Enterprise-Wide Risk Management

As a diversified financial services company providing banking, wealth management, capital market and insurance services, we are exposed to a variety of risks that are inherent in our business activities. A disciplined and integrated approach to managing risk is fundamental to the success of our operations. Our risk management framework provides independent risk oversight across the enterprise and is essential to building competitive advantage.

Surjit Rajpal
Chief Risk Officer
BMO Financial Group

Strengths and Value Drivers

- Disciplined approach to risk-taking.
- Comprehensive and consistent risk frameworks.
- Risk appetite and metrics integrated into strategic planning and the ongoing management of businesses and risks.
- Sustained focus on continuous improvement to drive consistency and efficiency in the management of risk.

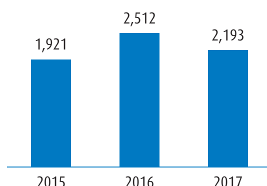
Challenges

- Balancing risk and return in an uncertain economic and geopolitical environment.
- Technology improvements and investment required to meet customer expectations and the need to anticipate and respond to the risk of cyber and competitive threats.

Priorities

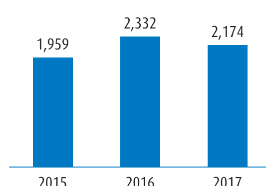
- Focus on our people and how we work together to enhance and strengthen our culture.
- Improve productivity and efficiency through simplification of processes and continuing to establish clear roles and responsibilities.
- Continue to invest in systems, data, processes and people to advance our capabilities and effectiveness.

Gross Impaired Loan Formations ($ millions)



Level of new impaired loan formations was 13% lower year over year, reflecting lower oil and gas impaired loan formations.

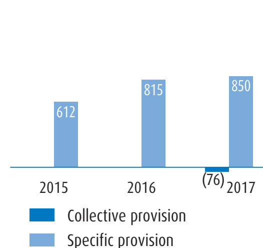
Gross Impaired Loan Balances* ($ millions)



Gross impaired loans were 7% lower year over year, reflecting lower oil and gas impaired loans.

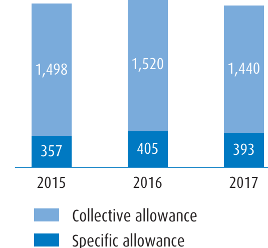
* Excludes purchased credit impaired loans.

Provision for Credit Losses ($ millions)



The total provision for credit losses was 5% lower year over year, reflecting the decrease in the collective allowance, and lower provisions in BMO Capital Markets and Canadian P&C, partially offset by lower recoveries in Corporate Services and higher provisions in U.S. P&C.

Total Allowance for Credit Losses* ($ millions)



The total allowance for credit losses decreased 5% year over year due to the decrease in the collective allowance and the impact of the weaker U.S. dollar, and remains adequate.

* Excludes allowances related to Other Credit Instruments.

Text and tables presented in a blue-tinted font in the Enterprise-Wide Risk Management section of the MD&A form an integral part of the 2017 annual consolidated financial statements. They present required disclosures as set out by the International Accounting Standards Board in IFRS 7, *Financial Instruments – Disclosures*, which permits cross-referencing between the notes to the consolidated financial statements and the MD&A. See Note 1 on page 144 and Note 5 on page 156 of the consolidated financial statements.

Adjusted results in this Enterprise-Wide Risk Management section are non-GAAP and are discussed in the Non-GAAP Measures section on page 29.

Risks That May Affect Future Results

Top and Emerging Risks That May Affect Future Results

We are exposed to a variety of continually changing risks that have the potential to affect our business and financial condition. An essential part of our risk management process is to proactively identify, assess, monitor and manage a broad spectrum of top and emerging risks. Our top and emerging risk identification process consists of several forums for discussion with the Board, senior management and business thought leaders, combining both bottom-up and top-down approaches in considering risk. Our assessment of top and emerging risks is used to develop action plans and stress tests of our exposure to certain events.

