 2016 - $1.1 billion).
(5) Amounts have been revised from those previously presented.
(6) Excludes $2.7 billion (October 31, 2016 - $1.9 billion) of exposures to supranational agencies.

(7) Reflects $1.4 billion of mitigation through credit default swaps, which are largely used to hedge single name exposures and market risk (October 31, 2016 - $1.5 billion).

2017 vs. 2016
Net credit risk exposure to Europe increased $10.8 billion from last year, largely driven by increased exposure to Germany, U.K., France, and Switzerland. Our net exposure to peripheral Europe, which includes Ireland, Italy, Portugal and Spain remained minimal, with total outstanding exposure increasing $0.1 billion during the year to $1.6 billion.

Our European corporate loan book is managed on a global basis with underwriting standards reflecting the same approach to the use of our balance sheet as we have applied in both Canada and the U.S. PCL taken on this portfolio during the year was not material. The gross impaired loans ratio of this loan book was 100 bps, slightly down from 110 bps in the prior year.

Residential mortgages and home equity lines of credit (insured vs. uninsured)
Residential mortgages and home equity lines of credit are secured by residential properties. The following table presents a breakdown by geographic region:

Residential mortgages and home equity lines of credit **Table 51**

	As at October 31, 2017					
	Residential mortgages (1)					**Home equity lines of credit** (2)
(Millions of Canadian dollars, except percentage amounts)	**Insured** (3)		**Uninsured**		**Total**	**Total**
Region (4)						
Canada						
Atlantic provinces	**$ 7,670**	**57%**	**$ 5,848**	**43%**	**$ 13,518**	**$ 1,986**
Quebec	**15,089**	**48**	**16,557**	**52**	**31,646**	**3,964**
Ontario	**42,610**	**39**	**66,549**	**61**	**109,159**	**16,823**
Alberta	**21,820**	**58**	**15,702**	**42**	**37,522**	**6,950**
Saskatchewan and Manitoba	**9,305**	**54**	**7,932**	**46**	**17,237**	**2,627**
B.C. and territories	**17,169**	**37**	**29,521**	**63**	**46,690**	**8,620**
Total Canada (5)	**$ 113,663**	**44%**	**$142,109**	**56%**	**$ 255,772**	**$ 40,970**
U.S.	**1**	**-**	**11,448**	**100**	**11,449**	**1,557**
Other International	**9**	**-**	**3,091**	**100**	**3,100**	**1,992**
Total International	**$ 10**	**-%**	**$ 14,539**	**100%**	**$ 14,549**	**$ 3,549**
Total	**$ 113,673**	**42%**	**$156,648**	**58%**	**$ 270,321**	**$ 44,519**

As at October 31, 2016

(Millions of Canadian dollars, except percentage amounts)	Residential mortgages (1) Insured (3)		Uninsured		Total	Home equity lines of credit (2) Total
Region (4)						
Canada						
Atlantic provinces	$ 7,633	59%	$ 5,409	41%	$ 13,042	$ 2,034
Quebec	14,432	50	14,429	50	28,861	4,060
Ontario	43,314	43	58,016	57	101,330	16,512
Alberta	21,746	58	15,429	42	37,175	7,066
Saskatchewan and Manitoba	8,897	54	7,730	46	16,627	2,682
B.C. and territories	17,657	40	27,024	60	44,681	8,739
Total Canada (5)	$113,679	47%	$128,037	53%	$241,716	$ 41,093
U.S.	2	-	10,012	100	10,014	1,464
Other International	13	-	3,171	100	3,184	2,442
Total International	$ 15	-%	$ 13,183	100%	$ 13,198	$ 3,906
Total	$113,694	45%	$141,220	55%	$254,914	$ 44,999

(1) The residential mortgages amounts exclude our third-party mortgage-backed securities (MBS) of $27 million (2016 - $84 million).
(2) Home equity lines of credit include revolving and non-revolving loans.
(3) Insured residential mortgages are mortgages whereby our exposure to default is mitigated by insurance through the Canada Mortgage and Housing Corporation (CMHC) or other private mortgage default insurers.
(4) Region is based upon address of the property mortgaged. The Atlantic provinces are comprised of Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick, and B.C. and territories are comprised of British Columbia, Nunavut, Northwest Territories and Yukon.
(5) Total consolidated residential mortgages in Canada of $256 billion (2016 - $242 billion) is largely comprised of $231 billion (2016 - $217 billion) of residential mortgages and $6 billion (2016 - $6 billion) of mortgages with commercial clients, of which $4 billion (2016 - $3 billion) are insured mortgages, both in Canadian Banking, and $19 billion (2016 - $19 billion) of residential mortgages in Capital Markets held for securitization purposes.

Home equity lines of credit are uninsured and reported within the personal loan category. As at October 31, 2017, home equity lines of credit in Canadian Banking were $41 billion (2016 - $41 billion). Approximately 98% of these home equity lines of credit (2016 - 98%) are secured by a first lien on real estate, and only 7% (2016 - 7%) of the total homeline clients pay the scheduled interest payment only.

Residential mortgages portfolio by amortization period

The following table provides a summary of the percentage of residential mortgages that fall within the remaining amortization periods based upon current customer payment amounts, which incorporate payments larger than the minimum contractual amount and/or higher frequency of payments:

Residential mortgages portfolio by amortization period **Table 52**

	As at					
	October 31 2017			October 31 2016		
	Canada	**U.S. and Other International**	**Total**	Canada	U.S. and Other International	Total
Amortization period						
≤ 25 years	**73%**	**43%**	**71%**	74%	40%	72%
> 25 years ≤ 30 years	**24**	**57**	**26**	25	58	27
> 30 years ≤ 35 years	**3**	**-**	**3**	1	2	1
Total	**100%**	**100%**	**100%**	100%	100%	100%

Average loan-to-value (LTV) ratio for newly originated and acquired uninsured residential mortgages and homeline products
The following table provides a summary of our average LTV ratio for newly originated and acquired uninsured residential mortgages and homeline products by geographic region:

Average LTV ratio **Table 53**

	October 31 2017		October 31 2016	
	Uninsured		Uninsured	
	Residential mortgages (1)	**Homeline products** (2)	Residential mortgages (1)	Homeline products (2)
Region (3)				
Atlantic provinces	**74%**	**74%**	73%	74%
Quebec	**72**	**73**	71	74
Ontario	**70**	**67**	70	69
Alberta	**73**	**72**	73	72
Saskatchewan and Manitoba	**74**	**74**	74	74
B.C. and territories	**69**	**65**	68	65
U.S.	**73**	**n.m.**	72	n.m.
Other International	**62**	**n.m.**	63	n.m.
Average of newly originated and acquired for the year (4), (5)	**70%**	**68%**	71%	69%

Total Canadian Banking residential mortgages portfolio (6)	**53%**	**49%**	54%	51%

(1) Residential mortgages exclude residential mortgages within the homeline products.
(2) Homeline products are comprised of both residential mortgages and home equity lines of credit.
(3) Region is based upon address of the property mortgaged. The Atlantic provinces are comprised of Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick, and B.C. and territories are comprised of British Columbia, Nunavut, Northwest Territories and Yukon.
(4) The average LTV ratio for newly originated and acquired uninsured residential mortgages and homeline products is calculated on a weighted basis by mortgage amounts at origination.
(5) For newly originated mortgages and homeline products, LTV is calculated based on the total facility amount for the residential mortgage and homeline product divided by the value of the related residential property.
(6) Weighted by mortgage balances and adjusted for property values based on the Teranet - National Bank National Composite House Price Index.
n.m. not meaningful

Credit quality performance

Provision for (recovery of) credit loss **Table 54**

(Millions of Canadian dollars, except percentage amounts)	**2017**	2016
Personal & Commercial Banking	**$ 1,054**	$ 1,122
Wealth Management	**34**	48
Capital Markets	**62**	327
Corporate Support and Other (1)	**-**	49
Total PCL	**$ 1,150**	$ 1,546
Canada (2)		
Residential mortgages	**$ 33**	$ 42
Personal	**413**	459
Credit cards	**426**	435
Small business	**32**	34
Retail	**904**	970
Wholesale	**95**	213
PCL on impaired loans	**999**	1,183
U.S. (2), (3)		
Retail	**$ 3**	$ 1
Wholesale	**117**	227
PCL on impaired loans	**120**	228
Other International (2), (3)		
Retail	**$ 25**	$ 41
Wholesale	**6**	44
PCL on impaired loans	**31**	85
PCL on loans not yet identified as impaired	**-**	50
Total PCL	**$ 1,150**	$ 1,546
PCL ratio		
Total PCL ratio	**0.21%**	0.29%
PCL on impaired loans ratio	**0.21%**	0.28%

Personal & Commercial Banking	**0.26%**	0.29%
Canadian Banking	**0.26%**	0.29%
Caribbean Banking	**0.44%**	0.53%
Wealth Management	**0.07%**	0.10%
PCL ratio - loans	**0.07%**	0.08%
PCL ratio - acquired credit-impaired loans	**0%**	0.02%
Capital Markets	**0.07%**	0.37%

(1) PCL in Corporate Support and Other primarily comprised of PCL for loans not yet identified as impaired. For further information, refer to the How we measure and report our business segments section.
(2) Geographic information is based on residence of borrower.
(3) Includes acquired credit-impaired loans.

2017 vs. 2016

Total PCL decreased $396 million, or 26% from the prior year. The PCL ratio of 21 bps improved 8 bps.

PCL in Personal & Commercial Banking decreased $68 million or 6% mainly due to lower provisions in our Canadian personal lending portfolios. The PCL ratio of 26 bps improved 3 bps.

PCL in Wealth Management decreased $14 million or 29%, mainly due to a recovery in International Wealth Management. This factor was partially offset by higher provisions in U.S. Wealth Management (including City National).

PCL in Capital Markets decreased $265 million or 81%, primarily due to lower provisions, including higher recoveries, primarily in the oil & gas sector, partially offset by higher provisions in the real estate and related sector.

PCL in Corporate Support and Other decreased $49 million, as the prior year included PCL for loans not yet identified as impaired.

Gross impaired loans (GIL) **Table 55**

(Millions of Canadian dollars, except percentage amounts)	**2017**	2016
Personal & Commercial Banking	**$ 1,500**	$ 1,651
Wealth Management (1)	**549**	710
Capital Markets	**527**	1,524
Investor & Treasury Services	**-**	2
Corporate Support and Other	**-**	16
Total GIL	**$ 2,576**	$ 3,903
Canada (2)		
Retail	**$ 559**	$ 642
Wholesale	**426**	522
GIL	**985**	1,164
U.S. (1), (2)		
Retail	**$ 59**	$ 56
Wholesale	**736**	1,736
GIL	**795**	1,792
Other International (2)		
Retail	**$ 345**	$ 380
Wholesale	**451**	567
GIL	**796**	947
Total GIL	**$ 2,576**	$ 3,903
Impaired loans, beginning balance	**$ 3,903**	$ 2,285
Classified as impaired during the period (new impaired) (3)	**2,269**	3,673
Net repayments (3)	**(1,192)**	(946)
Amounts written off	**(1,425)**	(1,523)
Other (3), (4)	**(979)**	414
Impaired loans, balance at end of period	**$ 2,576**	$ 3,903
GIL ratio (5)		

Total GIL ratio	**0.46%**	0.73%
Personal & Commercial Banking	**0.36%**	0.43%
Canadian Banking	**0.24%**	0.27%
Caribbean Banking	**6.33%**	7.56%
Wealth Management	**1.04%**	1.44%
GIL ratio - loans	**0.56%**	0.59%
GIL ratio - acquired credit-impaired loans	**0.48%**	0.85%
Capital Markets	**0.63%**	1.73%

(1) Includes $256 million (2016 - $418 million) related to acquired credit-impaired loans. For further details refer to Notes 2 and 5 of our 2017 Annual Consolidated Financial Statements.
(2) Geographic information is based on residence of borrower.
(3) Certain GIL movements for Canadian Banking retail and wholesale portfolios are generally allocated to New impaired, as Return to performing status, Net repayments, Sold, and Exchange and other movements amounts are not reasonably determinable. Certain GIL movements for Caribbean Banking retail and wholesale portfolios are generally allocated to Net repayments and New impaired, as Return to performing status, Sold, and Exchange and other movements amounts are not reasonably determinable.
(4) Includes Return to performing status during the year, Recoveries of loans and advances previously written off, Sold, and Exchange and other movements.
(5) GIL as a % of related loans and acceptances.

2017 vs. 2016

Total GIL decreased $1,327 million or 34% from the prior year, and the total GIL ratio of 46 bps improved 27 bps, largely reflecting lower impaired loans in our Capital Markets, Wealth Management and Personal & Commercial Banking portfolios. Total GIL also includes acquired credit-impaired loans (ACI) of $256 million related to City National, which contributed 5 bps to the GIL ratio. For further details on ACI loans, refer to Notes 2 and 5 of our 2017 Annual Consolidated Financial Statements.

GIL in Personal & Commercial Banking decreased $151 million or 9%, and the GIL ratio of 36 bps improved 7 bps, mainly due to lower impaired loans in our Caribbean portfolios, partially offset by higher impaired loans in our Canadian commercial lending portfolios.

GIL in Wealth Management decreased $161 million or 23%, mainly reflecting repayments in U.S. Wealth Management (including City National).

GIL in Capital Markets decreased $997 million or 65%, primarily due to lower impaired loans reflecting loans returning to performing status, and repayments in the oil & gas sector, partially offset by higher impaired loans in the real estate and related sector.

Allowance for credit losses (ACL) **Table 56**

(Millions of Canadian dollars)	**2017**	2016
Allowance for impaired loans		
Personal & Commercial Banking	**$ 497**	$ 520
Wealth Management (1)	**80**	73
Capital Markets	**160**	216
Investor & Treasury Services	-	-
Corporate Support and Other	**-**	-
Total allowance for impaired loans	**$ 737**	$ 809
Canada (2)		
Retail	**$ 141**	$ 160
Wholesale	**124**	119
Allowance for impaired loans	**265**	279
U.S. (1), (2)		
Retail	**$ 1**	$ 2
Wholesale	**150**	177
Allowance for impaired loans	**151**	179
Other International (2)		
Retail	**$ 168**	$ 180
Wholesale	**153**	171
Allowance for impaired loans	**321**	351
Total allowance for impaired loans	**$ 737**	$ 809
Allowance for loans not yet identified as impaired	**1,513**	1,517
Total ACL	**$ 2,250**	$ 2,326

(1) Effective Q1 2016, includes ACL related to acquired credit-impaired loans from our acquisition of City National.
(2) Geographic information is based on residence of borrower.

2017 vs. 2016
Total ACL decreased $76 million or 3% from a year ago, largely due to lower ACL in Capital Markets and Personal & Commercial Banking.

For further details, refer to Notes 2 and 5 of our 2017 Annual Consolidated Financial Statements.

Market risk

Market risk is defined to be the impact of market prices upon our financial condition. This includes potential gains or losses due to changes in market determined variables such as interest rates, credit spreads, equity prices, commodity prices, foreign exchange rates and implied volatilities.

The measures of financial condition impacted by market risk are as follows:

1. Positions whose revaluation gains and losses are reported in Revenue, which includes:
    a) Changes in the fair value of instruments classified or designated as fair value through profit and loss (FVTPL), including impaired securities, and
    b) Hedge ineffectiveness.
2. CET1 capital, which includes:
    a) All of the above, plus
    b) Changes in the fair value of AFS securities where revaluation gains and losses are reported as other comprehensive income,
    c) Changes in the Canadian dollar value of investments in foreign subsidiaries, net of hedges, due to foreign exchange translation, and
    d) Remeasurements of employee benefit plans; this includes pension fund assets underperforming in the market resulting in a deficit and volatility between the pension liabilities and the fund assets, and/or estimated actuarial parameters not being realized such that pension liabilities exceed pension fund assets.
3. CET1 ratio, which includes:
    a) All of the above, plus
    b) Changes in risk-weighted assets (RWA) resulting from changes in traded market risk factors, and
    c) Changes in the Canadian dollar value of RWA due to foreign exchange translation.
4. The economic value of the Bank, which includes:
    a) Points 1 and 2 above, plus
    b) Changes in the value of other non-trading positions whose value is a function of market risk factors.

Market risk controls - FVTPL positions

As an element of the Enterprise Risk Appetite Framework, the Board of Directors approves our overall market risk constraints. GRM creates and manages the control structure for FVTPL positions which ensures that business is conducted consistent with Board requirements. The Market and Trading Credit Risk function within GRM is responsible for creating and managing the controls and governance procedures that ensure that risk taken is consistent with risk appetite constraints set by the Board. These controls include limits on probabilistic measures of potential loss such as Value-at-Risk and Stressed Value-at-Risk as defined below:

Value-at-Risk (VaR) is a statistical measure of potential loss for a financial portfolio computed at a given level of confidence and over a defined holding period. We measure VaR at the 99th percentile confidence level for price movements over a one-day holding period using historic simulation of the last two years of equally weighted historic market data. These calculations are updated daily with current risk positions, with the exception of certain less material positions that are not actively traded and are updated on at least a monthly basis.

Stressed Value-at-Risk (SVaR) is calculated in an identical manner as VaR with the exception that it is computed using a fixed historical one-year period of extreme volatility and its inverse rather than the most recent two-year history. The stress period used is the interval from September 2008 through August 2009. SVaR is calculated daily for all portfolios, with the exception of certain less material positions that are not actively traded and are updated on at least a monthly basis.

VaR and SVaR are statistical estimates based on historical market data and should be interpreted with knowledge of their limitations - which include the following:

- VaR and SVaR will not be predictive of future losses if the realized market movements differ significantly from the historical periods used to compute them.
- VaR and SVaR project potential losses over a one-day holding period and do not project potential losses for risk positions held over longer time periods.
- VaR and SVaR are measured using positions at close of business and do not include the impact of trading activity over the course of a day.

We validate our VaR and SVaR measures through a variety of means - including subjecting the models to vetting and validation by a group independent of the model developers and by back-testing the VaR against daily marked-to-market revenue to identify and examine events in which actual outcomes in trading revenue exceed the VaR projections.

Stress Tests - Our market risk stress testing program is used to identify and control risk due to large changes in market prices and rates. We conduct stress testing daily on positions that are marked-to-market. The stress tests simulate both historical and hypothetical events which are severe and long term in duration. Historical scenarios are taken from actual market events over the last 30 years and range in duration up to 90 days. Examples include the equity market crash of 1987 and the global financial crisis of 2008. Hypothetical scenarios are designed to be forward looking at potential future market stresses, and are designed to be severe but plausible. We are constantly evaluating and refining these scenarios as market conditions change. Stress results are calculated assuming an instantaneous revaluation of our positions with no management action.

These measures are computed on all positions that are FVTPL for financial reporting purposes, with the exception of those in a designated hedging relationship and those in our insurance businesses.

Market risk measures - FVTPL positions

VaR and SVaR

The following table presents our Market risk VaR and Market risk SVaR figures for 2017 and 2016.

Market risk VaR* **Table 57**

(Millions of Canadian dollars)	**2017** As at Oct. 31	**2017** For the year ended October 31 Average	High	Low	2016 As at Oct. 31	2016 For the year ended October 31 Average	High	Low
Equity	**$ 10**	**$ 12**	**$ 26**	**$ 6**	$ 13	$ 16	$ 32	$ 7
Foreign exchange	**3**	**4**	**6**	**3**	5	5	8	3
Commodities	**3**	**3**	**6**	**2**	5	3	5	2
Interest rate (1)	**16**	**17**	**25**	**13**	18	21	32	14
Credit specific (2)	**4**	**4**	**5**	**4**	4	5	7	4
Diversification (3)	**(18)**	**(18)**	**n.m.**	**n.m.**	(21)	(17)	n.m.	n.m.
Market risk VaR	**$ 18**	**$ 22**	**$ 35**	**$ 15**	$ 24	$ 33	$ 53	$ 20
Market risk Stressed VaR	**$ 43**	**$ 53**	**$ 95**	**$ 34**	$ 46	$ 82	$ 150	$ 41

* This table represents an integral part of our 2017 Annual Consolidated Financial Statements.
(1) General credit spread risk and funding spread risk associated with uncollateralized derivatives are included under interest rate VaR.
(2) Credit specific risk captures issuer-specific credit spread volatility.
(3) Market risk VaR is less than the sum of the individual risk factor VaR results due to portfolio diversification.
n.m. not meaningful

2017 vs. 2016

Average market risk VaR of $22 million decreased $11 million from the prior year. Reduced average equity exposures were observed in 2017 due to lower than expected client-driven activity in rising equity markets, with volatility reaching historical lows. Furthermore, exposures in fixed income and securitized product portfolios have been maintained at lower levels on average. This follows portfolio reductions in 2016 as reflected in the interest rate and credit specific risk metrics. The impact of foreign exchange translation also contributed to the decrease.

Average SVaR of $53 million decreased $29 million from the prior year, largely driven by reduced equity exposures and the impact of foreign exchange translation as noted above, and the winding down of certain legacy trading portfolios in 2016.

The following chart displays a bar graph of our daily trading profit and loss and a line graph of our daily market risk VaR. We incurred 1 day of losses totalling $2 million in 2017 compared to 7 days of losses totalling $63 million in 2016, with none of the losses exceeding VaR.

Please see the PDF to view this chart

The following chart displays the distribution of daily trading profit and loss in 2017. The only daily reported loss during the year was $2 million on November 14, 2016. The largest reported profit was $41 million with an average daily profit of $14 million.

Please see the PDF to view this chart

Market risk measures for other FVTPL positions - Assets and liabilities of RBC Insurance

We offer a range of insurance products to clients and hold investments to meet the future obligations to policyholders. The investments which support actuarial liabilities are predominantly fixed income assets designated as FVTPL. Consequently, changes in the fair values of these assets are recorded in investment income in the consolidated statements of income and are largely offset by changes in the fair value of the actuarial liabilities, the impact of which is reflected in insurance policyholder benefits and claims. As at October 31, 2017, we had liabilities with respect to insurance obligations of $9.7 billion, up from $9.2 billion in the prior year, and trading securities of $7.7 billion in support of the liabilities, up from $7.2 billion last year.

Market risk controls - Structural Interest Rate Risk (SIRR) positions[1]

The interest rate risk arising from traditional banking products, such as deposits and loans, is referred to as SIRR and is subject to limits and controls. SIRR measures also include related hedges as well as the interest rate risk from securities held for liquidity management. Factors contributing to SIRR include the mismatch between asset and liability repricing dates, relative changes in asset and liability rates, and other product features that could affect the expected timing of cash flows, such as options to pre-pay loans or redeem term deposits prior to contractual maturity.

The Board of Directors approves the risk appetite for SIRR, and the Asset-Liability Committee (ALCO), along with GRM, provides ongoing governance of SIRR measurement and management through risk policies, limits, operating standards and other controls. SIRR reports are reviewed regularly by GRM, ALCO, the Group Risk Committee, the Risk Committee of the Board and the Board of Directors.

Details on the non-trading risks included in SIRR are outlined in Table 59.

(1) SIRR positions include impact of derivatives in hedge accounting relationships and AFS securities used for interest rate risk management.

SIRR measurement

To monitor and control SIRR, we assess two primary metrics, 12-month Net Interest Income (NII) risk and Economic Value of Equity (EVE) risk, under a range of market shocks and scenarios. Market scenarios include currency-specific parallel and non-parallel yield curve changes and interest rate volatility shocks.

In measuring NII risk, detailed structural balance sheets and income statements are dynamically simulated to determine the impact of market stress scenarios on projected NII. Assets, liabilities and off-balance sheet positions are simulated using monthly time steps over a one-year horizon. The simulations incorporate product maturities, renewals and growth along with prepayment and redemption behaviour. Product pricing and volumes are forecast based on past experience and expectations for a given market stress scenario. EVE risk captures the market value sensitivity of structural positions to changes in longer-term rates. In measuring EVE risk, deterministic (single-scenario) and stochastic (multiple-scenario) valuation techniques are applied to detailed spot position data. NII and EVE risks are measured for a range of market risk stress scenarios which include extreme but plausible changes in market rates and volatilities. These SIRR measures do not include the benefit of management actions.

Management of NII and EVE risk is complementary and supports our efforts to generate a sustainable high-quality NII stream. NII and EVE risks for specific units are measured daily, weekly or monthly depending on its materiality, complexity and hedge strategy.

A number of assumptions affecting cash flows, product re-pricing and the administration of rates underlie the models used to measure NII and EVE risk. The key assumptions pertain to the expected funding profile for mortgage rate commitments, fixed rate loan prepayment behaviour, term deposit redemption behaviour, and the treatment of non-maturity deposits. All assumptions are derived empirically based on historical client behaviour and product pricing with consideration of future behavioural changes. All models and assumptions used to measure SIRR are subject to independent oversight by GRM.

Market risk measures - Structural Interest Rate Sensitivities

The following table shows the potential before-tax impact of an immediate and sustained 100 bps and 200 bps increase or decrease in interest rates on projected 12-month NII and EVE for our structural balance sheet, assuming no subsequent hedging. Rate floors are applied within the declining rates scenarios, with floor levels set based on rate changes experienced globally. Interest rate risk measures are based upon interest rate exposures at a specific time and continuously change as a result of business activities and management actions.

Market risk - SIRR measures* **Table 58**

	2017						2016	
	EVE risk			**NII risk** (1)				
(Millions of Canadian dollars)	**Canadian dollar impact**	**U.S. dollar impact** (2)	**Total**	**Canadian dollar impact**	**U.S. dollar impact** (2)	**Total**	EVE risk	NII risk (1)
Before-tax impact of:								
100bps increase in rates	**$ (1,105)**	**$ (110)**	**$(1,215)**	**$ 269**	**$ 182**	**$ 451**	$ (1,377)	$ 420
100bps decrease in rates	**962**	**(324)**	**638**	**(385)**	**(219)**	**(604)**	644	(465)
Before-tax impact of:								
200bps increase in rates	**(2,199)**	**(308)**	**(2,507)**	**472**	**353**	**825**	(2,883)	711
200bps decrease in rates	**1,943**	**(940)**	**1,003**	**(647)**	**(360)**	**(1,007)**	664	(467)

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

(1) Represents the 12-month NII exposure to an instantaneous and sustained shift in interest rates.
(2) Represents the impact on the SIRR portfolios held in our City National and U.S. banking operations.

As at October 31, 2017, an immediate and sustained -100 bps shock would have had a negative impact to our NII of $604 million, up from $465 million last year. An immediate and sustained +100 bps shock at the end of October 31, 2017 would have had a negative impact to the Bank's EVE of $1,215 million, down from $1,377 million reported last year. The year-over-year NII sensitivity to rate increases was positioned marginally higher. Under the declining rate scenarios, NII risk has increased primarily as a result of higher rates, which allows rates to decline further under the down shock scenario. During 2017, NII and EVE risks remained well within approved limits.

Market risk measures for other material non-trading portfolios
AFS securities
We held $75.9 billion of securities classified as AFS as at October 31, 2017, compared to $69.9 billion as at October 31, 2016. We hold debt securities designated as AFS primarily as investments, as well as to manage liquidity risk and hedge interest rate risk in our non-trading banking balance sheet. Certain legacy debt portfolios are also classified as AFS. Changes in the value of these securities are reported in other comprehensive income. As at October 31, 2017, our portfolio of AFS securities exposes us to interest rate risk of a pre-tax change in value of $9.8 million as measured by the change in the value of the securities for a one basis point parallel increase in yields. The portfolio also exposes us to credit spread risk of a pre-tax change in value of $25.0 million, as measured by the change in value for a one basis point widening of credit spreads. The value of the AFS securities included in our SIRR measure as at October 31, 2017 was $36.4 billion. Our AFS securities also include equity exposures of $1.2 billion as at October 31, 2017, down from $1.6 billion in the prior year.