In 2017, particular attention was given to the following top and emerging risks:

Information and Cyber Security Risk

Information security is integral to BMO's business activities, brand and reputation. Given our pervasive use of the internet and reliance on advanced digital technologies, we face common banking information security risks, including the threat of hacking, identity theft and corporate espionage, as well as the possibility of denial of service resulting from efforts targeted at causing system failure and service disruption. BMO continues to proactively invest in defensive technology, talent and processes to prevent or detect and manage cyber security threats within BMO and at service providers. These include benchmarking and review of best practices across the banking and cyber security industries, evaluation of the effectiveness of our key controls and development of new controls, as needed, with ongoing investments in both technology and human resources. BMO performs assessments of third-party service providers to monitor alignment with BMO standards. We also work with cyber security and software suppliers to bolster our internal resources and technology capabilities in order to better enable us to remain resilient in a rapidly evolving threat landscape.

Geopolitical Risk

Geopolitical risk has increased, largely as a result of escalating tensions between several countries, in particular North Korea and the United States, and strained U.S. relations with countries such as Russia and China. Heightened geopolitical risk can create uncertainty in global economic investment, potentially leading to market disruptions and a decrease in growth and trade. Our portfolio has limited direct exposure outside North America; however, our core customers and our international strategy depend on trade and growth. To mitigate our exposure to geopolitical risk, we continually monitor and test our portfolio and business strategies, and we establish contingency plans for possible adverse developments.

Canadian Housing Market

The Canadian housing market has appreciated considerably over the past number of years. The Greater Toronto Area (GTA) had experienced rapid housing price increases until the spring of 2017, at which time price increases moderated following the announcement of the Ontario Fair Housing Plan. While recent resale market results suggest this price adjustment in the GTA is largely complete, Bank of Canada rate hikes announced during the year and future rate hikes and regulatory changes could weigh on sales activity and home prices in this region as well as in the Greater Vancouver Area. In particular, future regulatory changes related to the qualifying rate for all uninsured mortgages could also reduce transactional activity and therefore home prices in these regions. Lower sales activity in these previously heated markets may impact mortgage origination volumes and, if housing values decline, the collateralization of our existing portfolio would be reduced. It is not possible to accurately predict the full impact of the recent changes and potential future changes, but robust economic conditions in these regions, including good economic growth, low unemployment and above-average population growth, support the expectations for low ongoing delinquency rates for real estate loans. Our prudent lending practices, which include the personal adjudication of higher-value and higher loan-to-value transactions and setting and close monitoring of regional, property type and customer segment concentration limits, support the soundness of our Canadian real estate lending portfolio. Further, our stress test analysis suggests that significant price declines and recessionary economic conditions would result in manageable losses.

Trade Instability

The risk of global trade instability stems from political, economic and trade policy uncertainty. Support for protectionism and anti-globalization sentiment in the United States and other countries may impact existing trade agreements, such as the North American Free Trade Agreement (NAFTA), which is currently under renegotiation, as well as overall global growth. In particular, the outcome of the NAFTA negotiations could result in new rules that could have a significant impact on our customers in the United States and Canada, resulting in disruptions in cross-border supply chains and trade and investment flows.

BMO benefits from an integrated North American strategy in diverse industries and geographies, with limited direct lending exposure outside of North America and a footprint that minimizes the effects of changes in commodity prices and foreign exchange movements, wherein price declines/rises often have offsetting impacts across different North American regions and industries. Although it is difficult to successfully predict and mitigate the potential economic and financial consequences of trade-related events that could adversely affect economic growth, we actively monitor global and North American trends and continually assess our portfolio and business strategies in the context of those developments. We stress test our portfolios, business plans and capital adequacy against severely adverse scenarios arising from shocks, and we establish contingency plans and mitigation strategies to react to and offset possible adverse political and/or economic developments.

Our credit exposure by geographic region is provided in Tables 7, 8 and 11 to 13 on pages 128 to 133 and Note 4 on page 152 of the consolidated financial statements. Further information on our direct and indirect European exposures is provided in the European Exposures section on page 92.

Technology Disruption and Competition

The financial services industry continues to undergo rapid change, as technology enables new non-traditional entrants to compete in certain segments of banking, in some cases with reduced regulatory requirements and oversight. New entrants may leverage new technologies, advanced data and analytical tools, lower cost to serve and/or faster processes to challenge traditional banks, including new business models in retail payments, consumer and commercial lending, foreign exchange and low-cost investment advisory services. Failure to keep pace with these new technologies and competition may potentially impact our overall revenues and earnings if customers choose the services of these new market entrants. While we closely monitor technology disruptors, we also continue to adapt by increasing our investment in technology and innovation to keep pace with dynamic client expectations. This includes improving our mobile and internet banking capabilities, building new branch formats, and

refining our credit decisioning, analytic and modelling data and tools and, where appropriate, bringing new and enhanced customer solutions to market. We further mitigate this risk by providing our customers with access to banking services across different channels, focusing on improving customer loyalty and trust, enhancing our advanced data and analytical tools, and leveraging current and future partnerships in order to deliver an exceptional customer experience with reduced costs and simplified processes. However, matching the pace of innovation exhibited by new and differently-situated competitors may require us and policy-makers to adapt at a faster pace.

Other Factors That May Affect Future Results

General Economic and Market Conditions in the Countries in Which We Conduct Business

We operate in Canada, the United States and a number of other countries and the volume of business we conduct in these geographic regions may have an effect on our overall revenue and earnings. Factors such as fluctuations in interest rates, foreign exchange rates, consumer saving and spending, housing prices, consumer borrowing and repayment, business investment, and the rate of inflation affect the business and economic environments in which we operate, and may affect the value of our investments, the credit quality of our customer and counterparty loans and the funding markets that we access.

Regulatory Requirements

The financial services industry is highly regulated, and we have experienced changes and increased complexity in regulatory requirements as governments and regulators around the world continue to pursue major reforms intended to strengthen the stability of the financial system and protect key markets and participants. As a result, there is the potential for higher capital requirements and additional regulatory and compliance costs, which could lower our returns and affect our growth. These reforms could also affect the cost and availability of funding and the extent of market-making activities. Regulatory reforms may also impact fees and other revenues for certain of our operating groups. In addition, differences in laws and regulations enacted by various national regulatory authorities may provide advantages to our international competitors that could affect our ability to compete and result in loss of market share. We monitor such developments, and other potential changes such as reforms of the U.S. financial regulatory system or the potential impacts of a United Kingdom withdrawal from the European Union, so that BMO is well-positioned to respond to and implement any required changes. Failure to comply with applicable legal and regulatory requirements may result in litigation, financial losses, regulatory sanctions, enforcement actions, an inability to execute our business strategies, a decline in investor and customer confidence and harm to our reputation. Refer to the Legal and Regulatory Risk and Enterprise-Wide Capital Management sections on pages 109 and 69, respectively, for a more complete discussion of our legal and regulatory risk.

Fiscal and Monetary Policies

Our earnings are affected by fiscal, monetary, regulatory and other economic policies in Canada, the United States and other jurisdictions. Such policies may have the effect of increasing or reducing competition, profitability and uncertainty in businesses and markets, which may affect our customers and counterparties, potentially contributing to a greater risk of default.

Changes in fiscal and monetary policies are difficult to anticipate and predict. Fluctuations in interest rates and exchange rates that result from these changes can have an impact on our earnings and valuation. Prolonged low interest rates could lead to lower overall profitability in our retail and commercial businesses. Changes in the value of the Canadian dollar relative to the U.S. dollar could affect the results of our small business, corporate and commercial clients in Canada. A strengthening of the U.S. dollar could increase the value of our U.S.-dollar-denominated RWA and capital deductions, lowering our capital ratios. BMO may offset the impact of foreign exchange movements on its capital ratios, and did so during 2017. A decline in the U.S. dollar would reduce the strength of our U.S. operations' contribution to our Canadian dollar profitability. Hedging positions may be taken to manage interest rate exposures and partially offset the pre-tax effects of Canadian/U.S. dollar exchange rate fluctuations on financial results. Refer to the Foreign Exchange section on page 36, the Enterprise-Wide Capital Management section on page 69 and the Market Risk section on page 94 for a more complete discussion of our foreign exchange and interest rate risk exposures.

Tax Legislation and Interpretations

Changes in tax rates, tax law and policy, and its interpretation by taxing authorities can have an impact on our earnings. Tax laws, as well as the interpretation of tax laws and policy by taxing authorities, may change as a result of efforts by the G20 and the Organisation for Economic Co-operation and Development to broaden the tax base globally and increase tax related reporting. In addition, a reduction in income tax rates could lower the value of our deferred tax asset. Refer to the Critical Accounting Estimates section on page 113 for further discussion on income taxes and deferred tax assets.