Derivatives related to non-trading activity
Derivatives are also used to hedge market risk exposures unrelated to our trading activity. In aggregate, derivative assets not related to trading activity of $3.2 billion as at October 31, 2017 were down from $5.1 billion last year, and derivative liabilities of $3.2 billion as at October 31, 2017 were down from $4.1 billion last year.

Non-trading derivatives in hedge accounting relationships
The derivative assets and liabilities described above include derivative assets in a designated hedge accounting relationship of $1.3 billion as at October 31, 2017, down from $2.4 billion as at October 31, 2016, and derivative liabilities of $1.5 billion as at October 31, 2017, down from $1.8 billion last year. These derivative assets and liabilities are included in our SIRR measure and other internal non-trading market risk measures. We use interest rate swaps to manage our AFS securities and structural interest rate risk. To the extent these swaps are considered effective, changes in their fair value are recognized in other comprehensive income. The interest rate risk for the swaps designated as cash flow hedges, measured as the change in the fair value of the derivatives for a one basis point parallel increase in yields, was $7.7 million as of October 31, 2017 compared to $5.2 million as of October 31, 2016.

Interest rate swaps are also used to hedge changes in the fair value of certain fixed-rate instruments. Changes in fair value of the hedged instruments that are related to interest rate movements and the corresponding interest rate swaps are reflected in the consolidated statement of income.

We also use foreign exchange derivatives to manage our exposure to equity investments in subsidiaries that are denominated in foreign currencies, particularly the U.S. dollar, British pound, and Euro. Changes in the fair value of these hedges and the cumulative translation adjustment related to our structural foreign exchange risk are reported in other comprehensive income.

Other non-trading derivatives
Derivatives, including interest rate swaps and foreign exchange derivatives, that are not in designated hedge accounting relationships are used to manage other non-trading exposures. Changes in the fair value of these derivatives are reflected in the consolidated statement of income. Derivative assets of $1.9 billion as at October 31, 2017 were down from $2.7 billion as at October 31, 2016, and derivative liabilities of $1.7 billion as at October 31, 2017 were down from $2.3 billion last year.

Non-trading foreign exchange rate risk
Foreign exchange rate risk is the potential adverse impact on earnings and economic value due to changes in foreign currency rates. Our revenue, expenses and income denominated in currencies other than the Canadian dollar are subject to fluctuations as a result of changes in the value of the average Canadian dollar relative to the average value of those currencies. Our most significant exposure is to the U.S. dollar, due to our operations in the U.S. and other activities conducted in U.S. dollars. Other significant exposures are to the British pound and the Euro, due to our activities conducted internationally in these currencies. A strengthening or weakening of the Canadian dollar compared to the U.S. dollar, British pound and the Euro could reduce or increase, as applicable, the translated value of our foreign currency denominated revenue, expenses and earnings and could have a significant effect on the results of our operations. We are also exposed to foreign exchange rate risk arising from our investments in foreign operations. For unhedged equity investments, when the Canadian dollar appreciates against other currencies, the unrealized translation losses on net foreign investments decreases our shareholders' equity through the other components of equity and decreases the translated value of the Risk-weighted Assets (RWA) of the foreign currency-denominated asset. The reverse is true when the Canadian dollar depreciates against other currencies. Consequently, we consider these impacts in selecting an appropriate level of our investments in foreign operations to be hedged.

Our overall trading and non-trading market risk objectives, policies and methodologies have not changed significantly from 2016.

Linkage of market risk to selected balance sheet items
The following table provides the linkages between selected balance sheet items with positions included in our trading market risk and non-trading market risk disclosures, which illustrates how we manage market risk for our assets and liabilities through different risk measures:

Linkage of market risk to selected balance sheet items **Table 59**

	As at October 31, 2017			
		Market risk measure		
(Millions of Canadian dollars)	Balance sheet amount	Traded risk (1)	Non-traded risk (2)	Non-traded risk primary risk sensitivity
Assets subject to market risk				
Cash and due from banks (3)	$ 28,407	$ -	$ 28,407	Interest rate
Interest-bearing deposits with banks (4)	32,662	20,792	11,870	Interest rate
Securities				
Trading (5)	127,657	119,815	7,842	Interest rate, credit spread
Available-for-sale (6)	90,722	-	90,722	Interest rate, credit spread, equity
Assets purchased under reverse repurchase agreements and securities borrowed (7)	220,977	141,532	79,445	Interest rate
Loans				
Retail (8)	385,170	7,638	377,532	Interest rate
Wholesale (9)	159,606	4,217	155,389	Interest rate
Allowance for loan losses	(2,159)	-	(2,159)	Interest rate
Segregated fund net assets (10)	1,216	-	1,216	Interest rate
Derivatives	95,023	91,791	3,232	Interest rate, foreign exchange
Other assets (11)	68,545	2,006	66,539	Interest rate
Assets not subject to market risk (12)	5,027			
Total assets	$ 1,212,853	$ 387,791	$ 820,035	
Liabilities subject to market risk				
Deposits (13)	$ 789,635	$ 78,194	$ 711,441	Interest rate
Segregated fund liabilities (14)	1,216	-	1,216	Interest rate

Other				
Obligations related to securities sold short	**30,008**	**30,008**	**-**	
Obligations related to assets sold under repurchase agreements and securities loaned (15)	**143,084**	**136,371**	**6,713**	**Interest rate**
Derivatives	**92,127**	**88,919**	**3,208**	**Interest rate, foreign exchange**
Other liabilities (16)	**65,565**	**4,275**	**61,290**	**Interest rate**
Subordinated debentures	**9,265**	**-**	**9,265**	**Interest rate**
Liabilities not subject to market risk (17)	**7,525**			
Total liabilities	**$ 1,138,425**	**$ 337,767**	**$793,133**	
Total equity	**$ 74,428**			
Total liabilities and equity	**$ 1,212,853**			

(1) Traded risk includes positions that are classified or designated as FVTPL and positions whose revaluation gains and losses are reported in revenue. Market risk measures of VaR and SVaR and stress testing are used as risk controls for traded risk.
(2) Non-traded risk includes positions used in the management of the SIRR and other non-trading portfolios. Other material non-trading portfolios include positions from RBC Insurance and AFS securities not included in SIRR.

The following footnotes provide additional information on the Non-traded risk amounts:

(3) Cash and due from banks includes $15,895 million included in SIRR. An additional $12,512 million is included in other risk controls.
(4) Interest-bearing deposits with banks of $11,870 million are included in SIRR.
(5) Trading securities include $7,706 million in securities for asset/liability management of RBC Insurance. An additional $136 million is included in other risk controls.
(6) Includes AFS securities of $75,877 million and held-to-maturity securities of $14,845 million. $51,269 million of the total securities are included in SIRR. An additional $1,946 million are held by RBC Insurance. The remaining $37,507 million are captured in other internal non-trading market risk reporting.
(7) Assets purchased under reverse repurchase agreements include $32,541 million reflected in SIRR. An additional $46,904 million is included in other risk controls.
(8) Retail loans include $366,928 million reflected in SIRR and $241 million is used for asset/liability management of RBC Insurance. An additional $10,363 million is included in other risk controls.
(9) Wholesale loans include $153,829 million reflected in SIRR. An additional $1,560 million is used for asset/liability management of RBC Insurance.
(10) Investments for the account of segregated fund holders are included in RBC Insurance risk measures.
(11) Other assets include $37,999 million reflected in SIRR and $2,428 million is used for asset/liability management of RBC Insurance. An additional $26,112 million is included in other risk controls.
(12) Assets not subject to market risk include $5,027 million of physical and other assets.
(13) Deposits include $650,841 million reflected in SIRR. The remaining $60,600 million are captured in other internal non-trading market risk reporting.
(14) Insurance and investment contracts for the account of segregated fund holders are included in RBC Insurance risk measures.
(15) Obligations related to assets sold under repurchase agreements and securities loaned include $6,713 million included in other risk controls.
(16) Other liabilities include $36,019 million reflected in SIRR and $10,318 million of RBC Insurance liabilities. An additional $14,953 million is included in other risk controls.
(17) Liabilities not subject to market risk include $7,525 million of payroll related and other liabilities.

	As at October 31, 2016 (1)			
		Market risk measure		
(Millions of Canadian dollars)	Balance sheet amount	Traded risk (2)	Non-traded risk (3)	Non-traded risk primary risk sensitivity

(Millions of Canadian dollars)	As at October 31, 2016 (1) Balance sheet amount	Market risk measure Traded risk (2)	Market risk measure Non-traded risk (3)	Non-traded risk primary risk sensitivity
Assets subject to market risk				
Cash and due from banks (4)	$ 14,929	$ -	$ 14,929	Interest rate
Interest-bearing deposits with banks (5)	27,851	16,058	11,793	Interest rate
Securities				
Trading (6)	151,292	144,001	7,291	Interest rate, credit spread
Available-for-sale (7)	84,801	-	84,801	Interest rate, credit spread, equity
Assets purchased under reverse repurchase agreements and securities borrowed (8)	186,302	121,692	64,610	Interest rate
Loans				
Retail (9)	369,470	9,081	360,389	Interest rate
Wholesale (10)	154,369	2,341	152,028	Interest rate
Allowance for loan losses	(2,235)	-	(2,235)	Interest rate
Segregated fund net assets (11)	981	-	981	Interest rate
Derivatives	118,944	113,862	5,082	Interest rate, foreign exchange
Other assets (12)	68,363	1,440	66,923	Interest rate
Assets not subject to market risk (13)	5,191			
Total assets	$ 1,180,258	$ 408,475	$766,592	
Liabilities subject to market risk				
Deposits (14)	$ 757,589	$ 81,986	$675,603	Interest rate
Segregated fund liabilities (15)	981	-	981	Interest rate
Other				
Obligations related to securities sold short	50,369	50,369	-	
Obligations related to assets sold under repurchase agreements and securities loaned (16)	103,441	88,863	14,578	Interest rate
Derivatives	116,550	112,500	4,050	Interest rate, foreign exchange
Other liabilities (17)	62,625	5,439	57,186	Interest rate
Subordinated debentures	9,762	-	9,762	Interest rate
Liabilities not subject to market risk (18)	7,329			
Total liabilities	$ 1,108,646	$ 339,157	$762,160	

(Millions of Canadian dollars)	As at October 31, 2016 (1) Balance sheet amount	Market risk measure Traded risk (2)	Market risk measure Non-traded risk (3)	Non-traded risk primary risk sensitivity
Total equity	$ 71,612			
Total liabilities and equity	$ 1,180,258			

(1) Amounts have been revised from those previously presented.
(2) Traded risk includes positions that are classified or designated as FVTPL and positions whose revaluation gains and losses are reported in revenue. Market risk measures of VaR and SVaR and stress testing are used as risk controls for traded risk.
(3) Non-traded risk includes positions used in the management of the SIRR and other non-trading portfolios. Other material non-trading portfolios include positions from RBC Insurance and AFS securities not included in SIRR.

The following footnotes provide additional information on the Non-traded risk amounts:

(4) Cash and due from banks includes $12,644 million included in SIRR. An additional $2,285 million is included in other risk controls.
(5) Interest-bearing deposits with banks of $11,793 million are included in SIRR.
(6) Trading securities include $7,171 million in securities for asset/liability management of RBC Insurance. An additional $120 million is included in other risk controls.
(7) Includes AFS securities of $69,922 million and held-to-maturity securities of $14,879 million. $51,239 million of the total securities are included in SIRR. An additional $1,901 million are held by RBC Insurance. The remaining $31,661 million are captured in other internal non-trading market risk reporting.
(8) Assets purchased under reverse repurchase agreements include $24,838 million reflected in SIRR. An additional $39,772 million is included in other risk controls.
(9) Retail loans include $350,019 million reflected in SIRR and $251 million is used for asset/liability management of RBC Insurance. An additional $10,119 million is included in other risk controls.
(10) Wholesale loans include $150,619 million reflected in SIRR. An additional $1,409 million is used for asset/liability management of RBC Insurance.
(11) Investments for the account of segregated fund holders are included in RBC Insurance risk measures.
(12) Other assets include $39,272 million reflected in SIRR and $2,463 million is used for asset/liability management of RBC Insurance. An additional $25,188 million is included in other risk controls.
(13) Assets not subject to market risk include $5,191 million of physical and other assets.
(14) Deposits include $644,812 million reflected in SIRR. The remaining $30,791 million are captured in other internal non-trading market risk reporting.
(15) Insurance and investment contracts for the account of segregated fund holders are included in RBC Insurance risk measures.
(16) Obligations related to assets sold under repurchase agreements and securities loaned include $14,578 million included in other risk controls.
(17) Other liabilities include $35,526 million reflected in SIRR and $9,900 million of RBC Insurance liabilities. An additional $11,760 million is included in other risk controls.
(18) Liabilities not subject to market risk include $7,329 million of payroll related and other liabilities.

Liquidity and funding risk

Liquidity and funding risk (liquidity risk) is the risk that we may be unable to generate sufficient cash or its equivalents in a timely and cost-effective manner to meet our commitments as they come due. Liquidity risk arises from mismatches in the timing and value of on-balance sheet and off-balance sheet cash flows.

Our liquidity profile is structured to ensure that we have sufficient liquidity to satisfy current and prospective commitments in both normal and stressed business and liquidity environments. To achieve these goals, we operate under a comprehensive Liquidity Risk Management Framework (LRMF) and Pledging Policy. We also employ several liquidity risk mitigation strategies that include:

- An appropriate balance between the level of exposure allowed under our risk appetite and the cost of risk mitigation;
- Broad funding access, including preserving and promoting a reliable base of core client deposits and ongoing access to diversified sources of wholesale funding;
- A comprehensive liquidity stress testing program, contingency, recovery and resolution planning and status monitoring to ensure sufficiency of unencumbered marketable securities and demonstrated capacities to monetize specific asset classes;
- Governance of pledging activity through limits and liquid asset buffers for potential pledging activity;
- Timely and granular risk measurement information;
- Transparent liquidity transfer pricing and cost allocation; and
- A rigorous first and second line of defense governance model.

Risk control

Our liquidity risk objectives, policies and methodologies are reviewed regularly, and updated to reflect changing market conditions and business mix, to align with local regulatory developments and to position ourselves for the phase-in of Basel III regulatory liquidity standards. We continue to maintain liquidity and funding that is appropriate for the execution of our strategy. Liquidity risk remains well within our risk appetite.

The Board of Directors annually approves the delegation of liquidity risk authorities to senior management. The Risk Committee of the Board annually approves the LRMF and the Pledging Policy and is responsible for their oversight. The Board of Directors, the Risk Committee of the Board, the GRC and the ALCO regularly review reporting on our enterprise-wide liquidity position and status. The GRC, the Policy Review Committee (PRC) and/or the ALCO also review liquidity documents prepared for the Board of Directors or its committees.

- The PRC annually approves the Liquidity Risk Policy (LRP), which establishes minimum risk control elements in accordance with the Board-approved risk appetite and the LRMF.
- The ALCO annually approves the Liquidity Contingency Plan (LCP) and provides strategic direction and oversight to Corporate Treasury, other functions, and business segments on the management of liquidity.

These policies are supported by operational, desk and product-level policies that implement risk control elements, such as parameters, methodologies, management limits and authorities that govern the measurement and management of liquidity. Stress testing is also employed to assess the robustness of the control framework and inform liquidity contingency plans.

Risk measurement

Liquidity risk is measured by applying scenario-based assumptions against our assets and liabilities and off-balance sheet commitments to derive expected cash flow profiles over varying time horizons. For instance, government bonds can be quickly and reliably monetized without significant loss of value to generate cash inflow prior to their contractual maturity, and similarly, relationship demand deposits can be deemed as having little risk of short-term cash outflow, although depositors have the contractual right to redeem on demand. Risk methodologies and underlying assumptions are periodically reviewed and validated to ensure alignment with our operating environment, expected economic and market conditions, rating agency preferences, regulatory requirements and accepted practices.

To manage liquidity risk within our liquidity risk appetite, we set limits on various metrics reflecting a range of time horizons and severity of stress conditions and develop contingency, recovery and resolution plans. Our liquidity risk measurement and control activities are divided into three categories as follows:

Structural (longer-term) liquidity risk
To guide our secured and unsecured wholesale term funding activities, we employ an internal metric to focus on the structural alignment between long-term illiquid assets and longer-term funding sourced from wholesale investors and core relationship deposits.

Tactical (shorter-term) liquidity risk
To address more immediate cash flow risks we may experience in times of stress, we use short-term net cash flow limits, in conjunction with stress testing, to contain risk within the risk appetite at branch, subsidiary and currency levels. Net cash flow positions are derived from the application of internally generated risk assumptions and parameters to known and anticipated cash flows for all material unencumbered assets, liabilities and off-balance sheet activities. Encumbered assets are not considered a source of available liquidity. We also control tactical liquidity by adhering to enterprise-wide and unit-specific prescribed regulatory standards, such as LCR.

Contingency liquidity risk
Contingency liquidity risk planning assesses the impact of and our intended responses to sudden stressful events. Our LCP, maintained and administered by Corporate Treasury, guides our actions and responses to liquidity crises. This plan establishes a Liquidity Crisis Team, led by Corporate Treasury, and consisting of senior representatives with relevant subject matter expertise from key business segments, Group Risk Management, Finance, and Operations. This team contributes to the development of stress tests and funding plans and meets regularly to assess our liquidity status, conduct stress tests and review liquidity contingency preparedness.

Our stress tests, which include elements of scenario and sensitivity analyses, measure our prospective exposure to global, country-specific and RBC-specific events over a period of several weeks. Different levels of severity are considered for each type of crisis with some scenarios reflecting multiple notch downgrades to our credit ratings.

The contingency liquidity risk planning process identifies contingent funding needs (e.g., draws on committed credit and liquidity lines, demands for more collateral and deposit run-off) and sources (e.g., contingent liquid asset sales and incremental wholesale funding capacity) under various stress scenarios, and as a result, informs requirements for our earmarked contingent unencumbered liquid asset pools.

Our contingent liquid asset pools consist of diversified, highly rated and liquid marketable securities, overnight government reverse repos, and deposits with central banks. These portfolios are subject to minimum asset quality levels and, as appropriate, other strict eligibility guidelines (e.g., maturity, diversification and eligibility for central bank advances) to maximize ready access to cash in emergencies. These securities, when added to other unencumbered liquid assets that we hold as a result of capital markets or other activities, combine to populate our liquidity reserve and asset encumbrance disclosures provided below.

Liquidity reserve and asset encumbrance
The following tables provide summaries of our liquidity reserve and asset encumbrance. In both tables, unencumbered assets represent, for the most part, a ready source of funding that can be accessed quickly. For the purpose of constructing the following tables, encumbered assets include: (i) bank-owned liquid assets that are either pledged as collateral (e.g., repo financing and derivative pledging) or not freely available due to regulatory or internal policy requirements (e.g., earmarked to satisfy mandatory reserve or local capital adequacy requirements and to maintain continuous access to payment and settlement systems); (ii) securities received as collateral from securities financing and derivative transactions which have either been re-hypothecated where permissible (e.g., to obtain financing through repos or to cover securities sold short) or have no liquidity value since re-hypothecation is prohibited; and (iii) illiquid assets that have been securitized and sold into the market or that have been pledged as collateral in support of structured term funding vehicles. As per our liquidity management framework and practice, we do not include encumbered assets as a source of available liquidity in measuring liquidity risk. Unencumbered assets are the difference between total and encumbered assets from both on- and off-balance sheet sources.

Liquidity reserve
In the liquidity reserve table, available liquid assets consist of on-balance sheet cash and securities holdings, as well as securities received as collateral from securities financing (reverse repos and off-balance sheet collateral swaps) and derivative transactions, and constitute the preferred source for quickly accessing liquidity. The other component of our liquidity reserve consists primarily of uncommitted and undrawn central bank credit facilities that could be accessed under exceptional circumstances, provided certain pre-conditions could be met and where advances could be supported by eligible assets (e.g., certain unencumbered loans) not included in the liquid assets category.

The liquidity reserve is mainly affected by routine flows of client banking activity where liquid asset portfolios adjust to the change in cash balances, and additionally from capital markets activities where business strategies and client flows may also affect the addition or subtraction of liquid assets in the overall calculation of the liquidity reserve. Corporate Treasury also affects liquidity reserves through the management of funding issuances where reserves absorb timing mismatches between debt issuances and deployment into business activities.

Liquidity reserve **Table 60**

	As at October 31, 2017				
(Millions of Canadian dollars)	**Bank-owned liquid assets (1)**	**Securities received as collateral from securities financing and derivative transactions**	**Total liquid assets**	**Encumbered liquid assets**	**Unencumbered liquid assets**
Cash and holding at central banks	**$ 46,581**	**$ -**	**$ 46,581**	**$ 2,045**	**$ 44,536**
Deposits in other banks available overnight	**4,004**	**-**	**4,004**	**203**	**3,801**
Securities issued or guaranteed by sovereigns, central banks or multilateral development banks (2)	**303,003**	**27,534**	**330,537**	**187,465**	**143,072**
Other securities	**142,272**	**44,487**	**186,759**	**77,696**	**109,063**
Liquidity assets eligible at central banks (not included above) (3)	**436**	**-**	**436**	**-**	**436**
Undrawn credit lines granted by central banks (4)	**12,007**	**-**	**12,007**	**-**	**12,007**
Other assets eligible as collateral for discount (5)	**94,207**	**-**	**94,207**	**-**	**94,207**
Other liquid assets (6)	**19,520**	**-**	**19,520**	**19,520**	**-**
Total liquid assets	**$ 622,030**	**$ 72,021**	**$ 694,051**	**$ 286,929**	**$ 407,122**

	As at October 31, 2016				
(Millions of Canadian dollars)	Bank-owned liquid assets (1)	Securities received as collateral from securities financing and derivative transactions	Total liquid assets	Encumbered liquid assets	Unencumbered liquid assets
Cash and holding at central banks	$ 31,771	$ -	$ 31,771	$ 1,781	$ 29,990
Deposits in other banks available overnight	1,679	-	1,679	262	1,417
Securities issued or guaranteed by sovereigns, central banks or multilateral development banks (2), (3)	281,313	28,564	309,877	154,105	155,772
Other securities	146,269	34,386	180,655	72,765	107,890

	As at October 31, 2016				
(Millions of Canadian dollars)	Bank-owned liquid assets (1)	Securities received as collateral from securities financing and derivative transactions	Total liquid assets	Encumbered liquid assets	Unencumbered liquid assets
Liquidity assets eligible at central banks (not included above) (4)	600	-	600	-	600
Undrawn credit lines granted by central banks (5)	13,558	-	13,558	-	13,558
Other assets eligible as collateral for discount (6)	141,888	-	141,888	-	141,888
Other liquid assets (7)	23,307	-	23,307	23,307	-
Total liquid assets	640,385	$ 62,950	$ 703,335	$ 252,220	$ 451,115

(Millions of Canadian dollars)	As at **October 31 2017**	 October 31 2016
Royal Bank of Canada	**$ 204,999**	$ 264,522
Foreign branches	**63,283**	53,006
Subsidiaries	**138,840**	133,587
Total unencumbered liquid assets	**$ 407,122**	$ 451,115

(1) The Bank-owned liquid assets amount includes securities owned outright by the Bank as well as collateral received through reverse repurchase transactions.
(2) Includes liquid securities issued by provincial governments and U.S. government-sponsored entities working under U.S. Federal government's conservatorship (e.g., Federal National Mortgage Association and Federal Home Loan Mortgage Corporation).
(3) Amounts have been revised from those previously presented.
(4) Includes Auction Rate Securities.
(5) Includes loans that qualify as eligible collateral for the discount window facility available to us at the Federal Reserve Bank of New York (Federal Reserve Bank). Amounts are face value and would be subject to collateral margin requirements applied by the Federal Reserve Bank to determine collateral value/borrowing capacity. Access to the discount window borrowing program is conditional on meeting requirements set by the Federal Reserve Bank and borrowings are typically expected to be infrequent and due to uncommon occurrences requiring temporary accommodation.
(6) Represents our unencumbered Canadian dollar non-mortgage loan book (at face value) that could, subject to satisfying conditions precedent to borrowing and application of prescribed collateral margin requirements, be pledged to the Bank of Canada for advances under its Emergency Lending Assistance (ELA) program. ELA and other central bank facilities are not considered sources of available liquidity in our normal liquidity risk profile but could in extraordinary circumstances, where normal market liquidity is seriously impaired, allow us and other banks to monetize assets eligible as central bank collateral to meet requirements and mitigate further market liquidity disruption.
(7) Represents pledges related to OTC and exchange-traded derivative transactions.

2017 vs. 2016

Total liquid assets decreased $23.6 billion or 3%, primarily due to a reduction in non-mortgage loans that qualify to be pledged under the ELA program due to the change of the eligibility criteria by the BoC. This decline was partially offset by higher balances of cash and holdings at central banks.

Asset encumbrance

The table below provides a summary of cash, securities and other assets, distinguishing between those that are encumbered assets and those available for sale or use as collateral in secured funding transactions. Other assets, such as mortgages and credit card receivables can also be monetized, although over a longer timeframe than that required for marketable securities. As at October 31, 2017, our Unencumbered assets available as collateral comprised 33% of our total assets (October 31, 2016 - 38%).

Asset encumbrance **Table 61**

	As at									
	October 31 2017					October 31 2016				
	Encumbered		**Unencumbered**			Encumbered		Unencumbered		
(Millions of Canadian dollars)	**Pledged as collateral**	**Other** (1)	**Available as collateral** (2)	**Other** (3)	**Total**	Pledged as collateral	Other (1)	Available as collateral (2)	Other (3)	Total
Cash and due from banks	**$ 6**	**$ 2,039**	**$ 26,362**	**$ -**	**$ 28,407**	$ -	$ 1,781	$ 13,148	$ -	$ 14,929
Interest-bearing deposits with banks	**-**	**204**	**32,458**	**-**	**32,662**	-	262	27,589	-	27,851
Securities										
Trading	**51,344**	**-**	**74,922**	**1,391**	**127,657**	66,734	-	83,219	1,339	151,292
Available-for-sale	**3,184**	**-**	**86,442**	**1,096**	**90,722**	2,858	-	78,966	2,977	84,801
Assets purchased under reverse repurchase agreements and securities borrowed (4), (5)	**222,128**	**23,131**	**74,950**	**-**	**320,209**	166,449	20,450	82,749	-	269,648
Loans										
Retail										
Mortgage securities	**35,861**	**-**	**32,589**	**-**	**68,450**	34,624	-	35,591	-	70,215
Mortgage loans	**38,504**	**-**	**14,737**	**148,657**	**201,898**	40,293	-	12,796	131,694	184,783
Non-mortgage loans	**8,776**	**-**	**65,449**	**40,597**	**114,822**	10,422	-	100,612	3,438	114,472
Wholesale	**3,713**	**-**	**27,637**	**128,256**	**159,606**	3,477	-	41,445	109,447	154,369
Allowance for loan losses	**-**	**-**	**-**	**(2,159)**	**(2,159)**	-	-	-	(2,235)	(2,235)

	As at									
	October 31 2017					October 31 2016				
	Encumbered		**Unencumbered**			Encumbered		Unencumbered		
(Millions of Canadian dollars)	**Pledged as collateral**	**Other** (1)	**Available as collateral** (2)	**Other** (3)	**Total**	Pledged as collateral	Other (1)	Available as collateral (2)	Other (3)	Total
Segregated fund net assets	**-**	**-**	**-**	**1,216**	**1,216**	-	-	-	981	981
Other - Derivatives	**-**	**-**	**-**	**95,023**	**95,023**	-	-	-	118,944	118,944
- Others (6)	**19,520**	**-**	**-**	**54,052**	**73,572**	23,307	-	-	50,247	73,554
Total assets	**$ 383,036**	**$ 25,374**	**$ 435,546**	**$ 468,129**	**$ 1,312,085**	$ 348,164	$ 22,493	$ 476,115	$ 416,832	$ 1,263,604

(1) Includes assets restricted from use to generate secured funding due to legal or other constraints.
(2) Includes loans that could be used to collateralize central bank advances. Our unencumbered Canadian dollar non-mortgage loan book (at face value) could, subject to satisfying conditions for borrowing and application of prescribed collateral margin requirements, be pledged to the Bank of Canada for advances under its ELA program. We also lodge loans that qualify as eligible collateral for the discount window facility available to us at the Federal Reserve Bank of New York. ELA and other central bank facilities are not considered sources of available liquidity in our normal liquidity risk profile. However, banks could monetize assets meeting central bank collateral criteria during periods of extraordinary and severe disruption to market-wide liquidity.
(3) Other unencumbered assets are not subject to any restrictions on their use to secure funding or as collateral but would not be considered readily available since they may not be acceptable at central banks or for other lending programs.
(4) Includes bank-owned liquid assets and securities received as collateral from off-balance sheet securities financing, margin lending, and derivative transactions. Includes $21.7 billion (2016: $19.5 billion) of collateral received through reverse repurchase transactions that cannot be rehypothecated in its current legal form.
(5) Amounts have been revised from those previously presented.
(6) The Pledged as collateral amounts relate to OTC and exchange-traded derivative transactions.

Funding

Funding strategy
Core funding, comprising capital, longer-term wholesale liabilities and a diversified pool of personal and, to a lesser extent, commercial and institutional deposits, is the foundation of our structural liquidity position.

Deposit and funding profile
As at October 31, 2017, relationship-based deposits, which are the primary source of funding for retail loans and mortgages, were $525 billion or 54% of our total funding (October 31, 2016 - $506 billion or 55%). The remaining portion is comprised of short- and long-term wholesale funding.

Funding for highly liquid assets consists primarily of short-term wholesale funding that reflects the monetization period of those assets. Long-term wholesale funding is used mostly to fund less liquid wholesale assets and to support liquidity asset buffers.

For further details on our wholesale funding, refer to the Composition of wholesale funding tables below.

Long-term debt issuance
During 2017, we continued to experience more favourable unsecured wholesale funding access and pricing compared to many of our global peers. We also continued to expand our unsecured long-term funding base by selectively issuing, either directly or through our subsidiaries, $22.3 billion of term funding in various currencies and markets. Total unsecured long-term funding outstanding decreased $2.7 billion from the prior year due to maturities.

We primarily use residential mortgage and credit card securitization programs as alternative sources of funding and for liquidity and asset/liability management purposes. Our total secured long-term funding includes outstanding mortgage-backed securities (MBS) sold, covered bonds that are collateralized with residential mortgages, and securities backed by credit card receivables.

Compared to 2016, our outstanding MBS sold decreased $271 million. Our covered bonds and securitized credit card receivables decreased $2.7 billion and $2.3 billion, respectively.

For further details, refer to the Off-balance sheet arrangements section.

Long-term funding sources* **Table 62**

	As at	
(Millions of Canadian dollars)	**October 31 2017**	October 31 2016
Unsecured long-term funding	**$ 96,112**	$ 98,827
Secured long-term funding	**64,758**	69,971
Commercial mortgage-backed securities sold	**1,366**	1,297
Subordinated debentures	**9,362**	9,597
	$ 171,598	$ 179,692

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

Our wholesale funding activities are well-diversified by geography, investor segment, instrument, currency, structure and maturity. We maintain an ongoing presence in different funding markets, which allows us to continuously monitor market developments and trends, identify opportunities and risks, and take appropriate and timely actions. We operate longer-term debt issuance registered programs. The following table summarizes these programs with their authorized limits by geography.

Programs by geography **Table 63**

Canada	U.S.	Europe/Asia
• Canadian Shelf Program - $25 billion	• SEC Shelf Program - US$40 billion • SEC Registered Covered Bond Program - US$15 billion (1)	• European Debt Issuance Program - US$40 billion • Global Covered Bond Program - €32 billion • Japanese Issuance Programs - ¥1 trillion

(1) Subject to the €32 billion Global Covered Bond Program limit. Upon the enactment of U.S. SEC Regulation AB II on November 23, 2016, we are not currently able to issue new series of SEC-registered covered bonds under the existing program.

We also raise long-term funding using Canadian Deposit Notes, Canadian NHA MBS, Canada Mortgage Bonds, credit card receivable-backed securities, Kangaroo Bonds (issued in the Australian domestic market by foreign firms) and Yankee Certificates of Deposit (issued in the U.S. domestic market by foreign firms). We continuously evaluate opportunities to expand into new markets and untapped investor segments since diversification expands our wholesale funding flexibility, minimizes funding concentration and dependency, and generally reduces financing costs. As presented in the following charts, our current long-term debt profile is well-diversified by both currency and product. Maintaining competitive credit ratings is also critical to cost-effective funding.

Please see the PDF to view this chart

(1) Based on original term to maturity greater than 1 year

Please see the PDF to view this chart

(1) Based on original term to maturity greater than 1 year
(2) Mortgage-backed securities and Canada Mortgage Bonds

The following table provides our composition of wholesale funding based on remaining term to maturity:

Composition of wholesale funding (1) **Table 64**

	As at October 31, 2017							
(Millions of Canadian dollars)	**Less than 1 month**	**1 to 3 months**	**3 to 6 months**	**6 to 12 months**	**Less than 1 year sub-total**	**1 year to 2 years**	**2 years and greater**	**Total**
Deposits from banks (2)	**$ 5,054**	**$ 39**	**$ 47**	**$ 13**	**$ 5,153**	**$ -**	**$ -**	**$ 5,153**
Certificates of deposit and commercial paper	**1,092**	**8,801**	**14,194**	**13,501**	**37,588**	**1,549**	**39**	**39,176**
Asset-backed commercial paper (3)	**997**	**1,385**	**4,300**	**5,555**	**12,237**	**-**	**-**	**12,237**
Senior unsecured medium-term notes (4)	**-**	**2,625**	**3,402**	**16,691**	**22,718**	**17,311**	**38,695**	**78,724**
Senior unsecured structured notes (5)	**188**	**192**	**980**	**1,545**	**2,905**	**1,332**	**6,270**	**10,507**
Mortgage securitization	**-**	**571**	**1,310**	**1,549**	**3,430**	**4,094**	**12,650**	**20,174**
Covered bonds/asset-backed securities (6)	**-**	**2,685**	**1,777**	**6,179**	**10,641**	**10,017**	**23,925**	**44,583**
Subordinated liabilities	**-**	**-**	**-**	**-**	**-**	**1,106**	**8,256**	**9,362**
Other (7)	**4,669**	**2,005**	**173**	**1,488**	**8,335**	**5**	**5,344**	**13,684**
Total	**$ 12,000**	**$ 18,303**	**$ 26,183**	**$ 46,521**	**$ 103,007**	**$ 35,414**	**$ 95,179**	**$ 233,600**
Of which:								
- Secured	**$ 5,265**	**$ 5,541**	**$ 7,388**	**$ 13,283**	**$ 31,477**	**$ 14,111**	**$ 36,575**	**$ 82,163**
- Unsecured	**6,735**	**12,762**	**18,795**	**33,238**	**71,530**	**21,303**	**58,604**	**151,437**

	As at October 31, 2016							
(Millions of Canadian dollars)	Less than 1 month	1 to 3 months	3 to 6 months	6 to 12 months	Less than 1 year sub-total	1 year to 2 years	2 years and greater	Total
Deposits from banks (2)	$ 1,375	$ 80	$ 30	$ 38	$ 1,523	$ -	$ -	$ 1,523
Certificates of deposit and commercial paper	3,072	8,950	10,692	5,199	27,913	1,220	54	29,187
Asset-backed commercial paper (3)	1,503	1,600	3,551	2,923	9,577	-	-	9,577
Senior unsecured medium-term notes (4)	1,135	9,140	7,582	7,282	25,139	18,156	43,073	86,368
Senior unsecured structured notes (5)	141	305	213	554	1,213	1,871	6,493	9,577
Mortgage securitization	-	686	514	1,435	2,635	3,432	14,378	20,445
Covered bonds/asset-backed securities (6)	-	1,674	626	5,834	8,134	10,700	30,692	49,526
Subordinated liabilities	-	-	-	128	128	-	9,469	9,597
Other (7)	1,173	2,053	43	738	4,007	13	5,073	9,093
Total	$ 8,399	$24,488	$23,251	$24,131	$ 80,269	$ 35,392	$109,232	$224,893
Of which:								
- Secured	$ 2,502	$ 5,528	$ 4,691	$10,192	$ 22,913	$ 14,132	$ 45,071	$ 82,116
- Unsecured	5,897	18,960	18,560	13,939	57,356	21,260	64,161	142,777

(1) Excludes bankers' acceptances and repos.
(2) Only includes deposits raised by treasury. Excludes deposits associated with services we provide to these banks (e.g., custody, cash management).
(3) Only includes consolidated liabilities, including our collateralized commercial paper program.
(4) Includes deposit notes.
(5) Includes notes where the payout is tied to movements in foreign exchange, commodities and equities.
(6) Includes credit card, auto and mortgage loans.
(7) Includes tender option bonds (secured) of $5,168 million (October 31, 2016 - $2,567 million), bearer deposit notes (unsecured) of $3,342 million (October 31, 2016 - $1,652 million) and other long-term structured deposits (unsecured) of $5,176 million (October 31, 2016 - $4,874 million).

Credit ratings

Our ability to access unsecured funding markets and to engage in certain collateralized business activities on a cost-effective basis are primarily dependent upon maintaining competitive credit ratings. Credit ratings and outlooks provided by rating agencies reflect their views and methodologies. Ratings are subject to change, based on a number of factors including, but not limited to, our financial strength, competitive position, liquidity and other factors not completely within our control.

The following table presents our major credit ratings[1]:

Credit ratings **Table 65**

As at November 28, 2017

	Short-term debt	Senior long-term debt	Outlook
Moody's (2)	**P-1**	**A1**	**negative**
Standard & Poor's (3)	**A-1+**	**AA-**	**negative**
Fitch Ratings (4)	**F1+**	**AA**	**stable**
DBRS (5)	**R-1(high)**	**AA**	**stable**

(1) Credit ratings are not recommendations to purchase, sell or hold a financial obligation inasmuch as they do not comment on market price or suitability for a particular investor. Ratings are determined by the rating agencies based on criteria established from time to time by them, and are subject to revision or withdrawal at any time by the rating organization.
(2) On May 10, 2017, Moody's lowered our senior long-term debt rating one notch, along with our large Canadian peers, due to Moody's change to Canada's macroeconomic profile. Moody's also affirmed our negative outlook.
(3) On June 6, 2016, S&P revised our outlook to negative from stable.
(4) On October 27, 2017, Fitch Ratings revised our outlook to stable from negative.
(5) On July 31, 2017, DBRS revised our outlook to stable from negative.

Additional contractual obligations for rating downgrades

We are required to deliver collateral to certain counterparties in the event of a downgrade to our current credit rating. The following table presents the additional collateral obligations required at the reporting date in the event of a one-, two- or three-notch downgrade to our credit ratings. These additional collateral obligations are incremental requirements for each successive downgrade and do not represent the cumulative impact of multiple downgrades. The amounts reported change periodically as a result of several factors, including the transfer of trading activity to centrally cleared financial market infrastructures and exchanges, the expiration of transactions with downgrade triggers, the imposition of internal limitations on new agreements to exclude downgrade triggers, as well as normal course mark-to-market of positions with collateralized counterparties moving from a negative to a positive position. There is no outstanding senior debt issued in the market that contains rating triggers that would lead to early prepayment of principal.

Additional contractual obligations for rating downgrades **Table 66**

	As at					
	October 31 2017			October 31 2016		
(Millions of Canadian dollars)	**One-notch downgrade**	**Two-notch downgrade**	**Three-notch downgrade**	One-notch downgrade	Two-notch downgrade	Three-notch downgrade
Contractual derivatives funding or margin requirements	**$ 61**	**$ 102**	**$ 307**	$ 487	$ 117	$ 501
Other contractual funding or margin requirements (1)	**231**	**100**	**-**	293	473	-

(1) Includes GICs issued by our municipal markets business out of New York.

Liquidity Coverage Ratio (LCR)
The LCR is a Basel III metric that measures the sufficiency of high-quality liquid assets (HQLA) available to meet liquidity needs over a 30-day period in an acute stress scenario. The Basel Committee on Banking Supervision (BCBS) and OSFI regulatory minimum coverage level for LCR is currently 100%.

OSFI requires Canadian banks to disclose the LCR using the standard Basel disclosure template and calculated using the average of daily LCR positions during the quarter.

Liquidity coverage ratio (1) **Table 67**

	For the three-months ended			
	October 31 2017		October 31 2016	
(Millions of Canadian dollars, except percentage amounts)	**Total unweighted value (average)** (2)	**Total weighted value (average)**	Total unweighted value (average) (2)	Total weighted value (average)
High-quality liquid assets				
Total high-quality liquid assets (HQLA)		**211,735**		207,541
Cash outflows				
Retail deposits and deposits from small business customers, of which:	**243,794**	**19,118**	224,518	17,372
Stable deposits (3)	**75,160**	**2,255**	72,570	2,177
Less stable deposits	**168,634**	**16,863**	151,948	15,195
Unsecured wholesale funding, of which:	**260,993**	**117,451**	234,455	99,877
Operational deposits (all counterparties) and deposits in networks of cooperative banks (4)	**106,980**	**25,775**	106,040	25,491
Non-operational deposits	**137,475**	**75,138**	113,719	59,690
Unsecured debt	**16,538**	**16,538**	14,696	14,696
Secured wholesale funding		**18,735**		26,069
Additional requirements, of which:	**229,048**	**74,047**	226,706	67,106
Outflows related to derivative exposures and other collateral requirements	**61,901**	**41,364**	59,910	34,299
Outflows related to loss of funding on debt products	**7,108**	**7,108**	5,364	5,364
Credit and liquidity facilities	**160,039**	**25,575**	161,432	27,443
Other contractual funding obligations (5)	**26,252**	**26,252**	30,951	30,951
Other contingent funding obligations (6)	**429,706**	**6,902**	448,854	6,814
Total cash outflows		**262,505**		248,189
Cash inflows				
Secured lending (e.g., reverse repos)	**138,867**	**28,062**	126,615	31,978
Inflows from fully performing exposures	**11,626**	**8,310**	10,559	7,042

Other cash inflows	**51,878**	**51,878**	45,207	45,207
Total cash inflows		**88,250**		84,227
		Total adjusted value		Total adjusted value
Total HQLA		**211,735**		207,541
Total net cash outflows		**174,255**		163,962
Liquidity coverage ratio		**122%**		127%

(1) The LCR is calculated in accordance with OSFI's LAR guideline, which, in turn, reflects liquidity-related requirements issued by the BCBS. Effective in the first quarter of 2017, OSFI requires Canadian banks to disclose the LCR based on the average of daily positions during the quarter. Previously, the disclosed LCR was based on the average month-end positions during the quarter. The LCR for the quarter ended October 31, 2017 is calculated as an average of 63 daily positions.

(2) With the exception of other contingent funding obligations, unweighted inflow and outflow amounts are items maturing or callable in 30 days or less. Other contingent funding obligations also include debt securities with remaining maturity greater than 30 days.

(3) As defined by the BCBS, stable deposits from retail and small business customers are deposits that are insured and are either held in transactional accounts or the bank has an established relationship with the client making the withdrawal unlikely.

(4) Operational deposits from non-retail and non-small and medium-sized enterprise customers are deposits which clients need to keep with the bank in order to facilitate their access and ability to use payment and settlement systems primarily for clearing, custody and cash management activities.

(5) Other contractual funding obligations primarily include outflows from unsettled securities trades and outflows from obligations related to securities sold short.

(6) Other contingent funding obligations include outflows related to other off-balance sheet facilities that carry low LCR runoff factors (0% - 5%).

We manage our LCR position within a target range that reflects our liquidity risk tolerance and takes into account business mix, asset composition and funding capabilities. The range is subject to periodic review in light of changes to internal requirements and external developments.

We maintain HQLAs in major currencies with dependable market depth and breadth. Our treasury management practices ensure that the levels of HQLA are actively managed to meet target LCR objectives. Our Level 1 assets, as calculated according to OSFI LAR and the BCBS LCR requirements, represent 82% of total HQLA. These assets consist of cash, placements with central banks and highly rated securities issued or guaranteed by governments, central banks and supranational entities.

LCR captures cash flows from on- and off-balance sheet activities that are either expected or could potentially occur within 30 days in an acute stress scenario. Cash outflows result from the application of withdrawal and non-renewal factors to demand and term deposits, differentiated by client type (wholesale, retail and small- and medium-sized enterprises). Cash outflows also arise from business activities that create contingent funding and collateral requirements, such as repo funding, derivatives, short sales of securities and the extension of credit and liquidity commitments to clients. Cash inflows arise primarily from maturing secured loans, interbank loans and non-HQLA securities.

LCR does not reflect any market funding capacity that we believe would be available in a stress situation. All maturing wholesale debt is assigned 100% outflow in the LCR calculation.

Q4 2017 vs. Q4 2016

The average LCR for the quarter ended October 31, 2017 of 122% was generally consistent with prior quarters and translates into a surplus of approximately $37 billion. Compared to the prior year, the average LCR decreased 5%, mainly due to expected balance sheet growth and optimization of surplus liquidity.

Contractual maturities of financial assets, financial liabilities and off-balance sheet items

The following tables provide remaining contractual maturity profiles of all our assets, liabilities, and off-balance sheet items at their carrying value (e.g., amortized cost or fair value) at the balance sheet date. Off-balance sheet items are allocated based on the expiry date of the contract.

Details of contractual maturities and commitments to extend funds are a source of information for the management of liquidity risk. Among other purposes, these details form a basis for modelling a behavioural balance sheet with effective maturities to calculate liquidity risk measures. For further details, refer to the Risk measurement section.

Contractual maturities of financial assets, financial liabilities and off-balance sheet items **Table 68**

(Millions of Canadian dollars)	As at October 31, 2017 Less than 1 month	1 to 3 months	3 to 6 months	6 to 9 months	9 to 12 months	1 year to 2 years	2 years to 5 years	5 years and greater	With no specific maturity	Total
Assets										
Cash and deposits with banks	**$ 58,675**	**$ 27**	**$ 22**	**$ 4**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 2,341**	**$ 61,069**
Securities										
Trading (1)	**88,083**	**9**	**72**	**3**	**12**	**91**	**61**	**6,374**	**32,952**	**127,657**
Available-for-sale	**1,748**	**4,690**	**4,145**	**2,552**	**1,545**	**9,608**	**24,445**	**40,772**	**1,217**	**90,722**
Assets purchased under reverse repurchase agreements and securities borrowed	**106,342**	**47,726**	**26,207**	**13,696**	**14,327**	**6,624**	**-**	**-**	**6,055**	**220,977**
Loans (net of allowance for loan losses)	**15,228**	**16,024**	**23,572**	**27,220**	**24,086**	**104,059**	**206,201**	**40,028**	**86,199**	**542,617**
Other										
Customers' liability under acceptances	**10,825**	**5,541**	**77**	**-**	**-**	**11**	**5**	**-**	**-**	**16,459**
Derivatives	**5,619**	**10,004**	**4,530**	**3,290**	**2,849**	**9,351**	**19,459**	**39,919**	**2**	**95,023**
Other financial assets	**24,577**	**767**	**523**	**90**	**88**	**183**	**184**	**1,697**	**1,243**	**29,352**
Total financial assets	**$311,097**	**$84,788**	**$59,148**	**$46,855**	**$42,907**	**$129,927**	**$250,355**	**$128,790**	**$130,009**	**$1,183,876**
Other non-financial assets	**1,820**	**1,204**	**92**	**337**	**229**	**745**	**1,814**	**986**	**21,750**	**28,977**
Total assets	**$312,917**	**$85,992**	**$59,240**	**$47,192**	**$43,136**	**$130,672**	**$252,169**	**$129,776**	**$151,759**	**$1,212,853**
Liabilities and equity										
Deposits (2)										
Unsecured borrowing	**$ 40,373**	**$24,425**	**$33,825**	**$35,891**	**$30,641**	**$ 34,737**	**$ 48,980**	**$ 14,709**	**$429,152**	**$ 692,733**
Secured borrowing	**1,156**	**3,989**	**6,289**	**5,799**	**4,064**	**10,178**	**20,495**	**7,659**	**-**	**59,629**
Covered bonds	**-**	**1,898**	**1,107**	**1,331**	**4,862**	**7,118**	**19,732**	**1,225**	**-**	**37,273**
Other										
					-					
Acceptances	**10,825**	**5,541**	**77**	**-**	**-**	**11**	**5**	**-**	**-**	**16,459**
Obligations related to securities sold short	**30,008**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**30,008**
Obligations related to assets sold under repurchase agreements and securities loaned	**98,409**	**32,026**	**4,374**	**-**	**93**	**-**	**12**	**-**	**8,170**	**143,084**
Derivatives	**5,765**	**9,436**	**4,787**	**3,388**	**3,038**	**9,410**	**16,924**	**39,378**	**1**	**92,127**
Other financial liabilities	**25,137**	**1,118**	**466**	**222**	**296**	**138**	**366**	**3,532**	**574**	**31,849**
Subordinated debentures	**-**	**-**	**-**	**-**	**-**	**106**	**207**	**8,952**	**-**	**9,265**
Total financial liabilities	**$211,673**	**$78,433**	**$50,925**	**$46,631**	**$42,994**	**$ 61,698**	**$106,721**	**$ 75,455**	**$437,897**	**$1,112,427**

Other non-financial liabilities	**835**	**3,910**	**312**	**135**	**180**	**2,747**	**920**	**9,170**	**7,789**	**25,998**
Equity	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**74,428**	**74,428**
Total liabilities and equity	**$212,508**	**$82,343**	**$51,237**	**$46,766**	**$43,174**	**$ 64,445**	**$107,641**	**$ 84,625**	**$520,114**	**$1,212,853**
Off-balance sheet items										
Financial guarantees	**$ 511**	**$ 2,986**	**$ 1,428**	**$ 2,768**	**$ 1,279**	**$ 1,792**	**$ 6,450**	**$ 1,486**	**$ 46**	**$ 18,746**
Lease commitments	**63**	**125**	**182**	**181**	**181**	**720**	**1,471**	**2,859**	**-**	**5,782**
Commitments to extend credit	**4,532**	**4,000**	**7,735**	**12,105**	**9,198**	**26,719**	**141,732**	**15,260**	**7,176**	**228,457**
Other credit-related commitments	**526**	**801**	**1,185**	**1,521**	**1,274**	**412**	**749**	**246**	**101,863**	**108,577**
Other commitments	**38**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**442**	**480**
Total off-balance sheet items	**$ 5,670**	**$ 7,912**	**$10,530**	**$16,575**	**$11,932**	**$ 29,643**	**$150,402**	**$ 19,851**	**$109,527**	**$ 362,042**

(1) Trading debt securities classified as fair value through profit or loss have been included in the less than 1 month category as there is no expectation to hold these assets to their contractual maturity.

(2) A major portion of relationship-based deposits are repayable on demand or at short notice on a contractual basis while, in practice, these customer balances form a core base for our operations and liquidity needs, as explained in the preceding Deposit and funding profile.

	As at October 31, 2016									
(Millions of Canadian dollars)	Less than 1 month	1 to 3 months	3 to 6 months	6 to 9 months	9 to 12 months	1 year to 2 years	2 years to 5 years	5 years and greater	With no specific maturity	Total
Assets										
Cash and deposits with banks	$ 38,931	$ 342	$ 2	$ -	$ 192	$ -	$ -	$ -	$ 3,313	$ 42,780
Securities										
Trading (1)	98,843	5	18	-	24	40	117	6,183	46,062	151,292
Available-for-sale	1,648	4,854	2,011	1,810	1,687	8,869	25,709	36,587	1,626	84,801
Assets purchased under reverse repurchase agreements and securities borrowed	81,801	42,092	24,771	14,988	11,090	3,380	303	-	7,877	186,302
Loans (net of allowance for loan losses)	15,526	13,154	16,863	21,512	23,120	109,075	198,054	38,887	85,413	521,604
Other										
Customers' liability under acceptances	8,362	4,403	73	3	-	-	2	-	-	12,843
Derivatives	8,443	10,367	4,800	3,355	3,511	12,794	26,563	49,099	12	118,944
Other financial assets	28,659	741	484	222	62	43	38	414	1,372	32,035
Total financial assets	$ 282,213	$ 75,958	$ 49,022	$ 41,890	$ 39,686	$ 134,201	$ 250,786	$ 131,170	$ 145,675	$ 1,150,601
Other non-financial assets	1,259	887	130	295	237	2,579	1,824	2,991	19,455	29,657
Total assets	$ 283,472	$ 76,845	$ 49,152	$ 42,185	$ 39,923	$ 136,780	$ 252,610	$ 134,161	$ 165,130	$ 1,180,258
Liabilities and equity										
Deposits (2)										
Unsecured borrowing	$ 30,680	$ 35,333	$ 35,540	$ 16,684	$ 23,586	$ 34,044	$ 55,239	$ 15,123	$ 415,130	$ 661,359
Secured borrowing	1,545	4,788	4,947	5,700	2,290	7,256	20,660	8,569	-	55,755
Covered bonds	-	-	-	-	3,348	9,376	24,936	2,815	-	40,475
Other										
Acceptances	8,362	4,403	73	3	-	-	2	-	-	12,843
Obligations related to securities sold short	50,369	-	-	-	-	-	-	-	-	50,369

(Millions of Canadian dollars)	As at October 31, 2016 Less than 1 month	1 to 3 months	3 to 6 months	6 to 9 months	9 to 12 months	1 year to 2 years	2 years to 5 years	5 years and greater	With no specific maturity	Total
Obligations related to assets sold under repurchase agreements and securities loaned (3)	61,170	31,499	1,568	-	756	8	21	-	8,419	103,441
Derivatives	7,334	10,904	5,809	3,939	2,976	13,562	25,945	46,081	-	116,550
Other financial liabilities	22,700	2,212	375	125	218	154	290	4,762	482	31,318
Subordinated debentures	-	-	-	-	-	-	115	9,647	-	9,762
Total financial liabilities	$ 182,160	$ 89,139	$ 48,312	$ 26,451	$ 33,174	$ 64,400	$ 127,208	$ 86,997	$ 424,031	$ 1,081,872
Other non-financial liabilities	863	3,692	276	155	154	1,199	2,466	9,408	8,561	26,774
Equity	-	-	-	-	-	-	-	-	71,612	71,612
Total liabilities and equity	$ 183,023	$ 92,831	$ 48,588	$ 26,606	$ 33,328	$ 65,599	$ 129,674	$ 96,405	$ 504,204	$ 1,180,258
Off-balance sheet items										
Financial guarantees	$ 736	$ 2,255	$ 1,897	$ 3,199	$ 1,251	$ 3,010	$ 6,403	$ 79	$ 56	$ 18,886
Lease commitments	62	123	184	181	177	661	1,528	2,131	-	5,047
Commitments to extend credit	3,723	5,481	9,783	7,190	12,074	31,384	132,092	18,284	3,220	223,231
Other credit-related commitments	433	791	1,420	1,339	1,158	678	758	306	90,241	97,124
Other commitments	477	63	-	-	-	-	-	-	-	540
Total off-balance sheet items	$ 5,431	$ 8,713	$ 13,284	$ 11,909	$ 14,660	$ 35,733	$ 140,781	$ 20,800	$ 93,517	$ 344,828

(1) Trading debt securities classified as fair value through profit or loss have been included in the less than 1 month category as there is no expectation to hold these assets to their contractual maturity.

(2) A major portion of relationship-based deposits are repayable on demand or at short notice on a contractual basis while, in practice, these customer balances form a core base for our operations and liquidity needs, as explained in the preceding Deposit and funding profile.

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

Contractual maturities of financial liabilities and off-balance sheet items - undiscounted basis

The following tables provide remaining contractual maturity analysis of our financial liabilities and off-balance sheet items. The amounts disclosed in the following table are the contractual undiscounted cash flows of all financial liabilities (e.g., par value or amount payable upon maturity). The amounts do not reconcile directly with those in our consolidated balance sheets as the table incorporates only cash flows relating to payments on maturity and do not recognize premiums, discounts or mark-to-market adjustments recognized in the instruments' carrying values as at the balance sheet date. Financial liabilities are based upon the earliest period in which they are required to be paid. For off-balance sheet items, the undiscounted cash flows potentially payable under financial guarantees and commitments to extend credit are classified on the basis of the earliest date they can be called.

Contractual maturities of financial liabilities and off-balance sheet items - undiscounted basis* **Table 69**

(Millions of Canadian dollars)	As at October 31, 2017 On demand	Within 1 year	1 year to 2 years	2 years to 5 years	5 years and greater	Total
Financial liabilities						
Deposits (1)	**$ 372,108**	**$ 253,825**	**$ 52,026**	**$ 89,456**	**$ 22,280**	**$ 789,695**
Other						
Acceptances	**-**	**16,443**	**10**	**6**	**-**	**16,459**
Obligations related to securities sold short	**-**	**30,009**	**-**	**-**	**-**	**30,009**
Obligations related to assets sold under repurchase agreements and securities loaned	**8,171**	**134,904**	**-**	**12**	**-**	**143,087**
Other liabilities	**1,124**	**26,730**	**78**	**261**	**3,553**	**31,746**
Subordinated debentures	**-**	**-**	**106**	**207**	**8,952**	**9,265**
	381,403	**461,911**	**52,220**	**89,942**	**34,785**	**1,020,261**
Off-balance sheet items						
Financial guarantees (2)	**$ 18,569**	**$ 177**	**$ -**	**$ -**	**$ -**	**$ 18,746**
Lease commitments	**-**	**732**	**720**	**1,471**	**2,859**	**5,782**
Commitments to extend credit (2)	**187,078**	**41,369**	**9**	**1**	**-**	**228,457**
	205,647	**42,278**	**729**	**1,472**	**2,859**	**252,985**
Total financial liabilities and off-balance sheet items	**$ 587,050**	**$ 504,189**	**$ 52,949**	**$ 91,414**	**$ 37,644**	**$ 1,273,246**

(Millions of Canadian dollars) (3)	As at October 31, 2016 On demand	Within 1 year	1 year to 2 years	2 years to 5 years	5 years and greater	Total
Financial liabilities						
Deposits (1)	$ 358,254	$ 221,852	$ 50,293	$ 100,295	$ 25,422	$ 756,116

(Millions of Canadian dollars) (3)	On demand	Within 1 year	1 year to 2 years	2 years to 5 years	5 years and greater	Total
	As at October 31, 2016					
Other						
Acceptances	-	12,842	-	1	-	12,843
Obligations related to securities sold short	-	50,366	-	-	-	50,366
Obligations related to assets sold under repurchase agreements and securities loaned	8,420	95,005	8	21	-	103,454
Other liabilities	445	24,198	112	289	4,761	29,805
Subordinated debentures	-	-	-	115	9,646	9,761
	367,119	404,263	50,413	100,721	39,829	962,345
Off-balance sheet items						
Financial guarantees (2)	$ 18,689	$ 197	$ -	$ -	$ -	$ 18,886
Lease commitments	-	727	661	1,528	2,131	5,047
Commitments to extend credit (2)	181,496	41,671	5	59	-	223,231
	200,185	42,595	666	1,587	2,131	247,164
Total financial liabilities and off-balance sheet items	$ 567,304	$ 446,858	$ 51,079	$ 102,308	$ 41,960	$ 1,209,509

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

(1) A major portion of relationship-based deposits are repayable on demand or at short notice on a contractual basis while, in practice, these customer balances form a core base for our operations and liquidity needs, as explained in the preceding Deposit and funding profile.

(2) We believe that it is highly unlikely that all or substantially all of these guarantees and commitments will be drawn or settled within one year, and contracts may expire without being drawn or settled. The management of the liquidity risk associated with potential extensions of funds is outlined in the preceding Risk measurement section.

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

Insurance risk

Insurance risk refers to the potential financial loss that may arise where the amount, timing and/or frequency of benefit payments under insurance and reinsurance contracts are different than expected. Insurance risk is distinct from those risks covered by other parts of our risk management framework (e.g., credit, market and operational risk) where those risks are ancillary to, or accompany the risk transfer. The four insurance sub-risks are: morbidity, mortality, longevity and travel risk.

Our Insurance Risk Framework provides an overview of our processes and tools for identifying, assessing, managing, mitigating and reporting on the insurance risks that face the organization. These are also supported by our robust three lines of defence governance structure.

Execution risk drivers

Operational risk

Operational risk is the risk of loss or harm resulting from people, inadequate or failed internal processes and systems or from external events.

Operational risk is inherent in all our activities, including the practices and controls used to manage other risks. Failure to manage operational risk can result in direct or indirect financial loss, reputational impact, regulatory censure, or failure in the management of other risks such as credit or market risk.

Our management of operational risk follows our established three lines of defence governance model. This model encompasses the organizational roles and responsibilities for a co-ordinated enterprise-wide approach for the management of operational risk. For further details, refer to the Risk management - Enterprise risk management section.

Operational Risk Framework

We have put in place an Enterprise Operational Risk Framework, which is founded on the principles of our Enterprise Risk Management Framework and sets out the processes to identify, assess, manage, monitor and report operational risk. The processes are established through the following core programs:

- *Internal events* - Internal events are specific instances where operational risk leads to or could have led to an unintended, identifiable impact. The internal events program provides a structured and consistent approach for collecting and analyzing internal event data to facilitate the analysis of the operational risk events affecting us.
- *External events* - External events are operational risk events that affect institutions other than RBC. External event monitoring and analysis is critical to gain awareness of operational risk experience within the industry and to identify emerging industry trends.
- *Business Environment and Internal Control Factors (BEICF) Assessments* - BEICF Assessments are conducted to improve business decision-making by gaining awareness of the key risks and the strengths and vulnerabilities of internal controls. Key BEICF Assessment processes include: risk and control self-assessments conducted at both enterprise and business levels; change initiatives and new/amended product assessments conducted to ensure understanding of the risk and reward trade-off for initiatives (e.g., new products, acquisitions, changes in business processes, implementation of new technology, etc.) and that we do not assume risks not aligned with our risk appetite.
- *Scenario analysis* - Scenario analysis is a structured and disciplined process for making reasonable assessments of infrequent, yet plausible, severe operational risk events. Understanding how vulnerable we are to such "tail risks" identifies mitigating actions and informs the determination of related operational risk thresholds as part of the articulation of operational risk appetite.
- *BEICF monitoring* - BEICF monitoring is conducted on an ongoing basis through key risk indicators (KRIs) and other assurance/monitoring programs (e.g., business unit monitoring, second line of defence monitoring, audit results, etc.).

Conclusions from the operational risk programs enable learning based on "what has happened to us, could it happen again elsewhere in RBC and what controls do we need to amend or implement," support the articulation of operational risk appetite and are used to inform the overall level of exposure to operational risk, which defines our operational risk profile. The profile includes significant operational risk exposures, potential new and emerging exposures and trends, and overall conclusions on the control environment and risk outlook. We proactively identify and investigate corporate insurance opportunities to mitigate and reduce potential future impacts of operational risk.

We consider risk/reward decisions in striking the balance between accepting potential losses versus incurring costs of mitigation, the expression of which is in the form of our operational risk appetite. Our operational risk appetite is established at the board level and cascaded throughout each of our business segments.

Management reports have been implemented at various levels in order to support proactive management of operational risk and transparency of risk exposures. Reports are provided on a regular basis and provide detail on the main drivers of the risk status and trend for each of our business segments and RBC overall. In addition, changes to the operational risk profile that are not aligned to our business strategy or operational risk appetite are identified and discussed.

Our operations expose us to many different operational risks, which may adversely affect our businesses and financial results. The following list is not exhaustive, as other factors could also adversely affect our results.

Risk	Description
Information Technology and Cyber Risks Please see the PDF to view this picture	We use information technology for business operations and the enablement of strategic business goals and objectives. Information technology risk is the risk to our business associated with the use, ownership, operation, involvement, influence and adoption of information technology within the enterprise. It consists of information technology related events (e.g., cybersecurity incidents, including data breaches) that could have a material adverse impact on our business. Such events could result in business interruption, service disruptions, theft of intellectual property and confidential information, litigation and reputational damage. To manage our information technology risk, we have established an enterprise-wide Information Technology Risk Management Framework and we continue to develop advancements in cyber defence capabilities to support our business model and protect our clients.
Third Party Risk Please see the PDF to view this picture	Failing to effectively manage our service providers may expose us to service disruptions, regulatory action, financial loss, litigation or reputational damage. Third-party and outsourcing risk has received increased oversight from regulators and attention from the media. We formalized and standardized our expectations of our suppliers with a principles-based supplier code of conduct to ensure their behaviour aligns with our standards in the following key areas: business integrity, responsible business practices, responsible treatment of individuals, and the environment.
Processing and Execution Risk Please see the PDF to view this picture	Processing and execution risk is the risk of failure to effectively design, implement and execute a process. Exposure to this risk is global, existing in all of our locations and operations, and in our employee's actions. Examples of processing and execution events range from selecting the wrong interest rates, duplicating wire payment instructions, processing a foreign exchange transaction incorrectly, underinsuring a property and incorrectly investing funds. The potential impacts of such events include financial loss, legal and regulatory consequences and reputational damage. When identified, these situations are assessed, analyzed and mitigating actions are undertaken.
Fraud Risk Please see the PDF to view this picture	Fraud risk is defined as the risk of intentional unauthorized activities designed to obtain benefits either from us or assets under our care, or using our products. Fraud can be initiated by one or more parties who can include employees, potential or existing clients, agents, suppliers or outsourcers, or other external parties. We have extensive professional resources allocated for the recovery of lost assets and the improvement of loss avoidance through both enhanced intelligence and aggressive pursuit of those who attack enterprise assets.
Model Risk Please see the PDF to view this picture	The use of models plays an important role in many of our business activities. We use a variety of models for many purposes, including the valuation of financial products, risk measurement and management of different types of risk. Model risk is the risk of error in the design, development, implementation or subsequent use of models. We have established an enterprise-wide Model Risk Management Policy, including principles, policies and procedures, roles and responsibilities to manage model risk. One of the key factors in the policy to mitigate model risk is independent validation.

Operational risk capital

We received approval from OSFI on May 10, 2016 for the use of the Advance Measurement Approach (AMA) for operational risk capital measurement subject to the application of a Standardized Approach (TSA) floor. We commenced reflecting operational risk capital under the AMA in the third quarter of 2016. As such, we currently perform parallel runs of the TSA and the AMA of determining operational risk capital. Under TSA, operational risk capital is determined based on an OSFI-established percentage of 3 years' average gross income for pre-determined industry standardized business activities. Under AMA, operational risk capital is determined by using our internal Operational Risk Measurement System, which includes internal loss experience, external loss experience, scenario analysis, and Business Environment Internal Control Factors. RBC Bank (Georgia), RBC Caribbean, and City National will continue using TSA. RBC Insurance (including insurance recoveries) is not in the scope of operational risk capital calculations. We do not account for mitigation through insurance or any other risk transfer mechanism in our AMA model.

Operational risk loss events

During 2017, we did not experience any material operational risk loss event. For further details on our contingencies, including litigation, refer to Notes 25 and 26 of our 2017 Annual Consolidated Financial Statements.

Regulatory compliance risk

Regulatory compliance risk is the risk of potential non-conformance with laws, rules, regulations and prescribed practices in any jurisdiction in which we operate. Issues regarding compliance with laws and regulations can arise in a number of areas in a large complex financial institution such as RBC, and are often the result of inadequate or failed internal processes, people or systems.

Laws and regulations are in place to protect the financial and other interests of our clients, investors and the public. As a large-scale global financial institution, we are subject to numerous laws and to extensive and evolving regulation by governmental agencies, supervisory authorities and self-regulatory organizations in Canada, the U.S., Europe and other jurisdictions in which we operate. In recent years, such regulation has become increasingly extensive and complex. In addition, the enforcement of regulatory matters has intensified. Recent resolution of such matters involving other global financial institutions have involved the payment of substantial penalties, agreements with respect to future operation of their business, actions with respect to relevant personnel and guilty pleas with respect to criminal charges.

Operating in this increasingly complex regulatory environment and intense regulatory enforcement environment, we are and have been subject to a variety of legal proceedings, including civil claims and lawsuits, criminal charges, regulatory examinations, investigations, audits and requests for information by various governmental regulatory agencies and law enforcement authorities in various jurisdictions, and we anticipate that our ongoing business activities will give rise to such matters in the future. Changes to laws, including tax laws, regulations or regulatory policies, as well as the changes in how they are interpreted, implemented or enforced, could adversely affect us, for example, by lowering barriers to entry in the businesses in which we operate, increasing our costs of compliance or limiting our activities and ability to execute our strategic plans. Further, there is no assurance that we always will be or will be deemed to be in compliance with laws, regulations or regulatory policies. Accordingly, it is possible that we could receive a judicial or regulatory judgment or decision that results in fines, damages, penalties, and other costs or injunctions, criminal convictions or loss of licences or registrations that would damage our reputation and negatively impact our ability to conduct some of our businesses and our earnings. In addition, we are subject to litigation arising in the ordinary course of our business and the adverse resolution of any litigation could have a significant adverse effect on our results or could give rise to significant reputational damage, which in turn could impact our future business prospects.

Global compliance has developed a Regulatory Compliance Management Framework designed to manage and mitigate the regulatory compliance risks associated with failing to comply with, or adapt to, current and changing laws and regulations in the jurisdictions in which we operate.

Regulatory compliance risk includes the regulatory risks associated with financial crime (which includes, but is not limited to, money laundering, bribery and sanctions), privacy, market conduct, consumer protection, business conduct and prudential requirements. Specific compliance policies, procedures and supporting frameworks have been developed to manage regulatory compliance risk.

Strategic risk drivers

Strategic risk

Strategic risk is the risk that the enterprise or particular business areas will make inappropriate strategic choices, or will be unable to successfully implement selected strategies or related plans and decisions. Business strategy is the major driver of our risk profile and consequently the strategic choices we make in terms of business mix determine how our risk profile changes.

Responsibility for selecting and successfully implementing business strategies is mandated to the individual heads of the businesses. Oversight of strategic risk is the responsibility of the heads of the business segments and their operating committees, the Enterprise Strategy Office, Group Executive, and the Board of Directors. The Enterprise Strategy group supports the management of strategic risk through the strategic planning process (articulated within our Enterprise Strategic Planning Policy) ensuring alignment across our business, financial, capital and risk planning.

Our annual business portfolio review and project approval request processes help identify and mitigate strategic risk by ensuring strategies for new initiatives, lines of business, and the enterprise as a whole align with our risk appetite and risk posture. GRM provides oversight of strategic risk by providing independent review of these processes, establishing enterprise risk frameworks, and independently monitoring and reporting on the level of risk established against our risk appetite metrics in accordance with the three lines of defence governance model.

For details on the key strategic priorities for our business segments, refer to the Business segment results section.

Reputation risk

Reputation risk is the risk that an activity undertaken by an organization or its representatives will impair its image in the community or lower public confidence in it, resulting in the loss of business, legal action or increased regulatory oversight.

Reputation risk can arise from a number of events and primarily occurs in connection with credit risk, regulatory, legal and operational risks and failure to maintain strong risk conduct. Operational failures and non-compliance with laws and regulations can have a significant reputational impact on us.

Our Reputation Risk Framework provides an overview of our approach to the management of this risk. It focuses on our organizational responsibilities, and controls in place to mitigate reputation risks.

The following principles guide our management of reputation risk:

- We must operate with integrity at all times in order to sustain a strong and positive reputation.
- Protecting our reputation is the responsibility of all our employees, including senior management, and this responsibility extends to the Board of Directors.

Legal and regulatory environment risk

Legal and regulatory environment risk is the risk that new or modified laws and regulations, and the interpretation or application of those laws and regulations, will negatively impact the way in which we operate, both in Canada and abroad. The full impact of some of these changes on our business will not be known until final rules are implemented and market practices have developed in response. We continue to respond to these and other developments and are working to minimize any potential adverse business or economic impact. The following provides a high-level summary of some of the key regulatory changes that have potential to increase our operational, compliance, and technology costs and to impact our profitability, as well as to potentially increase the cost and complexity of our operations.

Canadian Housing Market and Consumer Debt

The Government of Canada (GoC) continues to express concerns with the level and sustainability of Canadian household debt. A number of measures to address these concerns have been introduced by both the federal government and a number of provinces, including changes to federal mortgage rules (e.g. changes to OSFI B-20 Guideline). Going forward, other initiatives continue to be explored, such as an assessment by the Department of Finance on a lender risk-sharing model.

Payments Issues

The federal government is engaged in several initiatives that could have an impact on the payment system in Canada. This includes the following: an ongoing review of the interchange framework; a consultation process on the regulatory framework for the retail payments system in Canada; and initiatives under consideration by Payments Canada to modernize the payments system in Canada.

Other Regulatory Initiatives Impacting Financial Services in Canada

The federal government continues to assess a number of issues relating to consumer protection. Previously withdrawn legislative proposals to update the consumer protection framework and to clarify federal jurisdiction in this area continue to be reviewed by the government. In addition, federal regulatory agencies are also undertaking a review of sales practices at Canadian banks and will be providing reports to the government on these issues. Provincial consumer protection initiatives are also being monitored to assess their possible implications from a financial services perspective.

Other regulatory initiatives include a review of the deposit insurance framework by the Department of Finance and the Canada Deposit Insurance Corporation, consultations by the Financial Consumer Agency of Canada on indirect auto lending, and initiatives by the Canadian Securities Administrators to regulate market conduct activities relating to OTC derivatives products.

Negotiations on North American Free Trade Agreement (NAFTA)

Canada, Mexico and the United States are currently engaged in negotiations on potential changes to NAFTA. The existing chapters in NAFTA such as those relating to financial services, cross-border trade, and temporary entry rules, could be changed as a result of these discussions. In addition, there may be efforts made to update the agreement to address new areas like electronic commerce. While the outcome of the negotiations remain unclear, changes to NAFTA may adversely affect certain of our businesses, either directly or indirectly through adverse effects on portions of the Canadian and U.S. economies.

United States Regulatory Initiatives
Policymakers are beginning to consider financial regulatory reforms that could result in reduced cost and complexity of U.S. regulations. These include possible reforms to the Volcker rule that could simplify compliance requirements regarding proprietary trading activity and investments in private equity and hedge funds; revisions to the new fiduciary rule that could have implications for financial services firms, investors and markets; potential changes to the framework for the regulation of OTC derivatives; and ongoing adjustments to key aspects of the capital, leverage, liquidity, and oversight framework in the U.S. (e.g. foreign bank organization rules; comprehensive capital analysis and review requirements; single counterparty credit limits; total loss absorbing capacity rules). In addition, U.S. policymakers are considering reforms to the tax code that could be beneficial in terms of lowering corporate tax rates; however, they are also considering measures to raise revenues to pay for those lower rates, including measures that could target the financial sector and many of its employees, such as: reductions in the deductibility of interest on corporate debt, of mortgage interest, and of state and local taxes; revisions to the tax exemption for interest on municipal debt; changes to tax credits for low-income housing and renewable fuels; changes to the tax treatment of derivatives; and a large-bank tax and/or financial transactions tax. The impact of the Tax Reform Framework, if enacted, could include a reduction in our deferred tax asset and tax reductions on future earnings. Congress may opt for a more modest, and less costly, package of reforms.

Regulatory Capital and Related Requirements
We continue to monitor and prepare for developments related to regulatory capital. The Basel Committee on Banking Supervision (BCBS) has issued a number of proposed revisions and new measures that would reform the manner in which banks calculate, measure and report regulatory capital and related risks, including with respect to the use of banks' own internal risk models. The impact of these proposals on us will depend on the final standards adopted by the BCBS and how these standards are implemented by our regulators. For further details on regulatory capital and related requirements, refer to the Capital Management section.

Canadian Bail-in Regime
Bail-in regimes are being implemented in a number of jurisdictions in an effort to limit taxpayer exposure to losses of a failing institution and ensure the institution's shareholders and creditors remain responsible for bearing such losses. On June 22, 2016, legislation came into force, amending certain federal statutes pertaining to banks to create a bank recapitalization or "bail-in" regime for the six domestic systemically important banks (D-SIBs) in Canada. On June 16, 2017, the Department of Finance announced the publication of draft regulations under the Canada Deposit Insurance Corporation (CDIC) Act and the Bank Act, which provide key details of the conversion, issuance and compensation regimes for bail-in instruments issued by D-SIBs. The proposed regulations provide that, pursuant to the CDIC Act, in circumstances when the Superintendent of Financial Institutions has determined that a bank may no longer be viable, the Governor in Council may, upon a recommendation of the Minister of Finance that he or she is of the opinion that it is in the public interest to do so, grant an order directing the CDIC to convert all or a portion of certain shares and liabilities of that bank into common shares. These changes are not expected to have a material impact on our cost of long-term unsecured funding.

Total Loss Absorbing Capacity (TLAC)
On June 16, 2017, OSFI released a draft guideline on TLAC, which will apply to Canada's D-SIBs as part of the Federal Government's bail-in regime. The draft guideline is consistent with the TLAC standard released on November 9, 2015 by the FSB for institutions designated as global systemically important banks (G-SIBs), but tailored to the Canadian context. The standards are intended to address the sufficiency of a systemically important bank's loss absorbing capacity in supporting its recapitalization in the event of its failure. TLAC is defined as the aggregate of Tier 1 capital, Tier 2 capital, and other TLAC instruments, which allow conversion in whole or in part into common shares under the CDIC Act and meet all of the eligibility criteria under the guideline. We are expected to comply with the disclosure requirements beginning the first quarter of 2019 and the remaining TLAC standard requirements by November 1, 2021. The final guidance is expected to be issued in 2018. We do not anticipate any challenges in meeting these TLAC requirements.

Step-In Risk
On October 25, 2017, the BCBS finalized its guidelines on the identification and management of step-in risk. Step-in risk is the risk that a bank may provide financial support to an unconsolidated entity beyond their contractual obligations, should the entity experience financial distress, in order to minimize any potential reputational risk to the bank. The guidelines aim to strengthen the oversight and regulation surrounding systemic risks arising from a bank's interaction with shadow banking entities. The guidelines provide that banks will be required to at a minimum annually self-assess their step-in risk based on a number of indicators, including the impact on liquidity and capital positions of stepping in to provide support to an unconsolidated entity. These new guidelines do not impose an automatic liquidity or capital charge for step-in risk but do require banks and supervisors to take appropriate actions to respond to and mitigate material step-in risk as outlined in the guideline. We are reviewing these new guidelines along with future OSFI guidance and incorporating them into our risk management activities as recommended by BCBS. The BCBS expects banks and supervisors to implement the guidelines no later than 2020.

U.K. and European Regulatory Reform
The revised directive and regulation on Markets in Financial Instruments (MiFID II/MiFIR) become effective January 2018 and will have a significant technological and procedural impact for certain businesses operating in the European Union. The reforms will introduce changes to pre- and post-trade transparency, market structure, trade and transaction reporting, algorithmic trading, and conduct of business. The U.K. is in negotiations to exit the European Union. Until those negotiations are concluded, and the resulting changes are implemented, the U.K. will remain a European Union Member State, subject to all European Union legislation.

Other regulatory initiatives include: the General Data Protection Regulation, effective May 2018, introducing significant obligations on data handling globally; the extension of the Senior Managers Regime to all U.K. regulated firms from 2018; the Benchmarks Regulation impacting users of, contributors to, and administrators of benchmarks; and the publication of the Foreign Exchange Global Code, setting out global principles of good practice in foreign exchange markets.

Competitive risk

The competition for clients among financial services companies in the markets in which we operate is intense. Client loyalty and retention can be influenced by a number of factors, including new technology used or services offered by our competitors, relative service levels and prices, product and service attributes, our reputation, actions taken by our competitors, and adherence with competition and anti-trust laws. Other companies, such as insurance companies and non-financial companies, are increasingly offering services traditionally provided by banks. This competition could also reduce net interest income and fee revenue and adversely affect our results.

We identify and assess competitive risks as part of our overall risk management process. Our products and services are regularly benchmarked against existing and potential competitors. In addition, we regularly conduct risk reviews of our products, services, alliances and acquisitions as well as ensure adherence to competition and anti-trust laws. Our annual strategy-setting process also plays an integral role in managing competitive risk.

Macroeconomic risk drivers

Systemic risk

Systemic risk is the risk that the financial system as a whole, or a major part of it - either in an individual country, a region, or globally - is put in real and immediate danger of collapse or serious damage with the likelihood of material damage to the economy, and that this will result in financial, reputation or other risks for us.

Our earnings are significantly affected by the general business and economic conditions in the geographic regions in which we operate. These conditions include consumer saving and spending habits as well as consumer borrowing and repayment patterns, business investment, government spending, exchange rates, sovereign debt risks, the level of activity and volatility of the capital markets, strength of the economy and inflation. For example, an extended economic downturn may result in high unemployment and lower family income, corporate earnings, business investment and consumer spending, and could adversely affect the demand for our loan and other products and result in higher provisions for credit losses. Given the importance of our Canadian operations, an economic downturn in Canada or in the U.S. impacting Canada would largely affect our personal and business lending activities in our Canadian banking businesses, including mortgages and credit cards, and could significantly impact our results of operations.

Our earnings are also sensitive to changes in interest rates, which have increased in Canada and the U.S. over the last year but remain historically low. A continuing low interest rate environment in Canada, the U.S. and globally would result in net interest income being unfavourably impacted by spread compression largely in Personal & Commercial Banking and Wealth Management. While a further increase in interest rates would benefit our businesses that are currently impacted by spread compression, a significant increase in interest rates could also adversely impact household balance sheets. This could result in credit deterioration which might negatively impact our financial results, particularly in some of our Personal & Commercial Banking and Wealth Management businesses.

Deterioration in global capital markets could result in volatility that would impact results in Capital Markets while in Wealth Management, weaker market conditions would lead to lower average fee-based client assets and transaction volumes. In addition, worsening financial and credit market conditions may adversely affect our ability to access capital markets on favourable terms and could negatively affect our liquidity, resulting in increased funding costs and lower transaction volumes in Capital Markets and Investor & Treasury Services.

Systemic risk is considered to be the least controllable risk facing us. Our ability to mitigate this risk when undertaking business activities is limited, other than through collaborative mechanisms between key industry participants, and, as appropriate, the public sector, to reduce the frequency and impact of these risks. The two most significant measures in mitigating the impact of systemic risk are diversification and stress testing.

Our diversified business portfolios, products, activities and funding sources help mitigate the potential impacts from systemic risk. We also mitigate systemic risk by establishing risk limits to ensure our portfolio is well-diversified, and concentration risk is reduced and remains within our risk appetite.

Stress testing involves consideration of the simultaneous movements in a number of risk factors. It is used to ensure our business strategies and capital planning are robust by measuring the potential impacts of credit, market, liquidity and funding and operational risks on us, under adverse economic conditions. Our enterprise-wide stress testing program uses stress scenarios featuring a range of severities based on plausible adverse economic and financial market events. These stress scenarios are evaluated across the organization, and results are integrated to develop an enterprise-wide view of the impacts on our financial results and capital requirements. For further details on our stress testing, refer to the Risk management - Enterprise risk management section.

Overview of other risks

In addition to the risks described in the Risk management section, there are other risk factors, described below, which may adversely affect our businesses and financial results. The following discussion is not exhaustive as other factors could also adversely affect our results.

Government fiscal, monetary and other policies
Our businesses and earnings are affected by monetary policies that are adopted by the Bank of Canada, the Fed in the U.S., the ECB in the European Union and monetary authorities in other jurisdictions in which we operate; as well as the fiscal policies of the governments of Canada, the U.S., Europe and such other jurisdictions. Such policies can also adversely affect our clients and counterparties in Canada, the U.S. and internationally, which may increase the risk of default by such clients and counterparties.

Tax risk and transparency
Tax risk refers to the risk of loss related to unexpected tax liabilities. The tax laws and systems that are applicable to RBC are complex and wide ranging. As a result, we ensure that any decisions or actions related to tax always reflect our assessment of the long-term costs and risks involved, including their impact on our relationship with clients, shareholders, and regulators, and our reputation.

Our approach to tax is governed by our Taxation Policy and Risk Management Framework, and reflects the fundamentals of our Risk Pyramid. Oversight of our tax policy and the management of tax risk is the responsibility of Group Executive, the CFO and the Senior Vice President, Taxation. We discuss our tax position with the Audit Committee on a regular basis and discuss our tax strategy with the Audit and Risk Committees.

Our tax strategy is designed to ensure transparency and support our business strategy, and is aligned with our corporate vision and values. We seek to maximize shareholder value by ensuring that our businesses are structured in a tax-efficient manner while considering reputational risk by being in compliance with all laws and regulations. Our framework seeks to ensure that we:

- Act with integrity and in a straightforward, open and honest manner in all tax matters;
- Ensure tax strategy is aligned with our business strategy supporting only bona fide transactions with a business purpose and economic substance;
- Ensure all intercompany transactions are conducted on arm's length terms;
- Ensure our full compliance and full disclosure to tax authorities of our statutory obligations; and
- Endeavour to work with the tax authorities to build positive long-term relationships and where disputes occur, address them constructively.

With respect to assessing the needs of our clients, we consider a number of factors including the purposes of the transaction. We seek to ensure that we only support bona fide client transactions with a business purpose and economic substance. Should we become aware of client transactions that are aimed at evading their tax obligations, we will not proceed with the transactions.

We operate in 37 countries worldwide. Our activities in these countries are subject to both Canadian and international tax legislation and other regulations, and are fully disclosed to the relevant tax authorities. The Taxation group and GRM both regularly review the activities of all entities to ensure compliance with tax requirements and other regulations.

Given that we operate globally, complex tax legislation and accounting principles have resulted in differing legal interpretations between the respective tax authorities we deal with and ourselves, and we are at risk of tax authorities disagreeing with prior positions we have taken for tax purposes. When this occurs, we are committed to an open and transparent dialogue with the tax authorities to ensure a quick assessment and prompt resolution of the issues where possible. Failure to adequately manage tax risk and resolve issues with tax authorities in a satisfactory manner could adversely impact our results, potentially to a material extent in a particular period, and/or significantly impact our reputation.

Tax contribution
In 2017, total income and other tax expense, including income taxes in the Consolidated Statements of Comprehensive Income and Changes in Equity, to various levels of governments globally totalled $5.1 billion (2016 - $3.8 billion). In Canada, total income and other tax expense for the year ended October 31, 2017 to various levels of government totalled $3.9 billion (2016 - $2.8 billion).

Please see the PDF to view this chart

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For further details on income and other tax expense, refer to the Financial performance section.

Environmental and social risk
Environmental and social (E&S) risk is the risk that an environmental or social issue associated with a client, transaction, product, supplier or activity will create a risk of loss of financial, operational, legal and/or reputational value to RBC. E&S issues include, but are not limited to: site contamination, waste management, land and resource use, biodiversity, water quality and availability, climate change, environmental

regulation, human rights, Indigenous Peoples' rights and consultation, and community engagement. GRM is responsible for developing policies to identify, assess, monitor and report on E&S risk, and for their regular review and update. E&S risk policies seek to identify sectors, clients and business activities exposed to E&S risk; apply enhanced due diligence and escalation procedures; and establish requirements to manage, mitigate and monitor E&S risk. Business segments and corporate functions are responsible for incorporating E&S risk management requirements within their operations.

RBC recognizes the importance of E&S risk management practices and processes and is committed to the regular and transparent disclosure of these. As a signatory to the Equator Principles (EP), we report annually on projects assessed for E&S risk according to the EP framework. As a signatory to the Carbon Disclosure Project, we annually disclose information on climate change risks as well as our energy and emissions performance. In 2017, we published our first Modern Slavery Act Statement, which sets out the steps that RBC has taken to ensure that slavery and human trafficking are not taking place in the supply chains or our businesses. A number of companies in our RBC Global Asset Management business and BlueBay Asset Management LLP are signatories to the United Nations Principles for Responsible Investment and they report annually on their responsible investment activities. Their approach integrates environmental, social and governance issues into the investment process when doing so may have a material impact on investment risk or return. RBC Europe Limited is a signatory to the Green Bond Principles and they report annually on green bond underwriting activities. RBC Corporate Citizenship sets corporate environmental strategy and reports annually on our performance in the Corporate Citizenship Report and Public Accountability Statement.

RBC believes we have a role to play in the transition to a clean, low-carbon economy. We are encouraged by the recent efforts of the Financial Stability Board's (FSB) Task Force on Climate-related Financial Disclosures (TCFD) and are participants in a pilot-test of the TCFD recommendations, which will be coordinated by the United Nations Environment Programme - Finance Initiative (UNEP-FI). We continue to investigate and assess climate-related risks and seek to develop and continually improve our climate-related financial disclosures.

Other factors

Other factors that may affect our results include changes in government trade policy, changes in accounting standards, including their effect on our accounting policies, estimates and judgments, currency and interest rate movements in Canada, the U.S., and other jurisdictions in which we operate, changes to our credit ratings, the timely and successful development of new products and services, technological changes, effective design, implementation and execution of processes and their associated controls, fraud by internal and external parties, the possible impact on our business from disease or illness that affects local, national or global economies, disruptions to public infrastructure, including transportation, communication, power and water, international conflicts and other political developments including those relating to the war on terrorism, and our success in anticipating and managing the associated risks.

We caution that the foregoing discussion of risk factors, many of which are beyond our control, is not exhaustive and other factors could also affect our results.

Capital management

We actively manage our capital to maintain strong capital ratios and high ratings while providing strong returns to our shareholders. In addition to the regulatory requirements, we consider the expectations of credit rating agencies, depositors and shareholders, as well as our business plans, stress tests, peer comparisons and our internal capital ratio targets. Our goal is to optimize our capital usage and structure, and provide support for our business segments and clients and generate better returns for our shareholders, while protecting depositors and senior creditors.

Capital management framework

Our capital management framework establishes policies and processes for defining, measuring, raising and investing all forms of capital in a co-ordinated and consistent manner. It sets our overall approach to capital management, including guiding principles and roles and responsibilities relating to capital adequacy and transactions, dividends, solo capital and management of risk-weighted assets (RWA) and leverage ratio exposures. We manage and monitor capital from several perspectives, including regulatory capital, economic capital and solo capital.

Our capital planning process is dynamic and involves various teams including Finance, Corporate Treasury, GRM, Economics and our businesses, and covers internal capital ratio targets, potential capital transactions as well as projected dividend payouts and share repurchases. This process considers our business operating plans, enterprise-wide stress test and Internal Capital Adequacy Assessment Process (ICAAP), regulatory capital and accounting changes, internal capital requirements, rating agency metrics and solo capital.

Our capital plan is established on an annual basis and is aligned with the management actions included in the annual business operating plan, which includes forecast growth in assets and earnings taking into account our business strategies, the projected market and economic environment, and peer positioning. This includes incorporating potential capital transactions based on our projected internal capital generation, business forecasts, market conditions and other developments, such as accounting and regulatory changes that may impact capital requirements. All of the components in the capital plan are monitored throughout the year and are revised as deemed appropriate.

Please see the PDF to view this chart

Our Enterprise-wide stress test and annual ICAAP provide key inputs for capital planning, including setting internal capital ratio targets. The stress scenarios are evaluated across the organization, and results are integrated to develop an enterprise-wide view of financial impacts and capital requirements, which in turn facilitate the planning of mitigating actions to absorb adverse events. ICAAP assesses capital adequacy and requirements covering all material risks, with a cushion for plausible contingencies. In accordance with OSFI guideline, major components of our ICAAP process include comprehensive risk assessment, stress testing, capital assessment and planning (both economic and regulatory), Board and senior management oversight, monitoring and reporting and internal control review.

Our internal capital targets are established to maintain robust capital positions in excess of OSFI's Basel III "all-in" regulatory targets. The stress test results of our Enterprise-wide stress testing and ICAAP are incorporated into the OSFI capital conservation buffer and D-SIBs surcharge, with a view to ensuring the bank has adequate capital to underpin risks and absorb losses under all plausible stress scenarios given our risk profile and appetite. In addition, we include a discretionary cushion on top of OSFI regulatory targets to maintain capital strength for forthcoming regulatory and accounting changes, peer comparatives, rating agencies sensitivities and solo capital level.

The Board of Directors is responsible for the ultimate oversight of capital management, including the annual review and approval of the capital plan. ALCO and GE share responsibility for capital management and receive regular reports detailing our compliance with approved limits and guidelines. The Risk Committee annually approves the Capital Management Framework. The Audit and Risk Committees jointly approve the ICAAP process. The Audit Committee is also responsible for the ongoing review of internal controls over capital management.

Basel III

Our consolidated regulatory capital requirements are determined by guidelines issued by OSFI, which are based on the minimum Basel III capital ratios adopted by the Basel Committee on Banking Supervision (BCBS).

The BCBS sets out the Basel III transitional requirements for Common Equity Tier 1 capital (CET1), Tier 1 capital and Total capital ratios at 5.75%, 7.25% and 9.25%, respectively for 2017, which would be required to be fully phased-in ("all-in") to 7.0%, 8.5% and 10.5%, respectively, by January 1, 2019 (including minimums plus capital conservation buffer of 2.5%). However, other than providing phase-out rules for non-qualifying capital instruments, OSFI required Canadian banks to meet the BCBS Basel III "all-in" targets for CET1, Tier 1 capital and Total capital ratios in 2013. Effective January 1, 2016, we were required to include an additional 1% risk-weighted capital surcharge to each tier of capital for the above all-in requirements given our designation as a D-SIB by OSFI in 2013 (similar to five other Canadian banks designated as D-SIBs).

In 2014, OSFI also advised Canadian banks that it would begin phasing in the Credit Valuation Adjustment (CVA) risk capital charge required under the Basel III framework. In accordance with OSFI's guidance, there are two possible options to phase in the CVA capital charge. Under the option selected by RBC, the 2017 CVA capital charge for CET1, Tier 1 capital and Total capital was 72%, 77%, and 81%, respectively. In 2018, the CVA capital charge will be 80%, 83% and 86%, respectively, and will reach 100% for each tier of capital by 2019.

Under Basel III, banks select from two main approaches, the Standardized Approach or the Internal Ratings Based (IRB) Approach, to calculate their minimum regulatory capital required to support credit, market and operational risks. We adopted the Basel III IRB approach to calculate credit risk capital for consolidated regulatory reporting purposes. While the majority of our credit risk exposures are reported under the Basel III IRB Approach for regulatory capital purposes, certain portfolios continue to use the Basel III Standardized Approach for credit risk (for example, our Caribbean banking operations and City National). For consolidated regulatory reporting of market risk capital, we use both Internal Models-based and Standardized Approaches. For consolidated regulatory reporting of operational risk, we use the higher of the Standardized Approach and the Advanced Measurement Approach. We determine our regulatory leverage ratio based on OSFI's Leverage Requirements (LR) Guideline, which reflects the BCBS Basel III leverage ratio requirements. We are required to maintain a minimum leverage ratio that meets or exceeds 3%.

All federally regulated banks with a Basel III leverage ratio total exposure exceeding €200 billion at their financial year-end are required, at a minimum, to publicly disclose in the first quarter following their year-end, the twelve indicators used in the G-SIB assessment methodology, with the goal of enhancing the transparency of the relative scale of banks' potential global systemic importance and data quality. The FSB publishes an updated list of G-SIBs annually. On November 21, 2017, we were designated a G-SIB in the 2017 FSB list. For further details refer to the Regulatory developments section.

In April 2017, OSFI issued final guidelines for the first phase of the Pillar 3 disclosure requirements, indicating that all D-SIBs are expected to implement the "Revised Pillar 3 Disclosure Requirements", issued by the BCBS in January 2015 for the reporting period ending October 31, 2018 (and referenced by BCBS as phase one). These guidelines replace existing disclosure requirements in the areas of credit risk, counterparty credit risk and securitization activities. We are making progress and expect to meet OSFI's stated timeline.

In March 2017, the BCBS issued its second phase of the Pillar 3 disclosure requirements entitled, "Pillar 3 disclosure requirements - consolidated and enhanced framework". The enhancements include the addition of a dashboard of key metrics and incorporates disclosure requirements related to ongoing reforms to the regulatory environment, such as the TLAC regime for G-SIBs, the proposed operational risk requirements, and the final standard for market risk. The disclosure standard also consolidates all existing Pillar 3 disclosure requirements of the Basel III framework, including the leverage and liquidity ratios disclosure templates. This phase two requirement, together with the phase one Revised Pillar 3 disclosure requirements, issued in January 2015, comprise the single Pillar 3 framework. OSFI has not yet released the implementation date for the BCBS phase two disclosure requirements.

The BCBS has commenced its work on the final phase of the Pillar 3 disclosure requirements, which includes the standardized approach RWA to benchmark internally modelled capital requirements, asset encumbrance, operational risk, and ongoing policy reform.

On August 21, 2017, OSFI announced its intention to delay the domestic implementation of the BCBS frameworks related to the Standardized Approach to Counterparty Credit Risk (SA-CCR) and the revisions to the capital requirements for bank exposures to Central counterparties until Q1 2019. In addition, in its communication, OSFI also announced its intention to delay the implementation of the BCBS Revised Securitization Framework until Q1 2019.

We continue to monitor the finalization of Basel III post-crisis regulatory reforms and assess their expected impact to our capital and leverage ratios. BCBS issued consultation papers on revisions relating to how regulatory capital is calculated under the Basel III Standardized and IRB approaches along with changes to operational risk methodology and the leverage framework. In addition, the BCBS expects to finalize a capital floor based on its revised Standardized Approach. Once these frameworks are finalized, OSFI's guidance will provide implementation timelines. Our aim is to ensure we maintain robust capital ratios in expectation of these pending regulatory changes.

The following table provides a summary of OSFI regulatory target ratios under Basel III:

Basel III - OSFI regulatory target **Table 70**

Basel III Capital ratios and leverage	OSFI regulatory target requirements for large banks under Basel III					RBC capital and leverage ratios as at October 31, 2017	Meet or exceed OSFI regulatory target ratios
	Minimum	Capital Buffers (1)	Minimum including Capital Buffers	D-SIB Surcharge (2)	Minimum including Capital Buffers and D-SIB surcharge (2)		
Common Equity Tier 1	> 4.5%	2.5%	> 7.0%	1.0%	> 8.0%	10.9%	✓
Tier 1 capital	> 6.0%	2.5%	> 8.5%	1.0%	> 9.5%	12.3%	✓
Total capital	> 8.0%	2.5%	> 10.5%	1.0%	> 11.5%	14.2%	✓
Leverage ratio	> 3.0%	n.a.	> 3.0%	n.a.	> 3.0%	4.4%	✓

(1) The capital buffers include the capital conservation buffer and the countercyclical capital buffer as prescribed by OSFI.
(2) Effective January 1, 2016, the D-SIBs surcharge is applicable to risk-weighted capital.
n.a. not applicable

Regulatory capital, RWA and capital ratios

Under Basel III, regulatory capital consists of CET1, Additional Tier 1 and Tier 2 capital.

CET1 capital comprises the highest quality of capital. Regulatory adjustments under Basel III include full deductions of certain items and additional capital components that are subject to threshold deductions.

Tier 1 capital comprises predominantly CET1 and Additional Tier 1 items including non-cumulative preferred shares that meet certain criteria. Tier 2 capital includes subordinated debentures that meet certain criteria, certain loan loss allowances and non-controlling interests in subsidiaries Tier 2 instruments. Total capital is defined as the sum of Tier 1 and Tier 2 capital. Preferred shares and subordinated debentures issued after January 1, 2013 require Non-viability contingent capital requirement (NVCC) features to be included into regulatory capital. NVCC requirements ensure that non-common regulatory capital instruments bear losses before banks seek government funding.

Regulatory capital ratios are calculated by dividing CET1, Tier 1 and Total capital by their respective RWA.

The following chart provides a summary of the major components of CET1, Additional Tier 1 and Tier 2 capital.

Please see the PDF to view this chart

(1) First level: The amount by which each of the items exceeds a 10% threshold of CET1 capital (after all deductions but before threshold deductions) will be deducted from CET1 capital. Second level: The aggregate amount of the three items not deducted from the first level above and in excess of 15% of CET1 capital after regulatory adjustments will be deducted from capital, and the remaining balance not deducted will be risk-weighted at 250%.
(2) Non-significant investments are subject to certain Capital Adequacy Requirements (CAR) criteria that drive the amount eligible for deduction.

The following tables provide details on our regulatory capital, RWA and capital and leverage ratios. Our capital position remains strong and our capital and leverage ratios remain well above OSFI regulatory targets:

Regulatory capital, risk-weighted assets (RWA) and capital and leverage ratios **Table 71**

(Millions of Canadian dollars, except percentage amounts and as otherwise noted)	As at **October 31 2017**	As at October 31 2016
Capital (1)		
CET1 capital	**$ 51,572**	$ 48,181
Tier 1 capital	**58,361**	55,270
Total capital	**67,556**	64,950
Risk-weighted Assets (RWA) used in calculation of capital ratios (1), (2)		
CET1 capital RWA	**$ 474,478**	$ 447,436
Tier 1 capital RWA	**474,478**	448,662
Total capital RWA	**474,478**	449,712
Total capital RWA consisting of: (1)		
Credit risk	**$ 376,519**	$ 369,751
Market risk	**27,618**	23,964
Operational risk	**59,203**	55,997
Regulatory floor adjustment (3)	**11,138**	-
Total capital RWA	**$ 474,478**	$ 449,712
Capital ratios and Leverage ratio (1), (4)		
CET1 ratio	**10.9%**	10.8%
Tier 1 capital ratio	**12.3%**	12.3%
Total capital ratio	**14.2%**	14.4%
Leverage ratio	**4.4%**	4.4%
Leverage ratio exposure (billions)	**$ 1,315.5**	$ 1,265.1

(1) Capital, RWA, and capital ratios are calculated using OSFI Capital Adequacy Requirements based on the Basel III framework ("all-in" basis). The leverage ratio is calculated using OSFI Leverage Requirements Guideline based on the Basel III framework.

(2) In 2016, the CVA scalars of 64%, 71% and 77% were applied to CET1, Tier 1 and Total capital, respectively. In fiscal 2017, the scalars were 72%, 77% and 81%, respectively. In 2018, the scalars will be 80%, 83% and 86%, respectively.

(3) Before any capital floor requirement as applicable, there are three different levels of RWAs for the calculation of the CET1, Tier 1, and Total capital ratios arising from the option we have chosen for the phase-in of the CVA capital charge. Since the introduction of Basel II in 2008, OSFI has prescribed a capital floor requirement for institutions that use the advanced internal ratings-based (AIRB) approach for credit risk. The capital floor is determined by comparing a capital requirement under Basel I and Basel III, as specified by OSFI. If the capital requirement under the Basel III standards is less than 90% of the capital requirements as calculated under the Basel I standards, the difference is added to the RWAs.

(4) To enhance comparability among other global financial institutions, our transitional CET1, Tier 1, Total capital and leverage ratios as at October 31, 2017 were 11.3%, 12.3%, 14.1%, and 4.5%, respectively. Transitional is defined as capital calculated according to the current year's phase-in of regulatory adjustments and phase-out of non-qualifying capital instruments.

Regulatory Capital **Table 72**

	All-in basis	
(Millions of Canadian dollars)	**2017**	2016
CET1 capital: instruments and reserves and regulatory adjustments		
Directly issued qualifying common share capital (and equivalent for non-joint stock companies) plus related stock surplus	**$ 18,019**	$ 18,161
Retained earnings	**45,043**	41,217
Accumulated other comprehensive income (and other reserves)	**4,354**	4,926
Directly issued capital subject to phase out from CET1 (only applicable to non-joint stock companies)	**-**	-
Common share capital issued by subsidiaries and held by third parties (amount allowed in group CET1)	**13**	13
Regulatory adjustments applied to CET1 under Basel III	**(15,857)**	(16,136)
Common Equity Tier 1 capital (CET1)	**$ 51,572**	$ 48,181
Additional Tier 1 capital: instruments and regulatory adjustments		
Directly issued qualifying Additional Tier 1 instruments plus related stock surplus	**$ 3,825**	$ 3,825
Directly issued capital instruments to phase out from Additional Tier 1	**2,961**	3,261
Additional Tier 1 instruments issued by subsidiaries and held by third parties (amount allowed in group AT1)	**3**	3
Regulatory adjustments applied to Additional Tier 1 under Basel III	**-**	-
Additional Tier 1 capital (AT1)	**$ 6,789**	$ 7,089
Tier 1 capital (T1 = CET1 + AT1)	**$ 58,361**	$ 55,270
Tier 2 capital: instruments and provisions and regulatory adjustments		
Directly issued qualifying Tier 2 instruments plus related stock surplus	**$ 6,346**	$ 6,630
Directly issued capital instruments subject to phase out from Tier 2	**2,550**	2,738
Tier 2 instruments issued by subsidiaries and held by third parties (amount allowed in group Tier 2)	**12**	18
Collective allowance	**287**	294
Regulatory adjustments applied to Tier 2 under Basel III	**-**	-
Tier 2 capital (T2)	**$ 9,195**	$ 9,680
Total capital (T1 + T2)	**$ 67,556**	$ 64,950

2017 vs. 2016

Please see the PDF to view this chart

(1) Represents rounded figures.
(2) Internal capital generation of $6.0 billion which represents Net income available to shareholders, less common and preferred shares dividends.

Our CET1 ratio was 10.9%, up 10 bps from last year. Changes reflect internal capital generation and returns on our pension assets, partially offset by share repurchases, higher RWA due to business growth and a regulatory floor adjustment, and an update to our corporate and business lending risk parameters.

Our Tier 1 capital ratio of 12.3% was flat, mainly due to the factors noted above under the CET1 ratio, along with the redemption of preferred shares.

Our Total capital ratio of 14.2% was down 20 bps, mainly due to the factors noted above under the Tier 1 capital ratio.

Our Leverage ratio of 4.4% was flat, mainly due to internal capital generation and returns on our pension assets, fully offset by share repurchases and growth in leverage exposures, primarily in loans, repos-style transactions, and cash and deposits.

Basel III RWA

OSFI requires banks to meet minimum risk-based capital requirements for exposures to credit risk, operational risk, and, where they have significant trading activity, market risk. RWA is calculated for each of these risk types and added together to determine total RWA. In addition, OSFI requires the minimum risk-based capital to be no less than 90% of the capital requirements as calculated under the Basel I standards. If the capital requirement is less than 90%, a floor adjustment to RWA must be applied as prescribed by OSFI CAR guidelines.

Total capital risk-weighted assets **Table 73**

	2017						2016
			Risk-weighted assets				
As at October 31 (Millions of Canadian dollars, except percentage amounts)	**Exposure** (1)	**Average of risk weights** (2)	**Standardized approach**	**Advanced approach**	**Other**	**Total**	Total
Credit risk							
Lending-related and other							
Residential mortgages	**$ 243,462**	**7%**	**$ 5,823**	**$ 12,374**	**$ -**	**$ 18,197**	$ 17,364
Other retail	**239,041**	**22%**	**7,638**	**46,111**	**-**	**53,749**	52,164
Business	**313,550**	**60%**	**41,187**	**145,976**	**-**	**187,163**	186,285
Sovereign	**135,450**	**9%**	**2,930**	**8,805**	**-**	**11,735**	9,776
Bank	**135,527**	**8%**	**2,802**	**8,465**	**-**	**11,267**	11,801
Total lending-related and other	**$ 1,067,030**	**26%**	**$ 60,380**	**$ 221,731**	**$ -**	**$282,111**	$ 277,390
Trading-related							
Repo-style transactions	**$ 475,832**	**2%**	**$ 66**	**$ 8,379**	**$ 75**	**$ 8,520**	$ 7,924
Derivatives - including CVA - CET1 phase-in adjustment	**86,999**	**33%**	**603**	**15,977**	**11,808**	**28,388**	29,796
Total trading-related	**$ 562,831**	**7%**	**$ 669**	**$ 24,356**	**$11,883**	**$ 36,908**	$ 37,720
Total lending-related and other and trading-related	**$ 1,629,861**	**20%**	**$ 61,049**	**$ 246,087**	**$11,883**	**$319,019**	$ 315,110
Bank book equities	**3,096**	**113%**	**-**	**3,485**	**-**	**3,485**	2,362
Securitization exposures	**58,418**	**14%**	**2,386**	**6,076**	**-**	**8,462**	9,591
Regulatory scaling factor	**n.a.**	**n.a.**	**n.a.**	**15,306**	**-**	**15,306**	15,028
Other assets	**51,139**	**56%**	**n.a.**	**n.a.**	**28,836**	**28,836**	25,384
Total credit risk	**$ 1,742,514**	**22%**	**$ 63,435**	**$ 270,954**	**$40,719**	**$375,108**	$ 367,475
Market risk							
Interest rate			**$ 2,562**	**$ 4,348**	**$ -**	**$ 6,910**	$ 4,484
Equity			**1,461**	**1,371**	**-**	**2,832**	3,005

Foreign exchange		**671**	**64**	**-**	**735**	931
Commodities		**232**	**13**	**-**	**245**	326
Specific risk		**5,117**	**2,076**	**-**	**7,193**	5,730
Incremental risk charge		**-**	**9,703**	**-**	**9,703**	9,488
Total market risk		**$ 10,043**	**$ 17,575**	**$ -**	**$ 27,618**	$ 23,964
Operational risk		**$ 4,470**	**$ 54,733**	**n.a.**	**$ 59,203**	$ 55,997
Regulatory floor adjustment (3)				**12,549**	**12,549**	-
CET1 capital risk-weighted assets (4)	**$ 1,742,514**	**$ 77,948**	**$ 343,262**	**$53,268**	**$474,478**	$ 447,436
Additional CVA adjustment, prescribed by OSFI, for Tier 1 capital				**784**	**784**	1,226
Regulatory floor adjustment (3)				**(784)**	**(784)**	-
Tier 1 capital risk-weighted assets (4)	**$ 1,742,514**	**$ 77,948**	**$ 343,262**	**$53,268**	**$474,478**	$ 448,662
Additional CVA adjustment, prescribed by OSFI, for Total capital				**627**	**627**	1,050
Regulatory floor adjustment (3)				**(627)**	**(627)**	-
Total capital risk-weighted assets (4)	**$ 1,742,514**	**$ 77,948**	**$ 343,262**	**$53,268**	**$474,478**	$ 449,712

(1) Total exposure represents exposure at default which is the expected gross exposure upon the default of an obligor. This amount is before any allowance against impaired loans or partial write-offs and does not reflect the impact of credit risk mitigation and collateral held.
(2) Represents the average of counterparty risk weights within a particular category.
(3) Before any capital floor requirement as applicable, there are three different levels of RWAs for the calculation of the CET1, Tier 1, and Total capital ratios arising from the option we have chosen for the phase-in of the CVA capital charge. Since the introduction of Basel II in 2008, OSFI has prescribed a capital floor requirement for institutions that use the advanced internal ratings-based (AIRB) approach for credit risk. The capital floor is determined by comparing a capital requirement under Basel I and Basel III, as specified by OSFI. If the capital requirement under the Basel III standards is less than 90% of the capital requirements as calculated under the Basel I standards, the difference is added to the RWAs.
(4) In 2017, the CVA scalars of 72%, 77% and 81% were applied to CET1, Tier 1 and Total capital, respectively. In 2016, the CVA scalars were 64%, 71% and 77%, respectively.
n.a. not applicable.

2017 vs. 2016
During the year, CET1 RWA was up $27 billion, primarily reflecting business growth, mainly in loans, securities lending and securitizations, and trading portfolios, the regulatory floor adjustment, and an update to our corporate and business lending risk parameters, partially offset by the impact of foreign exchange translation.

Selected capital management activity
The following table provides our selected capital management activity:

Selected capital management activity **Table 74**

(Millions of Canadian dollars, except number of shares)	2017 Issuance or redemption date	Number of shares (000s)	Amount
Tier 1 capital			
Common shares activity			
Issued in connection with share-based compensation plans (1)		**3,477**	**$ 227**
Purchased for cancellation (2)		**(35,973)**	**(436)**
Redemption of preferred shares, Series AB	**September 27, 2017**	**(12,000)**	**(300)**
Tier 2 capital			
Redemption of June 26, 2037 subordinated debentures	**June 26, 2017**		**119**

(1) Amounts include cash received for stock options exercised during the period and includes fair value adjustments to stock options.
(2) During the year ended October 31, 2017, we purchased common shares for cancellation at an average cost of $86.47 per share with a book value of $12.15 per share.

On March 9, 2017, we announced a normal course issuer bid (NCIB) to purchase up to 30 million of our common shares, commencing on March 14, 2017 and continuing until March 10, 2018, or such earlier date as we complete the repurchase of all shares permitted under the bid. We determine the amount and timing of the purchases under the NCIB, subject to prior consultation with OSFI. Purchases may be made through the TSX, the NYSE and other designated exchanges and alternative Canadian trading systems. The price paid for such repurchased shares has been and will be the prevailing market price at the time of acquisition. Purchases may also be made through other means permitted by the TSX and applicable securities laws, including under specific share repurchase programs pursuant to issuer bid exemption orders issued by applicable securities regulatory authorities. Any purchases made under an exemption order will generally be at a discount to the prevailing market price. In 2016, we announced a normal course issuer bid for the purchase of 20 million shares, which commenced on June 1, 2016 and was completed on March 7, 2017. In 2017, the total number of common shares repurchased under our NCIB programs was approximately 36 million. The total cost of the shares repurchased was $3,110 million, comprised of a book value of $436 million and an additional premium paid on repurchase of $2,674 million.

On June 26, 2017, we redeemed all ¥10,000 million outstanding 2.86% subordinated debentures due June 26, 2037 for 100% of their principal amount plus accrued interest to the redemption date. The redemption was completed on June 26, 2017.

On September 27, 2017, we redeemed all 12 million issued and outstanding Non-cumulative First Preferred Shares, Series AB, for cash at a redemption price of $25 per share.

On November 13, 2017, we redeemed all 82,050 issued and outstanding Non-cumulative Perpetual First Preferred Shares, Series C-1, for cash at a redemption price of US$1,000 per share.

Dividends

Our common share dividend policy reflects our earnings outlook, payout ratio objective and the need to maintain adequate levels of capital to support business plans. In 2017, our dividend payout ratio was 46%, which met our dividend payout ratio target of 40% to 50%. Common share dividends paid during the year were $5.1 billion.

Selected share data (1) **Table 75**

As at October 31 (Millions of Canadian dollars, except number of shares and as otherwise noted)	**2017** **Number of shares** (000s)	**Amount**	**Dividends declared per share**	2016 Number of shares (000s)	Amount	Dividends declared per share
Common shares outstanding (1)	**1,452,898**	**$ 17,730**	**$ 3.48**	1,485,394	$ 17,939	$ 3.24
First preferred shares outstanding						
Non-cumulative Series W (2)	**12,000**	**300**	**1.23**	12,000	300	1.23
Non-cumulative Series AA	**12,000**	**300**	**1.11**	12,000	300	1.11
Non-cumulative Series AB (3)	**-**	**-**	**0.99**	12,000	300	1.18
Non-cumulative Series AC	**8,000**	**200**	**1.15**	8,000	200	1.15
Non-cumulative Series AD	**10,000**	**250**	**1.13**	10,000	250	1.13
Non-cumulative Series AE	**10,000**	**250**	**1.13**	10,000	250	1.13
Non-cumulative Series AF	**8,000**	**200**	**1.11**	8,000	200	1.11
Non-cumulative Series AG	**10,000**	**250**	**1.13**	10,000	250	1.13
Non-cumulative Series AJ (4)	**13,579**	**339**	**0.88**	13,579	339	0.88
Non-cumulative Series AK (4)	**2,421**	**61**	**0.62**	2,421	61	0.60
Non-cumulative Series AL (4)	**12,000**	**300**	**1.07**	12,000	300	1.07
Non-cumulative Series AZ (4), (5)	**20,000**	**500**	**1.00**	20,000	500	1.00
Non-cumulative Series BB (4), (5)	**20,000**	**500**	**0.98**	20,000	500	0.98
Non-cumulative Series BD (4), (5)	**24,000**	**600**	**0.90**	24,000	600	0.90
Non-cumulative Series BF (4), (5)	**12,000**	**300**	**0.90**	12,000	300	0.90
Non-cumulative Series BH (5)	**6,000**	**150**	**1.23**	6,000	150	1.23
Non-cumulative Series BI (5)	**6,000**	**150**	**1.23**	6,000	150	1.23
Non-cumulative Series BJ (5)	**6,000**	**150**	**1.31**	6,000	150	1.51
Non-cumulative Series BK (4), (5)	**29,000**	**725**	**1.38**	29,000	725	1.29

Non-cumulative Series BM (4), (5)	**30,000**	**750**	**1.38**	30,000	750	0.98
Non-cumulative Series C-1 (6)	**82**	**107**	**US$ 55.00**	82	107	US$55.00
Non-cumulative Series C-2 (6)	**20**	**31**	**US$ 67.50**	20	31	US$67.50
Treasury shares held - preferred	**6**	**-**		31	-	
Treasury shares held - common	**(363)**	**(27)**		(1,159)	(80)	
Stock options						
Outstanding	**9,315**			11,388		
Exercisable	**4,337**			6,909		
Available for grant (7)	**9,933**			9,267		
Dividends						
Common		**5,096**			4,817	
Preferred		**300**			294	

(1) For further details about our capital management activity, refer to Note 21 of our 2017 Annual Consolidated Financial Statements.
(2) Effective February 24, 2010, we have the right to convert these shares into common shares at our option, subject to certain restrictions.
(3) On September 27, 2017, we redeemed all 12 million issued and outstanding Non-cumulative First Preferred Shares, Series AB, for cash at a redemption price of $25 per share.
(4) Dividend rate will reset every five years.
(5) Non-viable contingent capital (NVCC) instruments.
(6) Represents 3,282,000 and 815,400 depositary shares relating to preferred shares Series C-1 and Series C-2, respectively. Each depositary share represents one-fortieth interest in a share of Series C-1 and Series C-2, respectively.
(7) 2016 amount excludes 2.1 million stock options available for grant, which became available upon the exercise of tandem stock appreciation rights prior to November 1, 2015.

As at November 24, 2017, the number of outstanding common shares and stock options and awards was 1,453,039,318 and 9,124,811, respectively, and the number of Treasury shares - preferred and Treasury shares - common was (99,367) and (202,634), respectively.

NVCC provisions require the conversion of the capital instrument into a variable number of common shares in the event that OSFI deems a bank to be non-viable or a federal or provincial government in Canada publicly announces that a bank has accepted or agreed to accept a capital injection. If a NVCC trigger event were to occur, our NVCC capital instruments, which are the preferred shares Series AZ, preferred shares Series BB, preferred shares Series BD, preferred shares Series BF, preferred shares Series BH, preferred shares Series BI, preferred shares Series BJ, preferred shares Series BK, preferred shares Series BM, subordinated debentures due on July 17, 2024, subordinated debentures due on September 29, 2026, subordinated debentures due on June 4, 2025, subordinated debentures due on January 20, 2026 and subordinated debentures due on January 27, 2026, would be converted into RBC common shares pursuant to an automatic conversion formula with a conversion price based on the greater of: (i) a contractual floor price of $5.00, and (ii) the current market price of our common shares at the time of the trigger event (10-day weighted average). Based on a floor price of $5.00 and including an estimate for accrued dividends and interest, these NVCC capital instruments would convert into a maximum of 2,739 million RBC common shares, in aggregate, which would represent a dilution impact of 65.34% based on the number of RBC common shares outstanding as at October 31, 2017.

Attributed capital

Our methodology for allocating capital to our business segments is based on the higher of fully diversified economic capital and the Basel III regulatory capital requirements. Risk-based capital attribution provides a uniform base for performance measurement among business segments, which compares to our overall corporate return objective and facilitates management decisions in resource allocation in conjunction with other factors.

Attributed capital is calculated and attributed on a wider array of risks compared to Basel III regulatory capital requirements, which are calibrated predominantly to target credit, market (trading) and operational risk measures. Economic capital is our internal quantification of risks associated with business activities which is the capital required to remain solvent under extreme market conditions, reflecting our objective to maintain strong credit ratings. Economic capital is calculated based on credit, market (trading and non-trading), operational, business and fixed asset, and insurance risks, along with capital attribution for goodwill and other intangibles. The common risks between the two frameworks are aligned to reflect increased regulatory requirements.

- Business risk is the risk of loss or harm due to variances in volumes, prices and costs caused by competitive forces, regulatory changes, reputation and strategic risks.
- Fixed asset risk is defined as the risk that the value of fixed assets will be less than their book value at a future date.

For further discussion on Credit, Market, Operational and Insurance risks, refer to the Risk management section.

Attributed capital is also used to assess the adequacy of our capital base. Our policy is to maintain a level of available capital, defined as common equity and other capital instruments with equity-like loss absorption features such as preferred shares that exceed Economic capital with a comfortable cushion.

The calculation and attribution of capital involves a number of assumptions and judgments by management which are monitored to ensure that the economic capital framework remains comprehensive and consistent. The models are benchmarked to leading industry practices via participation in surveys, reviews of methodologies and ongoing interaction with external risk management industry professionals.

The following outlines our attributed capital:

Attributed capital **Table 76**

(Millions of Canadian dollars)	**2017**	2016
Credit risk	**$21,450**	$ 20,550
Market risk (trading and non-trading)	**3,250**	3,200
Operational risk	**5,200**	4,900
Business and fixed asset risk	**3,200**	3,100
Insurance risk	**650**	650
Goodwill and other intangibles	**15,550**	16,100
Regulatory capital allocation	**10,950**	8,900
Attributed capital	**$60,250**	$ 57,400
Unattributed capital	**5,050**	4,800
Average common equity	**$65,300**	$ 62,200

2017 vs. 2016

Attributed capital increased $3 billion, mainly reflecting business growth, higher capital attribution rate, and the update to our corporate and business lending risk parameters.

We remain well capitalized with current levels of available capital exceeding the attributed capital required to underpin all of our material risks.

Attributed capital in the context of our business activities

In carrying out our business activities, we are exposed to a range of risks. The following chart provides a high level view of risks within our business segments, which includes credit, market and operational risks. We have used attributed capital to illustrate the relative size of the risks in each of our businesses. The attributed capital distribution reflects the diversified nature of our business activities. RWA represents our exposure to credit, market and operational risk for regulatory capital requirements.

Within Personal & Commercial Banking, credit risk is the most significant risk, largely related to our personal financial services, business financial services and cards businesses. The primary risks within Wealth Management, which provides services to institutional and individual clients, are operational risk and credit risk. Risks within our Insurance operations are primarily related to insurance risk in our life and health businesses followed by market risk and operational risk. The largest risk within Investor & Treasury Services is market risk, followed by credit risk and operational risk. The most significant risk within Capital Markets is credit risk, followed by market risk.

For additional information on the risks highlighted below, refer to the Risk management section.

Please see the PDF to view this chart

(1) Attributed capital: An estimate of the amount of equity capital required to underpin risks. It is calculated by estimating the level of capital that is necessary to support our various businesses, given their risks, consistent with our desired solvency standard and credit ratings.
(2) Market risk attributed capital: An estimate of the amount of equity capital required to underpin trading market risk and interest rate risk.
(3) Other - RBC: Includes (a) an estimate of the amount of equity capital required to underpin risks associated with business, fixed assets and insurance risks; (b) a regulatory capital adjustment since attributed capital is determined at the higher of regulatory or economic capital; and (c) unattributed capital reported representing common equity in excess of common equity attributed to our business segments which is reported in the Corporate Support segment only.
(4) RWA amount represents RWA for CET1.
(5) RWA regulatory floor adjustment is not attributed to business segments.
(6) Other - Business segments: Includes (a) an estimate of the amount of equity capital required to underpin risks associated with business, fixed assets and insurance risks; and (b) a regulatory capital adjustment since attributed capital is determined at the business segment level as the greater of regulatory or economic capital.
(7) Insurance RWA amount above represents our investments in the insurance subsidiaries capitalized at the regulatory prescribed rate as required under Basel CAR filing.

Subsidiary capital

Our capital management framework includes the management of subsidiaries' capital. We invest capital across the enterprise to meet local regulators' capital adequacy requirements and maximize returns to our shareholders. We set guidelines for defining capital investments in our subsidiaries and manage the relationship between capital invested in subsidiaries and our consolidated capital base to ensure that we can access capital recognized in our consolidated regulatory capital measurements.

Each of our subsidiaries has responsibility for maintaining compliance with local regulatory capital adequacy requirements, which may include restrictions on the transfer of assets in the form of cash, dividends, loans or advances. Concurrently, Corporate Treasury provides centralized oversight of capital adequacy across all subsidiary entities.

Other considerations affecting capital

Capital treatment for equity investments in other entities is determined by a combination of accounting and regulatory guidelines based on the size or nature of the investment. Three broad approaches apply as follows:

- Consolidation: entities which we control are consolidated on our Consolidated Balance Sheets.
- Deduction: certain holdings are deducted from our regulatory capital. These include all unconsolidated "substantial investments," as defined by *the Bank Act* (Canada) in the capital of financial institutions, as well as all investments in insurance subsidiaries.
- Risk weighting: equity investments that are not deducted from capital are risk weighted at a prescribed rate for determination of capital charges.

Regulatory capital approach for securitization exposures

For our securitization exposures, we use an internal assessment approach (IAA) for exposures related to our ABCP business, and for other securitization exposures we use a combination of approaches including a ratings-based approach and the standardized approach.

While our IAA rating methodologies are based in large part on criteria that are published by External Credit Assessment Institutions (ECAIs) such as S&P and therefore are similar to the methodologies used by these institutions, they are not identical. Our ratings process includes a comparison of the available credit enhancement in a securitization structure to a stressed level of projected losses. The stress level used is determined by the desired risk profile of the transaction. As a result, we stress the cash flows of a given transaction at a higher level in order to achieve a higher rating. Conversely, transactions that only pass lower stress levels achieve lower ratings.

Most of the other securitization exposures (non-ABCP) carry external ratings and we use the lower of our own rating or the lowest external rating for determining the proper capital allocation for these positions. We periodically compare our own ratings to ECAIs ratings to ensure that the ratings provided by ECAIs are reasonable.

GRM is responsible for providing risk assessments for capital purposes in respect of all our banking book exposures. GRM is independent of the business originating the securitization exposures and performs its own analysis, sometimes in conjunction with but always independent of the applicable business. GRM has developed asset class specific criteria guidelines which provide the rating methodologies for each asset class. The guidelines are reviewed periodically and are subject to the ratings replication process mandated by Pillar I of the Basel rules.

Accounting and control matters

Critical accounting policies and estimates

Application of critical accounting policies, judgments, estimates and assumptions

Our significant accounting policies are described in Note 2 to our 2017 Annual Consolidated Financial Statements. Certain of these policies and related estimates are recognized as critical because they require us to make particularly subjective or complex judgments about matters that are inherently uncertain and significantly different amounts could be reported under different conditions or using different assumptions. Our critical accounting judgments, estimates and assumptions relate to the fair value of financial instrument and securities impairment, allowance for credit losses, goodwill and other intangible assets, employee benefits, consolidation, derecognition of financial assets, application of the effective interest method, provisions, insurance claims and policy benefit liabilities, income taxes, and deferred revenue on our customer loyalty program. Our critical accounting policies and estimates have been reviewed and approved by our Audit Committee, in consultation with management, as part of their review and approval of our significant accounting policies, judgments, estimates and assumptions.

Fair value of financial instruments and securities impairment

The fair value of a financial instrument is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. We determine fair value by incorporating factors that market participants would consider in setting a price, including commonly accepted valuation approaches.

We give priority to third-party pricing services and valuation techniques with the highest and most consistent accuracy. The level of accuracy is determined over time by comparing third-party price values to traders' or system values, other pricing service values and, when available, actual trade data. Other valuation techniques are used when a price or quote is not available. Some valuation processes use models to determine fair value. We have a systematic and consistent approach to control model use.

In determining fair value, a hierarchy is used which prioritizes the inputs to valuation techniques. The fair value hierarchy gives the highest priority to unadjusted quoted prices in active markets and the lowest priority to unobservable inputs. Fair values established based on this hierarchy require the use of observable market data whenever available. Level 1 inputs are unadjusted quoted prices in active markets for identical assets or liabilities that we have the ability to access at the measurement date. Level 2 inputs include quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active, and model inputs that are either observable, or can be corroborated by observable market data for substantially the full term of the assets or liabilities. Level 3 inputs are one or more inputs that are unobservable and significant to the fair value of the asset or liability. Unobservable inputs are used to measure fair value to the extent that observable inputs are not available at the measurement date. The availability of inputs for valuation may affect the selection of valuation techniques. The classification of a financial instrument in the fair value hierarchy for disclosure purposes is based upon the lowest level of input that is significant to the measurement of fair value.

Where observable prices or inputs are not available, management judgment is required to determine fair values by assessing other relevant sources of information such as historical data, proxy information from similar transactions, and through extrapolation and interpolation techniques. For more complex or illiquid instruments, significant judgment is required to determine the model used, select the model inputs, and in some cases, apply valuation adjustments to the model value or quoted price for inactively traded financial instruments. The selection of model inputs may be subjective and the inputs may be unobservable. Unobservable inputs are inherently uncertain as there is little or no market data available from which to determine the level at which the transaction would occur under normal business circumstances. Appropriate parameter uncertainty and market risk valuation adjustments for such inputs and other model risk valuation adjustments are assessed in all such instances.

Valuation adjustments may be subjective as they require significant judgment in the input selection, such as the probability of default and recovery rate, and are intended to arrive at a fair value that is determined based on assumptions that market participants would use in pricing the financial instrument. The realized price for a transaction may be different from its recorded value that was previously estimated using management judgment, and may therefore impact unrealized gains and losses recognized in Non-interest income - Trading revenue or Other.

At each reporting date or more frequently when conditions warrant, we evaluate our AFS securities to determine whether there is any objective evidence of impairment, such as a significant or prolonged decline in the fair value of the security below its cost or when an adverse effect on future cash flows from the security can be reliably estimated. Evidence of impairment includes, but is not limited to, delinquency or default, bankruptcy, restructuring or other events that may question the issuer's creditworthiness. When assessing impairment for debt instruments we primarily consider counterparty ratings and security-specific factors, including collateral, external ratings, subordination and other market factors. For complex debt instruments including U.S. non-agency MBS, ABS and other structured products, we also use cash flow projection models which incorporate actual and projected cash flows for each security using a number of assumptions and inputs that are based on security specific factors. The inputs and assumptions used, such as default, prepayment and recovery rates, are based on updated market data. In addition, we consider the transaction structure and credit enhancement for structured securities. If results indicate that we will not be able to recover the entire principal and interest amount, we do a further review of the security in order to assess whether a loss would ultimately be realized. As equity securities do not have contractual cash flows, they are assessed differently than debt securities. When assessing equity securities for impairment, we consider factors that include the length of time and extent the fair value has been below cost and the financial condition and near term prospects of the issuer. We also consider the estimated recoverable value and the period of recovery. Refer to Note 4 to our 2017 Annual Consolidated Financial Statements for more information.

Allowance for credit losses

We maintain an allowance for credit losses relating to on-balance sheet exposures, such as loans and acceptances, and off-balance sheet items such as letters of credit, guarantees and unfunded commitments, at levels that we consider appropriate to cover credit-related losses incurred as at the balance sheet date.

Loans which are individually significant are assessed individually for objective indicators of impairment. A loan is considered impaired when we determine that we will not be able to collect all amounts due according to the original contractual terms. Credit exposures of individually significant loans are evaluated based on factors including the borrower's overall financial condition, resources and payment record, and where applicable, the realizable value of any collateral. If there is evidence of impairment leading to an impairment loss, then the amount of the loss is determined as the difference between the carrying value of the loan, including accrued interest, and the estimated recoverable amount. The estimated recoverable amount is measured as the present value of expected future cash flows discounted at the loan's original effective interest rate, including cash flows that may result from the realization of collateral less costs to sell.

Loans which are not individually significant, or which are individually assessed and not determined to be impaired, are collectively assessed for impairment. For the purposes of a collective evaluation of impairment, loans are grouped on the basis of similar credit risk characteristics, taking into account loan type, industry, geographic location, collateral type, past due status and other relevant factors. The collective impairment allowance is determined by reviewing factors including: (i) historical loss experience, which takes into consideration historical probabilities of default, loss given default and exposure at default, and (ii) management's judgment on the level of impairment losses based on historical experience relative to the actual level as reported at the balance sheet date, taking into consideration the current portfolio credit quality trends; business, economic and credit conditions; the impact of policy and process changes; and other supporting factors. Future cash flows for a group of loans are collectively evaluated for impairment on the basis of contractual cash flows and historical loss experience for loans with credit risk characteristics similar to those in the group. We use historical loss experience and normalize observable inputs for current and past conditions that are not relevant to the assessment performed for the current reporting period. The methodology and assumptions used for estimating future cash flows are reviewed regularly to reduce any differences between loss estimates and actual loss experience.

Loans and the related impairment allowance for credit losses are written off, either partially or in full, when there is no realistic prospect of recovery. Where loans are secured, they are generally written off after receipt of any proceeds from the realization of the collateral. In circumstances where the net realizable value of any collateral has been determined and there is no reasonable expectation of further recovery, write off may be earlier.

For further information on allowance for credit losses, refer to Note 5 to our 2017 Annual Consolidated Financial Statements.

Goodwill and other intangible assets

We allocate goodwill to groups of cash-generating units (CGU). Goodwill is not amortized and is tested for impairment on an annual basis, or more frequently if there are objective indications of impairment. We test for impairment by comparing the recoverable amount of a CGU with its carrying amount.

We estimate the value in use and fair value less costs of disposal of our CGUs primarily using a discounted cash flow method which incorporates each CGU's internal forecasts of revenues and expenses. Significant management judgment is applied in the determination of expected future cash flows (uncertainty in timing and amount), discount rates (based on CGU-specific risks) and terminal growth rates. CGU-specific risks include country risk, business/operational risk, geographic risk (including political risk, devaluation risk and government regulation), currency risk and price risk (including product pricing risk and inflation). If the forecast earnings and other assumptions in future periods deviate significantly from the current amounts used in our impairment testing, the value of our goodwill could become impaired.

We assess for indicators of impairment of our other intangible assets at each reporting period. If there is an indication that an asset may be impaired, an impairment test is performed by comparing the carrying amount of the intangible asset to its recoverable amount. Where it is not possible to estimate the recoverable amount of an individual asset, we estimate the recoverable amount of the CGU to which the asset belongs. Significant judgment is applied in estimating the useful lives and recoverable amounts of our intangible assets and assessing whether certain events or circumstances constitute objective evidence of impairment. We do not have any other intangible assets with indefinite lives.

For further details, refer to Notes 2 and 10 to our 2017 Annual Consolidated Financial Statements.

Employee benefits

We sponsor a number of benefit programs for eligible employees, including registered pension plans, supplemental pension plans, health, dental, disability and life insurance plans.

The calculation of defined benefit expenses and obligations depends on various assumptions such as discount rates, healthcare cost trend rates, projected salary increases, retirement age, and mortality and termination rates. Discount rates are determined using a yield curve based on spot rates from high quality corporate bonds. All other assumptions are determined by us and are reviewed by the actuaries. Actual experience that differs from the actuarial assumptions will affect the amounts of benefit obligations and remeasurements that we recognize. The weighted average assumptions used and the sensitivity of key assumptions are presented in Note 17 to our 2017 Annual Consolidated Financial Statements.

Consolidation of structured entities

Subsidiaries are those entities, including structured entities, over which we have control. We control an entity when we are exposed, or have rights, to variable returns from our involvement with the entity and have the ability to affect those returns through our power over the investee. We have power over an entity when we have existing rights that give us the current ability to direct the activities that most significantly affect the entity's returns (relevant activities). Power may be determined on the basis of voting rights or, in the case of structured entities, other contractual arrangements.

We are not deemed to control an entity when we exercise power over an entity as the agent of a third party or parties. In determining whether we are acting as an agent, we consider the overall relationship between us, the investee and other parties to the arrangement with respect to the following factors: (i) the scope of our decision making power; (ii) the rights held by other parties; (iii) the remuneration to which we are entitled; and (iv) our exposure to variability of returns.

The determination of control is based on the current facts and circumstances and is continuously assessed. In some circumstances, different factors and conditions may indicate that various parties control an entity depending on whether those factors and conditions are assessed in isolation or in totality. Significant judgment is applied in determining whether we control an entity, specifically, assessing whether we have substantive decision making rights over the relevant activities and whether we are exercising our power as a principal or an agent.

We consolidate all subsidiaries from the date control is transferred to us, and cease consolidation when an entity is no longer controlled by us. Our consolidation conclusions affect the classification and amount of assets, liabilities, revenues and expenses reported in our Consolidated Financial Statements.

For further details, refer to the Note 7 to our 2017 Annual Consolidated Financial Statements.

Derecognition of financial assets

We periodically enter into transactions in which we transfer financial assets such as loans or mortgage-backed securities to structured entities or trusts that issue securities to investors. We derecognize the assets when our contractual rights to the cash flows from the assets have expired; when we retain the rights to receive the cash flows but assume an obligation to pay those cash flows to a third party subject to certain pass-through requirements; or when we transfer our contractual rights to receive the cash flows and substantially all of the risks and rewards of the assets have been transferred. When we retain substantially all of the risks and rewards of the transferred assets, the transferred assets are not derecognized from our Consolidated Balance Sheets and are accounted for as secured financing transactions. When we neither retain nor transfer substantially all risks and rewards of ownership of the assets, we derecognize the assets if control over the assets is relinquished. If we retain control over the transferred assets, we continue to recognize the transferred assets to the extent of our continuing involvement. Management's judgment is applied in determining whether we have transferred or retained substantially all risk and rewards of ownership of the transferred financial asset.

The majority of assets transferred under repurchase agreements, securities lending agreements, and in our Canadian residential mortgage securitization transactions do not qualify for derecognition. As a result, we continue to record the associated transferred assets on our Consolidated Balance Sheets and no gains or losses are recognized for those securitization activities. Otherwise, a gain or loss is recognized on securitization by comparing the carrying amount of the transferred asset with its fair value at the date of the transfer. For further information on derecognition of financial assets, refer to Note 6 to our 2017 Annual Consolidated Financial Statements.

Application of the effective interest method

Interest is recognized in Interest income and Interest expense in the Consolidated Statements of Income for all interest bearing financial instruments using the effective interest method. The effective interest rate is the rate that discounts estimated future cash flows over the expected life of the financial asset or liability to the net carrying amount upon initial recognition. Significant judgment is applied in determining the effective interest rate due to uncertainty in the timing and amounts of future cash flows.

Provisions

Provisions are liabilities of uncertain timing or amount and are recognized when we have a present legal or constructive obligation as a result of a past event, it is probable that an outflow of resources will be required to settle the obligation, and a reliable estimate can be made of the amount of the obligation. We record provisions related to litigation, asset retirement obligations, and the allowance for off-balance sheet and other items. Provisions are recorded under Other liabilities on our Consolidated Balance Sheets.

Provisions are measured as the best estimate of the consideration required to settle the present obligation at the reporting date. Significant judgment is required in determining whether a present obligation exists and in estimating the probability, timing and amount of any outflows. The forward-looking nature of these estimates requires us to use a significant amount of judgment in projecting the timing and amount of future cash flows. We record our provisions on the basis of all available information at the end of the reporting period and make adjustments on a quarterly basis to reflect current expectations. Should actual results differ from our expectations, we may incur expenses in excess of the provisions recognized.

When some or all of the economic benefits required to settle a provision are expected to be recovered from a third party, such as an insurer, a separate asset is recognized if it is virtually certain that reimbursement will be received.

Insurance claims and policy benefit liabilities

Insurance claims and policy benefit liabilities represent current claims and estimates for future insurance policy benefits. Liabilities for life insurance contracts are determined using the Canadian Asset Liability Method, which incorporates assumptions for mortality, morbidity, policy lapses and surrenders, investment yields, policy dividends, operating and policy maintenance expenses, and provisions for adverse deviation. These assumptions are reviewed at least annually and updated in response to actual experience and market conditions. Liabilities for property and casualty insurance represent estimated provisions for reported and unreported claims. Liabilities for life and property and casualty insurance are included in Insurance claims and policy benefit liabilities. Changes in Insurance claims and policy benefit liabilities are included in the Insurance policyholder benefits, claims and acquisition expense in our Consolidated Statements of Income in the period in which the estimates change. Refer to Note 15 to our 2017 Annual Consolidated Financial Statements for further information.

Income taxes

We are subject to income tax laws in various jurisdictions where we operate, and the complex tax laws are potentially subject to different interpretations by us and the relevant taxation authority. Management's judgment is applied in interpreting the relevant tax laws and estimating the expected timing and amount of the provision for current and deferred income taxes. A deferred tax asset or liability is determined for each temporary difference based on the tax rates that are expected to be in effect in the period that the asset is realized or the liability is settled. Where the temporary differences will not reverse in the foreseeable future, no deferred tax amount is recognized.

On a quarterly basis, we review whether it is probable that the benefits associated with our deferred tax assets will be realized, using both positive and negative evidence. Refer to Note 23 to our 2017 Annual Consolidated Financial Statements for further information.

Future changes in accounting policy and disclosure

IFRS 9 *Financial Instruments* (IFRS 9)

In July 2014, the IASB issued the complete version of IFRS 9, which brings together the classification and measurement, impairment and hedge accounting phases of the IASB's project to replace IAS 39 *Financial Instruments: Recognition and Measurement* (IAS 39).

In January 2015, OSFI issued an advisory with respect to the early adoption of IFRS 9 for D-SIBs, requiring D-SIBs to adopt IFRS 9 for the annual period beginning on November 1, 2017. As a result, we are required to adopt IFRS 9 on November 1, 2017, with the exception of the own credit provisions of IFRS 9, which we adopted in the second quarter of 2014.

In June 2016, OSFI issued its final guideline on *IFRS 9 Financial Instruments and Disclosures*. The guideline provides guidance to Federally Regulated Entities on the application of IFRS 9, including the implementation of the expected credit loss framework under IFRS 9. The OSFI guideline is effective for us on November 1, 2017, consistent with the adoption of IFRS 9.

The new classification and measurement and impairment requirements will be applied by adjusting our Consolidated Balance Sheet on November 1, 2017, the date of initial application, with no restatement of comparative period financial information. Based on current estimates, the adoption of IFRS 9 is expected to result in a reduction to retained earnings as at November 1, 2017 of approximately $600 million, net of taxes. The impact is primarily attributable to increases in the allowance for credit losses under the new impairment requirements. We do not expect the adoption of IFRS 9 to have a significant impact on our CET1 capital. We continue to monitor and refine certain elements of our impairment process in advance of Q1 2018 reporting.

Classification and measurement

IFRS 9 introduces a principles-based approach to the classification of financial assets. Debt instruments, including hybrid contracts, are measured at fair value through profit or loss (FVTPL), FVOCI or amortized cost based on the nature of the cash flows of the assets and an entity's business model. These categories replace the existing IAS 39 classifications of FVTPL, AFS, loans and receivables, and held-to-maturity. Equity instruments are measured at FVTPL, unless they are not held for trading purposes, in which case an irrevocable election can be made on initial recognition to measure them at FVOCI with no subsequent reclassification to profit or loss.

For financial liabilities, most of the pre-existing requirements for classification and measurement previously included in IAS 39 were carried forward unchanged into IFRS 9. The requirements related to the fair value option for financial liabilities, which were adopted in 2014, were changed to address the treatment of own credit risk.

The combined application of the contractual cash flow characteristics and business model tests as at November 1, 2017 is expected to result in certain differences in the classification of financial assets when compared to our classification under IAS 39. The most significant changes include the following:

- Approximately $25 billion of debt securities previously classified as AFS are expected to be classified as amortized cost based on a held-to-collect business model.
- Approximately $2.5 billion of securities previously classified as AFS are expected to be classified as FVTPL, primarily representing equities and debt securities whose cash flows do not represent solely payments of principal and interest.

Impairment

IFRS 9 introduces an expected credit loss impairment model that differs significantly from the incurred loss model under IAS 39 and is expected to result in earlier recognition of credit losses. Additional details on the key elements of the new expected credit loss model are described below.

Scope

Under IFRS 9, the same impairment model is applied to all financial assets, except for financial assets classified or designated as at FVTPL and equity securities designated as at FVOCI, which are not subject to impairment assessment. The scope of the IFRS 9 expected credit loss impairment model includes amortized cost financial assets, debt securities classified as at FVOCI, and off balance sheet loan commitments and financial guarantees which were previously provided for under IAS 37 *Provisions, Contingent Liabilities and Contingent Assets* (IAS 37). The above-mentioned reclassifications into or out of these categories under IFRS 9 and items that previously fell under the IAS 37 framework were considered in determining the scope of our application of the new expected credit loss impairment model.

Expected credit loss impairment model

Under IFRS 9, credit loss allowances will be measured on each reporting date according to a three-stage expected credit loss impairment model:

- Stage 1 - From initial recognition of a financial asset to the date on which the asset has experienced a significant increase in credit risk relative to its initial recognition, a loss allowance is recognized equal to the credit losses expected to result from defaults occurring over the next 12 months.
- Stage 2 - Following a significant increase in credit risk relative to the initial recognition of the financial asset, a loss allowance is recognized equal to the credit losses expected over the remaining lifetime of the asset.
- Stage 3 - When a financial asset is considered to be credit-impaired, a loss allowance equal to full lifetime expected credit losses will be recognized. Interest revenue is calculated based on the carrying amount of the asset, net of the loss allowance, rather than on its gross carrying amount.

Stage 1 and Stage 2 credit loss allowances effectively replace the collectively-assessed allowance for loans not yet identified as impaired recorded under IAS 39, while Stage 3 credit loss allowances effectively replace the individually and collectively assessed allowances for impaired loans. Under IFRS 9, the population of financial assets and corresponding allowances disclosed as Stage 3 will not necessarily correspond to the amounts of financial assets currently disclosed as impaired in accordance with IAS 39. Consistent with IAS 39, loans are written off when there is no realistic probability of recovery. Accordingly, our policy on when financial assets are written-off will not significantly change on adoption of IFRS 9.

Because all financial assets within the scope of the IFRS 9 impairment model will be assessed for at least 12-months of expected credit losses, and the population of financial assets to which full lifetime expected credit losses applies is larger than the population of impaired loans for which there is objective evidence of impairment in accordance with IAS 39, loss allowances are generally expected to be higher under IFRS 9 relative to IAS 39.

Changes in the required credit loss allowance, including the impact of movements between Stage 1 (12 month expected credit losses) and Stage 2 (lifetime expected credit losses), will be recorded in profit or loss. Because of the impact of moving between 12 month and lifetime expected credit losses and the application of forward looking information, provisions are expected to be more volatile under IFRS 9 than IAS 39.

Measurement

The measurement of expected credit losses will primarily be based on the product of the instrument's probability of default (PD), loss given default (LGD), and exposure at default (EAD), discounted to the reporting date. The main difference between Stage 1 and Stage 2 expected credit losses is the respective PD horizon. Stage 1 estimates will use a maximum of a 12-month PD while Stage 2 estimates will use a lifetime PD. Stage 3 estimates will continue to leverage existing processes for estimating losses on impaired loans, however, these processes will be updated to reflect the requirements of IFRS 9, including the requirement to consider multiple forward-looking scenarios.

An expected credit loss estimate will be produced for each individual exposure, including amounts which are subject to a more simplified model for estimating expected credit losses; however the relevant parameters will be modeled on a collective basis using largely the same underlying data pool supporting our stress testing and regulatory capital expected loss processes. Models have been developed, primarily leveraging our existing models for enterprise-wide stress testing.

For the small percentage of our portfolios that lack detailed historical information and/or loss experience, we will apply simplified measurement approaches that may differ from what is described above. These approaches have been designed to maximize the available information that is reliable and supportable for each portfolio and may be collective in nature.

Expected credit losses must be discounted to the reporting period using the effective interest rate, or an approximation thereof.

Movement between stages

Movements between Stage 1 and Stage 2 are based on whether an instrument's credit risk as at the reporting date has increased significantly relative to the date it was initially recognized. For the purposes of this assessment, credit risk is based on an instrument's lifetime PD, not the losses we expect to incur. The assessment of significant increases in credit risk is a new concept under IFRS 9 and will require significant judgment.

Our assessment of significant increases in credit risk will be performed at least quarterly for each individual exposure based on three factors. If any of the following factors indicates that a significant increase in credit risk has occurred, the instrument will be moved from Stage 1 to Stage 2:

(1) We have established thresholds for significant increases in credit risk based on both a percentage and absolute change in lifetime PD relative to initial recognition. The exact thresholds applied will differ by product and/or business.

(2) Additional qualitative reviews will be performed to assess the staging results and make adjustments, as necessary, to better reflect the positions which have significantly increased in risk.

(3) IFRS 9 contains a rebuttable presumption that instruments which are 30 days past due have experienced a significant increase in credit risk. We do not intend to rebut this presumption.

Movements between Stage 2 and Stage 3 are based on whether financial assets are credit-impaired as at the reporting date. The determination of credit-impairment under IFRS 9 will be similar to the individual assessment of financial assets for objective evidence of impairment under IAS 39.

The assessments for significant increases in credit risk since initial recognition and credit-impairment are performed independently as at each reporting period. Assets can move in both directions through the stages of the impairment model. After a financial asset has migrated to Stage 2, if it is no longer considered that credit risk has significantly increased relative to initial recognition in a subsequent reporting period, it will move back to Stage 1. Similarly, an asset that is in Stage 3 will move back to Stage 2 if it is no longer considered to be credit-impaired.

Forward-looking information

The measurement of expected credit losses for each stage and the assessment of significant increases in credit risk must consider information about past events and current conditions as well as reasonable and supportable forecasts of future events and economic conditions. The estimation and application of forward-looking information will require significant judgment.

PD, LGD and EAD inputs used to estimate Stage 1 and Stage 2 credit loss allowances are modelled based on the macroeconomic variables (or changes in macroeconomic variables) that are most closely correlated with credit losses in the relevant portfolio. Each macroeconomic scenario used in our expected credit loss calculation will have forecasts of the relevant macroeconomic variables - including, but not limited to, unemployment rates, gross domestic product, bond yields, credit spreads, equity indices, stock market volatility, residential and commercial real estate prices, and commodity prices - for a five year period, subsequently reverting to long-run averages.

Our estimation of expected credit losses in Stage 1 and Stage 2 will be a discounted probability-weighted estimate that considers a minimum of three future macroeconomic scenarios. Our base case scenario will be based on macroeconomic forecasts published by our internal economics group. Upside and downside scenarios will be set relative to our base case scenario based on reasonably possible alternative macroeconomic conditions. Scenario design, including the identification of additional downside scenarios will occur on at least an annual basis and more frequently if conditions warrant.

Scenarios will be probability-weighted according to our best estimate of their relative likelihood based on historical frequency and current trends and conditions. Probability weights will be updated on a quarterly basis. All scenarios considered will be applied to all portfolios subject to expected credit losses with the same probabilities.

Loss rates used in collectively-assessed Stage 3 allowances will be adjusted based on the forward-looking macroeconomic scenarios used in the Stage 1 and Stage 2 estimates. Individually-assessed allowances will be established on consideration of a range of possible outcomes, which may include macroeconomic or non-macroeconomic scenarios, as appropriate.

Our assessment of significant increases in credit risk will be based on changes in probability-weighted forward-looking lifetime PD, using the same macroeconomic scenarios as the calculation of expected credit losses.

Expected life

For instruments in Stage 2 or Stage 3, loss allowances will cover expected credit losses over the expected remaining lifetime of the instrument. For most instruments, the expected life is limited to the remaining contractual life, adjusted as applicable for expected prepayments. However, an exemption from this limit is granted for instruments that include both a loan and undrawn commitment component and where our contractual ability to demand repayment and cancel the undrawn commitment does not limit our exposure to credit losses to the contractual notice period. For products in scope of this exemption, the expected life is the period over which our exposure to credit losses is not mitigated by our normal credit risk management actions. Determining the instruments in scope for this exemption and estimating the appropriate remaining life will require significant judgment.

Products identified as in scope of the lifetime exemption include credit cards, overdraft balances and certain revolving lines of credit. The expected life for these products will be determined using a behavioral life simulation, based on our historical experience.

Definition of default

The definition of default used in the measurement of expected credit losses and the assessment to determine movement between stages will be consistent with the definition of default used for internal credit risk management purposes. IFRS 9 does not define default, but contains a rebuttable presumption that default has occurred when an exposure is greater than 90 days past due. We will rebut this presumption for our

Canadian and U.S. credit card assets, which use a definition of default of 180 days for both accounting and regulatory capital purposes, based on an analysis of write-off and cure rates which indicates that a more lagging criterion is appropriate.

Governance

As part of the implementation of IFRS 9, we have designed and implemented new controls and governance procedures in several areas that contribute to the calculation of expected credit losses. These include controls over credit risk data and systems, expected credit loss models and calculation engine, forecasts of future macroeconomic variables, design and probability-weighting of future macroeconomic scenarios, and the determination of significant increases in credit risk.

In addition to the existing risk management framework, we have established an Allowance Committee to provide oversight to the IFRS 9 impairment process. The Allowance Committee is comprised of senior representatives from Finance, Risk Management and Economics and will be responsible for reviewing and approving key inputs and assumptions used in our expected credit loss estimates. It also assesses the appropriateness of the overall allowance results to be included in our financial statements. We have also established the Business Advisory Working Group, comprised of senior representatives from the Business and Risk Management, which provides advice to the Allowance Committee on certain measurement methodology and assumptions. The new committee structure, with underlying key controls, went into operation in 2017.

Regulatory capital

Under the Basel III regulatory capital framework, any shortfall of accounting allowances to expected losses calculated according to the Basel rules for IRB portfolios is a deduction from CET1 capital. If accounting allowances exceed Basel expected losses, the excess is included as Tier 2 capital.

After the adoption of IFRS 9, expected loss models will be used for both regulatory capital and accounting purposes. Under both models, expected losses are calculated as the product of PD, LGD and EAD. However, there are several key differences under current Basel rules which could lead to significantly different expected loss estimates:

- Basel PDs are based on long-run averages over an entire economic cycle. IFRS 9 PDs are based on current conditions, adjusted for estimates of future conditions that will impact PD under several probability-weighted macroeconomic scenarios.
- Basel PDs consider the probability of default over the next 12 months. IFRS 9 PDs consider the probability of default over the next 12 months only for instruments in Stage 1. Expected credit losses for instruments in Stage 2 are calculated using lifetime PDs.
- Basel LGDs are based on severe but plausible downturn economic conditions. IFRS 9 LGDs are based on current conditions, adjusted for estimates of future conditions that will impact LGD under several probability-weighted macroeconomic scenarios.

As at October 31, 2017, our shortfall of accounting allowances under IAS 39 to Basel expected losses was $1.2 billion. We expect the impact of the impairment requirements of IFRS 9 to reduce but not eliminate the shortfall of accounting allowances to Basel expected losses as at November 1, 2017**.** Going forward, the regulatory capital impact of further increases in our accounting allowances under IFRS 9 will be mitigated to the extent of the remaining deduction from CET1 capital.

Hedge accounting

The new hedge accounting model under IFRS 9 aims to simplify hedge accounting, align the accounting for hedge relationships more closely with an entity's risk management activities and permit hedge accounting to be applied more broadly to a greater variety of hedging instruments and risks eligible for hedge accounting.

The new standard does not explicitly address the accounting for macro hedging activities, which is being addressed by the IASB through a separate project. As a result, IFRS 9 includes an accounting policy choice to retain IAS 39 for hedge accounting requirements until the amended standard resulting from the IASB's project on macro hedge accounting is effective. We will elect the accounting policy choice to continue applying hedge accounting under the IAS 39 framework. The new hedge accounting disclosures required by the related amendments to IFRS 7 *Financial Instruments: Disclosures*, however, are required for the annual period beginning November 1, 2017.

Transition

To manage our transition to IFRS 9, we implemented a comprehensive enterprise-wide program led jointly by Finance and Risk Management that focuses on key areas of impact, including financial reporting, data, systems and processes, as well as communications and training. Throughout the project, we have provided regular updates to the Audit Committee, Risk Committee and senior management to ensure escalation of key issues and risks.

During fiscal 2015 and 2016, we completed initial assessments of the scope of IFRS 9, differences from IAS 39, classification of financial assets, financial and economic impacts, system and resource requirements, and key accounting interpretations. We also designed and began building the systems, models, controls and processes required to implement IFRS 9.

During fiscal 2017, we completed the following steps:

- Completed a parallel run of the full end to end process during the fourth quarter of 2017, the results of which were used to test our models and methodologies against our key performance indicators;
- Validated significant new impairment models;
- Completed documentation of updated bank-wide accounting and risk policies;
- Finalized governance and control frameworks over new processes and testing of internal controls;
- Documented the roll-out and implementation of the IFRS 9 project and governance structure including key controls;
- Continued to provide training and educational seminars to impacted internal stakeholders; and
- Prepared external disclosures to be provided on transition to IFRS 9 and going forward on a quarterly or annual basis.

IFRS 15 *Revenue from Contracts with Customers* (IFRS 15)
In May 2014, the IASB issued IFRS 15, which establishes the principles for reporting about the nature, amount, timing and uncertainty of revenue and cash flows arising from an entity's contracts with customers. The standard provides a single, principles based five-step model for revenue recognition to be applied to contracts with customers except for revenue arising from items such as financial instruments, insurance contracts and leases. The majority of our revenue, including net interest income, is not expected to be impacted. In April 2016, the IASB issued amendments to IFRS 15, which clarify the underlying principles of IFRS 15 and provide additional transitional relief on initial application. IFRS 15 and its amendments will be effective for us on November 1, 2018.

We plan to adopt IFRS 15 by adjusting our Consolidated Balance Sheet at November 1, 2018, the date of initial application, with no restatement of comparative periods.

To manage our transition to IFRS 15, we implemented a comprehensive enterprise-wide program and governance structure led by Finance that focuses on key areas of impact, including financial reporting, systems and processes, training, as well as communications.

During fiscal 2017, we have continued to manage the IFRS 15 program through detailed assessment of our higher-risk revenue contracts and accounting policies. In the upcoming year, we will continue our assessment of the remaining revenue contracts and finalize the changes required to our applicable transition, interim and annual disclosures. While our implementation efforts are not complete, aside from the limited changes necessary to comply with the enhanced presentation and disclosure requirements, we do not expect any material impacts of IFRS 15 on our Consolidated Financial Statements.

As we prepare for our transition to IFRS 15, we will continue to monitor industry interpretations of the new standard and expect to adjust our implementation accordingly.

IFRS 16 *Leases* (IFRS 16)
In January 2016, the IASB issued IFRS 16, which sets out the principles for the recognition, measurement, presentation and disclosure of leases. The standard removes the current requirement for lessees to classify leases as finance leases or operating leases by introducing a single lessee accounting model that requires the recognition of lease assets and lease liabilities on the balance sheet for most leases. Lessees will also recognize depreciation expense on the lease asset and interest expense on the lease liability in the statement of income. There are no significant changes to lessor accounting aside from enhanced disclosure requirements. IFRS 16 will be effective for us on November 1, 2019.

IAS 7 *Statement of Cash Flows* (IAS 7)
In January 2016, the IASB issued amendments to IAS 7, which will require specific disclosures for movements in certain liabilities on the statement of cash flows. These amendments will be effective for us on November 1, 2017 and will adopt these disclosures in our 2018 Consolidated Financial Statements. The adoption of these amendments is not expected to have a material impact on our consolidated financial statements.

IFRS 17 *Insurance Contracts* (IFRS 17)
In May 2017, the IASB issued IFRS 17 to establish a comprehensive global insurance standard which provides guidance on the recognition, measurement, presentation and disclosures of insurance contracts. This new standard will be effective for us on November 1, 2021. We are currently assessing the impact of adopting this standard on our Consolidated Financial Statements.

Regulatory developments

Global systemically important bank (G-SIB) designation
On November 21, 2017, Royal Bank of Canada was designated as a G-SIB by the FSB. We remain in consultation with OSFI and other relevant regulatory bodies to discuss and understand the impacts resulting from the G-SIB designation; however we do not expect any significant impacts resulting from the designation. In accordance with BCBS requirements, we will begin disclosing the detailed template used in the calculation of each of the 12 G-SIB indicators beginning in Q1 2018. The proposed 2018 CAR Guideline also clarifies that if, and when, a Canadian bank is designated a G-SIB, the higher of the D-SIB and G-SIB surcharges will apply.

BCBS Pillar 3 disclosure requirements
In April 2017, OSFI issued final guidelines for the first phase of the Pillar 3 disclosure requirements, indicating that all D-SIBs are expected to implement the "Revised Pillar 3 Disclosure Requirements", issued by the BCBS in January 2015 for the reporting period ending October 31, 2018 (and referenced by BCBS as phase one). These guidelines replace existing disclosure requirements in the areas of credit risk, counterparty credit risk and securitization activities. We are making progress and expect to meet OSFI's stated timeline.

In March 2017, the BCBS issued its second phase of the Pillar 3 disclosure requirements entitled, "*Pillar 3 disclosure requirements - consolidated and enhanced framework*". The enhancements include the addition of a dashboard of key metrics and incorporates disclosure requirements related to ongoing reforms to the regulatory environment, such as the TLAC regime for G-SIBs, the proposed operational risk requirements, and the final standard for market risk. The disclosure standard also consolidates all existing Pillar 3 disclosure requirements of the Basel III framework, including the leverage and liquidity ratios disclosure templates. This phase two requirement, together with the phase one *Revised Pillar 3 disclosure requirements*, issued in January 2015, comprise the single Pillar 3 framework. OSFI has not yet released the implementation date for the BCBS phase two disclosure requirements.

The BCBS has commenced its work on the final phase of the Pillar 3 disclosure requirements, which includes the standardized approach RWA to benchmark internally modelled capital requirements, asset encumbrance, operational risk, and ongoing policy reform.

Capital treatment proposed or issued in connection with accounting changes

On March 29, 2017, the BCBS issued a standard with details on the interim regulatory treatment of accounting provisions under the Basel III regulatory capital framework. The standard addresses the impact of new expected credit loss accounting requirements under IFRS 9 *Financial Instruments* (IFRS 9) that will replace the current incurred loss models used for accounting purposes. IFRS 9 will be effective for us on November 1, 2017. For further details on the adoption of IFRS 9, including applicable regulatory guidance, refer to the Critical accounting policies and estimates section.

The standard retains the current regulatory treatment of accounting provisions under the standardized and the internal ratings-based approaches until a longer-term solution is developed. It also sets out transitional arrangements which allow for a phase-in of the impact of the new expected credit loss accounting standard on regulatory capital for up to five years, should individual jurisdictions choose to provide capital relief. OSFI has not adopted any of these transitional arrangements.

On August 21, 2017, OSFI announced its intention to delay the domestic implementation of the BCBS frameworks related to the Standardized Approach to Counterparty Credit Risk (SA-CCR) and the revisions to the capital requirements for bank exposures to Central counterparties until Q1 2019. In addition, in its communication, OSFI announced its intention to delay the implementation of the BCBS Revised Securitization Framework until Q1 2019.

Controls and procedures

Disclosure controls and procedures

Our disclosure controls and procedures are designed to provide reasonable assurance that information required to be disclosed by us in reports filed or submitted under Canadian and U.S. securities laws is recorded, processed, summarized and reported within the time periods specified under those laws and include controls and procedures that are designed to ensure that information is accumulated and communicated to management, including the President and Chief Executive Officer, and the Chief Financial Officer, to allow timely decisions regarding required disclosure.

As of October 31, 2017, management evaluated, under the supervision of and with the participation of the President and Chief Executive Officer and the Chief Financial Officer, the effectiveness of our disclosure controls and procedures as defined under rules adopted by the United States Securities and Exchange Commission (U.S. SEC). Based on that evaluation, the President and Chief Executive Officer and the Chief Financial Officer concluded that our disclosure controls and procedures were effective as of October 31, 2017.

Internal control over financial reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with IFRS. However, because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements on a timely basis. See Management's Report on Internal Control over Financial Reporting and the Report of Independent Registered Public Accounting Firm.

No changes were made in our internal control over financial reporting during the year ended October 31, 2017 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Related party transactions

In the ordinary course of business, we provide normal banking services and operational services, and enter into other transactions with associated and other related corporations, including our joint venture entities, on terms similar to those offered to non-related parties. We grant loans to directors, officers and other employees at rates normally accorded to preferred clients. In addition, we offer deferred share and other plans to non-employee directors, executives and certain other key employees. For further information, refer to Notes 12 and 28 of our audited 2017 Annual Consolidated Financial Statements.

Supplementary information

Selected annual information **Table 77**

(Millions of Canadian dollars, except as otherwise noted)	**2017**	2016	2015
Total revenue (1)	**$ 40,669**	$ 38,795	$ 35,703
Net income attributable to:			
Shareholders	**11,428**	10,405	9,925
Non-controlling interest	**41**	53	101
	$ 11,469	$ 10,458	$ 10,026
Basic earnings per share (in dollars)	**7.59**	6.80	6.75
Diluted earnings per share (in dollars)	**7.56**	6.78	6.73
Dividends declared per common shares (in dollars)	**3.48**	3.24	3.08
Total assets	**1,212,853**	1,180,258	1,074,208
Deposits	**789,635**	757,589	697,227

(1) Effective Q4 2017, certain commissions and fees paid and related revenue are presented on a gross basis in non-interest expense and non-interest income, respectively. Prior period amounts have been reclassified to conform with this presentation.

Net interest income on average assets and liabilities **Table 78**

(Millions of Canadian dollars, except for percentage amounts)	Average balances 2017	Average balances 2016	Interest 2017	Interest 2016	Average rate 2017	Average rate 2016
Assets						
Deposits with other banks						
Canada	**$ 11,380**	$ 11,679	**$ 146**	$ 114	**1.28%**	0.98%
U.S.	**21,508**	16,842	**192**	71	**0.89**	0.42
Other International	**17,215**	15,415	**(31)**	(18)	**(0.18)**	(0.12)
	50,103	43,936	**307**	167	**0.61%**	0.38%
Securities						
Trading	**130,816**	153,114	**3,520**	3,366	**2.69**	2.20
Available-for-sale	**83,787**	72,440	**1,379**	1,227	**1.65**	1.69
	214,603	225,554	**4,899**	4,593	**2.28**	2.04
Asset purchased under reverse repurchase agreements and securities borrowed	**205,993**	191,243	**3,021**	1,816	**1.47**	0.95
Loans (1)						
Canada						
Retail	**350,155**	338,270	**11,672**	11,141	**3.33**	3.29
Wholesale	**74,955**	69,028	**3,534**	3,249	**4.71**	4.71
	425,110	407,298	**15,206**	14,390	**3.58**	3.53
U.S.	**75,967**	75,734	**2,391**	2,038	**3.15**	2.69
Other International	**27,201**	29,409	**1,080**	1,448	**3.97**	4.92
	528,278	512,441	**18,677**	17,876	**3.54**	3.49
Total interest-earning assets	**998,977**	973,174	**26,904**	24,452	**2.69**	2.51
Non-interest-bearing deposits with other banks	**23,953**	17,586	**-**	-	**-**	-
Customers' liability under acceptances	**14,550**	13,247	**-**	-	**-**	-
Other assets	**149,114**	172,393	**-**	-	**-**	-
Total assets	**$ 1,186,600**	$ 1,176,400	**$ 26,904**	$ 24,452	**2.27%**	2.08%
Liabilities and shareholders' equity						
Deposits (2)						

Canada	**$ 498,134**	$ 487,194	**$ 5,560**	$ 4,714	**1.12%**	0.97%
U.S.	**79,354**	83,001	**640**	413	**0.81**	0.50
Other International	**70,028**	67,365	**364**	340	**0.52**	0.50
	647,516	637,560	**6,564**	5,467	**1.01**	0.86
Obligations related to securities sold short	**37,205**	50,262	**1,515**	1,579	**4.07**	3.14
Obligations related to assets sold under repurchase agreements and securities loaned	**128,831**	110,231	**1,396**	629	**1.08**	0.57
Subordinated debentures	**9,460**	8,931	**270**	227	**2.85**	2.54
Other interest-bearing liabilities	**14,839**	15,437	**19**	19	**0.13**	0.12
Total interest-bearing liabilities	**837,851**	822,421	**9,764**	7,921	**1.17**	0.96
Non-interest-bearing deposits	**122,800**	112,071	**-**	-	**-**	-
Acceptances	**14,549**	13,248	**-**	-	**-**	-
Other liabilities	**138,797**	159,215	**-**	-	**-**	-
Total liabilities	**$ 1,113,997**	$ 1,106,955	**$ 9,764**	$ 7,921	**0.88%**	0.72%
Equity	**72,607**	69,445	**n.a.**	n.a.	**n.a.**	n.a.
Total liabilities and shareholders' equity	**$ 1,186,600**	$ 1,176,400	**$ 9,764**	$ 7,921	**0.82%**	0.67%
Net interest income and margin	**$ 1,186,600**	$ 1,176,400	**$ 17,140**	$ 16,531	**1.44%**	1.41%
Net interest income and margin (average earning assets)						
Canada	**$ 595,790**	$ 572,671	**$ 12,104**	$ 11,694	**2.03%**	2.04%
U.S.	**243,276**	246,065	**3,469**	3,241	**1.43**	1.32
Other International	**159,912**	154,438	**1,567**	1,596	**0.98**	1.03
Total	**$ 998,978**	$ 973,174	**$ 17,140**	$ 16,531	**1.72%**	1.70%

(1) Interest income includes loan fees of $561 million (2016 - $573 million).
(2) Deposits include personal savings deposits with average balances of $178 billion (2016 - $166 billion), interest expense of $.5 billion (2016 - $.4 billion) and average rates of .3% (2016 - .3%). Deposits also include term deposits with average balances of $353 billion (2016 - $362 billion), interest expense of $5.0 billion (2016 - $4.3 billion) and average rates of 1.42% (2016 - 1.20%).

Change in net interest income **Table 79**

(Millions of Canadian dollars)	2017 (1) vs. 2016 Increase (decrease) due to changes in Average volume (2)	Average rate (2)	Net change
Assets			
Deposits with other banks			
Canada (3)	$ (3)	$ 35	$ 32
U.S. (3)	20	101	121
Other international (3)	(2)	(11)	(13)
Securities			
Trading	(490)	644	154
Available-for-sale	192	(40)	152
Asset purchased under reverse repurchase agreements and securities borrowed	140	1,065	1,205
Loans			
Canada			
Retail	391	140	531
Wholesale	279	6	285
U.S.	6	347	353
Other international	(109)	(259)	(368)
Total interest income	$ 424	$ 2,028	$ 2,452
Liabilities			
Deposits			
Canada	106	740	846
U.S.	(18)	245	227
Other international	13	11	24
Obligations related to securities sold short	(410)	346	(64)
Obligations related to assets sold under repurchase agreements and securities loaned	106	661	767
Subordinated debentures	13	30	43
Other interest-bearing liabilities	(1)	1	-
Total interest expense	$ (191)	$ 2,034	$ 1,843

Net interest income	**$ 615**	**$ (6)**	**$ 609**

(1) Insurance segment assets and liabilities are included in Other assets and Other liabilities, respectively.
(2) Volume/rate variance is allocated on the percentage relationships of changes in balances and changes in rates to the total net change in net interest income.
(3) Geographic classification for selected assets and liabilities is based on the domicile of the booking point of the subject assets and liabilities.

Loans and acceptances by geography **Table 80**

As at October 31 (Millions of Canadian dollars)	**2017**	2016	2015	2014	2013
Canada					
Residential mortgages	**$ 255,799**	$241,800	$229,987	$215,624	$206,134
Personal	**82,022**	82,205	84,637	86,984	86,102
Credit cards	**17,491**	16,601	15,516	14,650	13,902
Small business	**4,493**	3,878	4,003	4,067	4,026
Retail	**359,805**	344,484	334,143	321,325	310,164
Business	**88,453**	76,266	71,246	64,643	58,920
Sovereign (1)	**9,379**	8,586	8,508	3,840	3,807
Bank	**1,326**	1,278	530	413	823
Wholesale	**$ 99,158**	$ 86,130	$ 80,284	$ 68,896	$ 63,550
	$ 458,963	$430,614	$414,427	$390,221	$373,714
U.S.					
Retail	**18,100**	17,134	5,484	4,686	3,734
Wholesale	**55,037**	59,349	34,702	23,639	19,443
	73,137	76,483	40,186	28,325	23,177
Other International					
Retail	**7,265**	7,852	8,556	8,258	6,768
Wholesale	**21,870**	21,733	24,536	21,881	17,103
	29,135	29,585	33,092	30,139	23,871
Total loans and acceptances	**$ 561,235**	$536,682	$487,705	$448,685	$420,762
Total allowance for loan losses	**(2,159)**	(2,235)	(2,029)	(1,994)	(1,959)
Total loans and acceptances, net of allowance for loan losses	**$ 559,076**	$534,447	$485,676	$446,691	$418,803

(1) In 2015, we reclassified $4 billion from AFS securities to Loans.

Loans and acceptances by portfolio and sector **Table 81**

As at October 31 (Millions of Canadian dollars)		**2017**	2016	2015	2014	2013
Residential mortgages	**$**	**270,348**	$254,998	$233,975	$219,257	$209,238
Personal		**92,294**	93,466	94,346	96,021	93,260
Credit cards		**18,035**	17,128	15,859	14,924	14,142
Small business		**4,493**	3,878	4,003	4,067	4,026
Retail	**$**	**385,170**	$369,470	$348,183	$334,269	$320,666
Business						
Agriculture		**7,380**	6,515	6,057	5,694	5,441
Automotive		**8,248**	7,279	6,614	6,209	6,167
Consumer goods		**11,387**	10,052	7,146	7,172	6,230
Energy						
Oil & gas		**6,743**	6,259	7,691	5,849	5,046
Utilities		**5,614**	7,680	5,162	3,766	3,860
Financing products		**6,556**	8,840	10,093	3,670	3,162
Forest products		**911**	1,099	1,169	979	893
Health services		**6,998**	7,763	6,023	4,052	3,786
Holding and investments		**8,803**	7,195	6,935	6,865	4,973
Industrial products		**5,581**	5,508	4,725	4,665	4,038
Mining & metals		**1,113**	1,455	1,402	1,320	1,074
Non-bank financial services		**10,744**	8,408	6,428	5,688	4,903
Other services		**14,757**	11,582	8,834	8,322	8,090
Real estate & related		**46,197**	40,419	33,802	30,387	24,413
Technology & media		**8,890**	11,019	6,599	4,822	4,006
Transportation & environment		**5,950**	6,060	5,907	5,432	5,593
Other		**4,570**	7,568	3,248	3,695	2,705
Sovereign		**11,362**	10,581	9,887	4,628	4,396

Bank	**4,261**	1,930	1,800	1,201	1,320
Wholesale	**$ 176,065**	$167,212	$139,522	$114,416	$100,096
Total loans and acceptances	**$ 561,235**	$536,682	$487,705	$448,685	$420,762
Total allowance for loan losses	**(2,159)**	(2,235)	(2,029)	(1,994)	(1,959)
Total loans and acceptances, net of allowance for loan losses	**$ 559,076**	$534,447	$485,676	$446,691	$418,803

Impaired loans by portfolio and geography **Table 82**

As at October 31 (Millions of Canadian dollars, except for percentage amounts)	**2017**	2016	2015	2014	2013
Residential mortgages	**$ 634**	$ 709	$ 646	$ 678	$ 691
Personal	**276**	304	299	300	363
Small business	**38**	46	45	47	37
Retail	**948**	1,059	990	1,025	1,091
Business					
Agriculture	**$ 28**	$ 43	$ 41	$ 40	$ 43
Automotive	**29**	43	11	12	12
Consumer goods	**105**	165	130	108	101
Energy					
Oil and gas	**315**	1,264	156	6	14
Utilities	**10**	78	57	-	-
Financing products	**107**	111	109	-	39
Forest products	**7**	21	28	25	26
Health services	**21**	21	17	18	25
Holding and investments	**27**	72	185	132	40
Industrial products	**34**	43	45	48	54
Mining & metals	**3**	15	17	9	2
Non-bank financial services	**32**	3	1	3	1
Other services	**157**	109	69	99	101
Real estate & related	**345**	241	297	314	367
Technology & media	**82**	93	34	38	117
Transportation & environment	**23**	45	53	32	98
Other	**47**	57	43	66	67
Sovereign	**-**	-	-	-	-
Bank	**-**	2	2	2	3
Wholesale	**1,372**	2,426	1,295	952	1,110
Acquired credit-impaired loans	**256**	418	-	-	-
Total impaired loans (1)	**$ 2,576**	$ 3,903	$ 2,285	$ 1,977	$ 2,201

Canada					
Residential mortgages	**$ 323**	$ 368	$ 356	$ 388	$ 464
Personal	**198**	228	223	224	229
Small business	**38**	46	45	47	36
Retail	**559**	642	624	659	729
Business					
Agriculture	**22**	34	39	36	38
Automotive	**4**	9	8	11	9
Consumer goods	**45**	91	65	70	58
Energy					
Oil & gas	**13**	57	39	4	14
Utilities	**-**	15	20	-	-
Financing products	**-**	-	-	-	-
Forest products	**7**	21	5	6	8
Health services	**5**	18	17	19	15
Holding and investments	**3**	5	3	3	3
Industrial products	**25**	39	39	41	40
Mining & metals	**3**	12	7	9	2
Non-bank financial services	**29**	-	-	1	1
Other services	**48**	49	51	67	59
Real estate & related	**187**	121	161	171	169
Technology & media	**12**	27	34	37	86
Transportation & environment	**23**	24	29	11	21
Other	**-**	-	(5)	1	3
Sovereign	**-**	-	-	-	-
Bank	**-**	-	-	-	-
Wholesale	**426**	522	512	487	526
Total	**$ 985**	$ 1,164	$ 1,136	$ 1,146	$ 1,255
U.S.					
Retail	**$ 59**	$ 56	$ 10	$ 13	$ 14
Wholesale	**736**	1,736	204	18	98
Total	**$ 795**	$ 1,792	$ 214	$ 31	$ 112

		2017	2016	2015	2014	2013
Other International						
Retail	**$**	**345**	$ 380	$ 356	$ 353	$ 348
Wholesale		**451**	567	579	447	486
Total	**$**	**796**	$ 947	$ 935	$ 800	$ 834
Total impaired loans	**$**	**2,576**	$ 3,903	$ 2,285	$ 1,977	$ 2,201
Allowance for impaired loans		**(737)**	(809)	(654)	(632)	(599)
Net impaired loans	**$**	**1,839**	$ 3,094	$ 1,631	$ 1,345	$ 1,602
Gross impaired loans as a % of loans and acceptances						
Residential mortgages		**0.23%**	0.28%	0.28%	0.31%	0.33%
Personal		**0.30%**	0.33%	0.32%	0.31%	0.39%
Small business		**0.85%**	1.19%	1.13%	1.16%	0.83%
Retail		**0.25%**	0.29%	0.28%	0.31%	0.34%
Wholesale		**0.92%**	1.69%	0.93%	0.84%	1.11%
Total		**0.46%**	0.73%	0.47%	0.44%	0.52%
Allowance for impaired loans as a % of gross impaired loans		**28.61%**	20.72%	28.64%	31.98%	27.22%

(1) Past due loans greater than 90 days not included in impaired loans were $307 million in 2017 (2016 - $337 million; 2015 - $314 million; 2014 - $316 million; 2013 - $346 million). For further details, refer to Note 5 of our 2017 Annual Consolidated Financial Statements.

Provision for credit losses by portfolio and geography **Table 83**

(Millions of Canadian dollars, except for percentage amounts)		**2017**	2016	2015	2014	2013
Residential mortgages	**$**	**56**	$ 77	$ 47	$ 94	$ 41
Personal		**409**	458	388	441	458
Credit cards		**435**	442	378	353	354
Small business		**32**	34	32	44	32
Retail	**$**	**932**	$ 1,011	$ 845	$ 932	$ 885
Business						
Agriculture	**$**	**2**	$ 10	$ 9	$ 3	$ 4
Automotive		**14**	13	3	2	3
Consumer goods		**11**	20	33	27	17
Energy						
Oil and gas		**(27)**	320	47	(5)	(6)

Utilities		**5**	16	9	32	-
Financing products		**(19)**	1	39	3	1
Forest products		**4**	4	6	7	4
Health services		**10**	4	-	-	-
Holding and investments		**1**	-	18	29	(6)
Industrial products		**16**	12	4	14	21
Mining & metals		**(4)**	7	8	2	1
Non-bank financial services		**2**	-	7	-	10
Other services		**20**	(5)	4	18	14
Real estate & related		**115**	36	29	58	62
Technology & media		**13**	8	5	14	157
Transportation & environment		**-**	(4)	8	2	35
Other		**53**	36	24	26	35
Sovereign		**-**	-	-	-	-
Bank		**-**	(3)	(1)	-	-
Wholesale	**$**	**216**	$ 475	$ 252	$ 232	$ 352
Acquired credit-impaired loans		**2**	10	-	-	-
Total provision for credit losses on impaired loans	**$**	**1,150**	$ 1,496	$ 1,097	$ 1,164	$ 1,237
Canada						
Residential mortgages	**$**	**33**	$ 42	$ 27	$ 27	$ 27
Personal		**413**	459	393	393	391
Credit cards		**426**	435	371	345	346
Small business		**32**	34	32	44	32
Retail	**$**	**904**	$ 970	$ 823	$ 809	$ 796
Business						
Agriculture		**-**	10	9	4	4
Automotive		**1**	3	3	3	3
Consumer goods		**11**	19	21	25	16
Energy						
Oil & gas		**(15)**	99	22	(5)	(6)
Utilities		**1**	-	1	-	-
Financial products		**-**	-	-	-	-

Forest products	**4**	5	1	1	3
Health services	**7**	4	-	-	-
Holding and investments	**-**	-	-	-	(8)
Industrial products	**13**	10	7	14	14
Mining & metals	**1**	7	3	2	1
Non-bank financial services	**2**	-	-	-	-
Other services	**21**	14	-	6	3
Real estate & related	**38**	26	13	34	37
Technology & media	**10**	2	6	14	50
Transportation & environment	**2**	8	7	3	2
Other	**(1)**	6	23	22	30
Sovereign	**-**	-	-	-	-
Bank	**-**	-	-	-	-
Wholesale	**$ 95**	$ 213	$ 116	$ 123	$ 149
Total	**$ 999**	$ 1,183	$ 939	$ 932	$ 945
U.S.					
Retail	**3**	1	1	2	3
Wholesale	**117**	227	40	40	32
	$ 120	$ 228	$ 41	$ 42	$ 35
Other International					
Retail	**25**	41	21	121	86
Wholesale	**6**	44	96	69	171
	$ 31	$ 85	$ 117	$ 190	$ 257
Total provision for credit losses on impaired loans	**$ 1,150**	$ 1,496	$ 1,097	$ 1,164	$ 1,237
Total provision for credit losses on non-impaired loans	**-**	50	-	-	-
Total provision for credit losses	**$ 1,150**	$ 1,546	$ 1,097	$ 1,164	$ 1,237
Total PCL as a % of average net loans and acceptances	**0.21%**	0.29%	0.24%	0.27%	0.31%
PCL on impaired loans as a % of average net loans and acceptances	**0.21%**	0.28%	0.24%	0.27%	0.31%

Allowance for credit losses by portfolio and geography **Table 84**

(Millions of Canadian dollars, except percentage amounts)	**2017**	2016	2015	2014	2013
Allowance at beginning of year	**$ 2,326**	$ 2,120	$ 2,085	$ 2,050	$ 2,087
Provision for credit losses	**1,150**	1,546	1,097	1,164	1,237
Write-offs by portfolio					
Residential mortgages	**(53)**	(42)	(64)	(30)	(24)
Personal	**(543)**	(556)	(494)	(565)	(498)
Credit cards	**(565)**	(564)	(497)	(466)	(466)
Small business	**(38)**	(40)	(40)	(47)	(35)
Retail	**$ (1,199)**	$ (1,202)	$ (1,095)	$ (1,108)	$ (1,023)
Business	**$ (226)**	$ (321)	$ (243)	$ (221)	$ (448)
Sovereign	**-**	-	-	-	-
Bank	**-**	-	-	-	-
Wholesale	**$ (226)**	$ (321)	$ (243)	$ (221)	$ (448)
Total write-offs by portfolio	**$ (1,425)**	$ (1,523)	$ (1,338)	$ (1,329)	$ (1,471)
Recoveries by portfolio					
Residential mortgages	**$ 8**	$ 5	$ 7	$ 2	$ 2
Personal	**116**	111	105	106	96
Credit cards	**131**	122	119	114	112
Small business	**9**	10	10	9	9
Retail	**$ 264**	$ 248	$ 241	$ 231	$ 219
Business	**$ 66**	$ 38	$ 33	$ 32	$ 51
Sovereign	**-**	-	-	-	-
Bank	**-**	-	1	-	-
Wholesale	**$ 66**	$ 38	$ 34	$ 32	$ 51
Total recoveries by portfolio	**$ 330**	$ 286	$ 275	$ 263	$ 270
Net write-offs	**$ (1,095)**	$ (1,237)	$ (1,063)	$ (1,066)	$ (1,201)
Adjustments (1)	**(131)**	(103)	1	(63)	(73)
Total allowance for credit losses at end of year	**$ 2,250**	$ 2,326	$ 2,120	$ 2,085	$ 2,050
Allowance against impaired loans					
Canada					
Residential mortgages	**$ 31**	$ 35	$ 27	$ 31	$ 36

Personal	**91**	105	96	93	97
Small business	**19**	20	19	19	16
Retail	**$ 141**	$ 160	$ 142	$ 143	$ 149
Business					
Agriculture	**$ 3**	$ 6	$ 5	$ 6	$ 6
Automotive	**4**	4	4	4	4
Consumer goods	**11**	14	12	22	15
Energy					
Oil & gas	**3**	6	-	-	1
Utilities	**-**	-	1	-	-
Financing products	**-**	-	-	-	-
Forest products	**3**	5	3	3	4
Health services	**6**	6	6	6	6
Holding and investments	**1**	1	1	1	2
Industrial products	**13**	11	13	18	15
Mining and metals	**4**	4	1	1	1
Non-bank financial services	**1**	-	-	-	-
Other services	**19**	18	19	28	23
Real estate & related	**36**	23	28	48	42
Technology & media	**11**	10	12	17	46
Transportation & environment	**8**	11	7	5	6
Other	**1**	-	(1)	1	(1)
Sovereign	**-**	-	-	-	-
Bank	**-**	-	-	-	-
Wholesale	**$ 124**	$ 119	$ 111	$ 160	$ 170
	$ 265	$ 279	$ 253	$ 303	$ 319

U.S.					
Retail	**$ 1**	$ 2	$ 1	$ 1	$ 2
Wholesale	**150**	177	47	16	19
	$ 151	$ 179	$ 48	$ 17	$ 21
Other International					
Retail	**$ 168**	$ 180	$ 169	$ 172	$ 146
Wholesale	**153**	171	184	140	113
	$ 321	$ 351	$ 353	$ 312	$ 259
Total allowance against impaired loans	**$ 737**	$ 809	$ 654	$ 632	$ 599
Allowance against non-impaired loans					
Residential mortgages	**$ 128**	$ 96	$ 83	$ 78	$ 48
Personal	**391**	385	396	400	405
Credit cards	**379**	386	386	385	385
Small business	**37**	45	45	45	45
Retail	**$ 935**	$ 912	$ 910	$ 908	$ 883
Wholesale	**$ 487**	$ 514	$ 465	$ 454	$ 477
Off-balance sheet and other items	**$ 91**	$ 91	$ 91	$ 91	$ 91
Total allowance against non-impaired loans	**$ 1,513**	$ 1,517	$ 1,466	$ 1,453	$ 1,451
Total allowance for credit losses	**$ 2,250**	$ 2,326	$ 2,120	$ 2,085	$ 2,050
Key ratios					
Allowance for credit losses as a % of loans and acceptances	**0.40%**	0.43%	0.43%	0.46%	0.49%
Net write-offs as a % of average net loans and acceptances	**0.20%**	0.23%	0.23%	0.25%	0.30%

(1) Under IFRS, other adjustments include $104 million of unwind of discount and $27 million of changes in exchange rate (2016 - $100 million and $3 million; 2015 - $80 million and $(81) million; 2014 - $87 million and $(24) million). For further details, refer to Note 5 of our 2017 Annual Consolidated Financial Statements.

Credit quality information by Canadian province **Table 85**

(Millions of Canadian dollars)	**2017**	2016	2015	2014	2013
Loans and acceptances					
Atlantic provinces (1)	**$ 24,471**	$ 23,947	$ 23,040	$ 22,130	$ 21,263
Quebec	**56,749**	53,518	51,197	50,748	48,060

Ontario		**202,272**	185,434	175,315	159,817	152,258
Alberta		**68,051**	66,277	64,902	61,197	58,318
Other Prairie provinces (2)		**31,318**	30,143	29,490	27,341	25,697
B.C. and territories (3)		**76,102**	71,295	70,483	68,988	68,118
Total loans and acceptances in Canada	**$**	**458,963**	$430,614	$414,427	$390,221	$373,714
Gross impaired loans						
Atlantic provinces (1)	**$**	**77**	$ 101	$ 93	$ 81	$ 83
Quebec		**176**	207	213	205	177
Ontario		**213**	336	341	391	424
Alberta		**284**	313	224	185	233
Other Prairie provinces (2)		**125**	93	115	73	97
B.C. and territories (3)		**110**	114	150	211	241
Total gross impaired loans in Canada	**$**	**985**	$ 1,164	$ 1,136	$ 1,146	$ 1,255
Provision for credit losses on impaired loans						
Atlantic provinces (1)	**$**	**66**	$ 67	$ 57	$ 51	$ 50
Quebec		**85**	92	96	92	78
Ontario		**617**	654	590	588	605
Alberta		**112**	226	77	71	74
Other Prairie provinces (2)		**64**	64	52	40	39
B.C. and territories (3)		**55**	80	67	90	99
Total provision for credit losses on impaired loans in Canada	**$**	**999**	$ 1,183	$ 939	$ 932	$ 945

(1) Comprises Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick.
(2) Comprises Manitoba and Saskatchewan.
(3) Comprises British Columbia, Nunavut, Northwest Territories and Yukon.

EDTF recommendations index

We aim to present transparent, high-quality risk disclosures by providing disclosures in our 2017 Annual Report and Supplementary Financial Information package (SFI), in accordance with recommendations from the Financial Stability Board's (FSB) Enhanced Disclosure Task Force (EDTF).

The following index summarizes our disclosure by EDTF recommendation:

			Location of disclosure	
Type of Risk	Recommendation	Disclosure	Annual Report page	SFI page
General	1	Table of contents for EDTF risk disclosure	116	1
	2	Define risk terminology and measures	52, 54-57 206-207	-
	3	Top and emerging risks	53	-
	4	New regulatory ratios	92-95	-
Risk governance, risk management and business model	5	Risk management organization	52, 54-57	-
	6	Risk culture	54-57	-
	7	Risk in the context of our business activities	100	-
	8	Stress testing	56-57, 69	-
Capital adequacy and risk-weighted assets (RWA)	9	Minimum Basel III capital ratios and Domestic systemically important bank surcharge	92-95	-
	10	Composition of capital and reconciliation of the accounting balance sheet to the regulatory balance sheet	-	21-24
	11	Flow statement of the movements in regulatory capital	-	25
	12	Capital strategic planning	92-95	-
	13	RWA by business segments	-	28
	14	Analysis of capital requirement, and related measurement model information	58-60	26-27
	15	RWA credit risk and related risk measurements	-	42-44
	16	Movement of risk-weighted assets by risk type	-	28
	17	Basel back-testing	55, 58	42
Liquidity	18	Quantitative and qualitative analysis of our liquidity reserve	75-77, 81-82	-
Funding	19	Encumbered and unencumbered assets by balance sheet category, and contractual obligations for rating downgrades	77, 80	-
	20	Maturity analysis of consolidated total assets, liabilities and off-balance sheet commitments analyzed by remaining contractual maturity at the balance sheet date	82-83	-
	21	Sources of funding and funding strategy	77-79	-

Type of Risk	Recommendation	Disclosure	Location of disclosure: Annual Report page	Location of disclosure: SFI page
Market risk	22	Relationship between the market risk measures for trading and non-trading portfolios and the balance sheet	73-74	-
	23	Decomposition of market risk factors	68-72	-
	24	Market risk validation and back-testing	69	-
	25	Primary risk management techniques beyond reported risk measures and parameters	68-72	-
Credit risk	26	Bank's credit risk profile	58-68, 154-156	31-44
		Quantitative summary of aggregate credit risk exposures that reconciles to the balance sheet	111-115	40
	27	Policies for identifying impaired loans	59-60, 101-102, 130	-
	28	Reconciliation of the opening and closing balances of impaired loans and impairment allowances during the year	-	33,37
	29	Quantification of gross notional exposure for OTC derivatives or exchange-traded derivatives	61-62	46
	30	Credit risk mitigation, including collateral held for all sources of credit risk	60	41
Other	31	Other risk types	84-91	-
	32	Publicly known risk events	87-89, 193-194	-