Acquisitions

We conduct thorough due diligence before completing business or portfolio acquisitions. However, it is possible that we could make an acquisition that subsequently does not perform in line with our financial or strategic objectives or expectations. Our ability to successfully complete an acquisition may be subject to regulatory and shareholder approvals and we may not be able to determine when, if or on what terms the necessary approvals will be granted. Changes in the competitive and economic environment, as well as other factors, may result in lower revenue, while higher than anticipated integration costs and failure to realize expected cost savings after an acquisition could also adversely affect our earnings. Integration costs may increase as a result of higher regulatory costs related to an acquisition, unanticipated costs that were not identified in the due diligence process or demands on management time that are more significant than anticipated, as well as unexpected delays in implementing certain plans that in turn lead to delays in achieving full integration. Successful post-acquisition performance depends on retaining the clients and key employees of acquired companies and on integrating key systems and processes without disruption, and there can be no assurance that we will always succeed in doing so.

Critical Accounting Estimates and Accounting Standards

We prepare our consolidated financial statements in accordance with IFRS. Changes that the International Accounting Standards Board makes from time to time to these standards can be difficult to anticipate and may materially affect how we record and report our financial results. Significant accounting policies and future changes in accounting policies are discussed on pages 116 to 117 as well as in Note 1 on page 144 of the consolidated financial statements.

The application of IFRS requires management to make significant judgments and estimates, sometimes relying on financial and statistical models, that can affect the dates on which certain assets, liabilities, revenues and expenses are recorded in our consolidated financial statements, as well as their recorded values. In making these judgments and estimates, we rely on the best information available at the time. However, it is possible that circumstances may change, that new information may become available or that our models may prove to be imprecise.

Our financial results could be affected for the period during which any such new information or change in circumstances becomes apparent, and the extent of the impact could be significant. More information is included in the Critical Accounting Estimates section on page 113.

Caution

This Risks That May Affect Future Results section and the remainder of this Enterprise-Wide Risk Management section contain forward-looking statements.

Other factors beyond our control that may affect our future results are noted in the Caution Regarding Forward-Looking Statements on page 31. We caution that the preceding discussion of risks that may affect future results is not exhaustive.

Risk Management Overview

At BMO, we believe that risk management is every employee's responsibility. We are guided by five key perspectives on risk that drive our approach to managing risk across the enterprise.

Our Approach to Risk Management

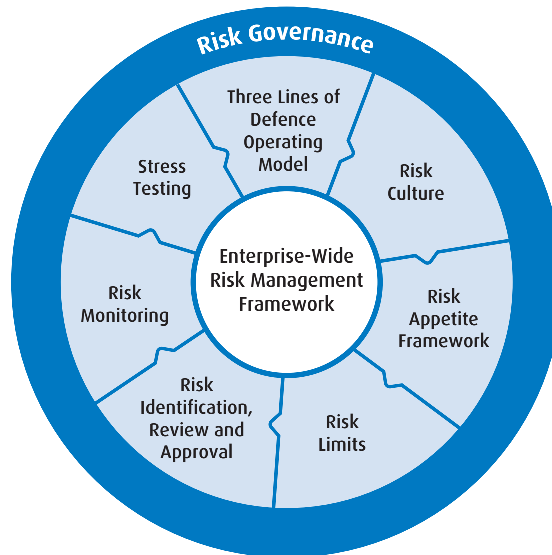
- Understand and manage
- Protect our reputation
- Diversify. Limit tail risk
- Maintain strong capital and liquidity
- Optimize risk return

Our integrated and disciplined approach to risk management is fundamental to the success of our operations. All elements of our risk management framework work together in support of prudent and measured risk-taking, while striking an appropriate balance between risk and return.
Our Enterprise Risk and Portfolio Management (ERPM) group develops our risk appetite, risk policies and limits, and provides independent review and oversight across the enterprise on risk-related issues to achieve prudent and measured risk-taking that is integrated with our business strategy.

Framework and Risks

Enterprise-Wide Risk Management Framework

Our enterprise-wide risk management framework assists the bank in managing its risk-taking activities and ensuring they are within our risk appetite.



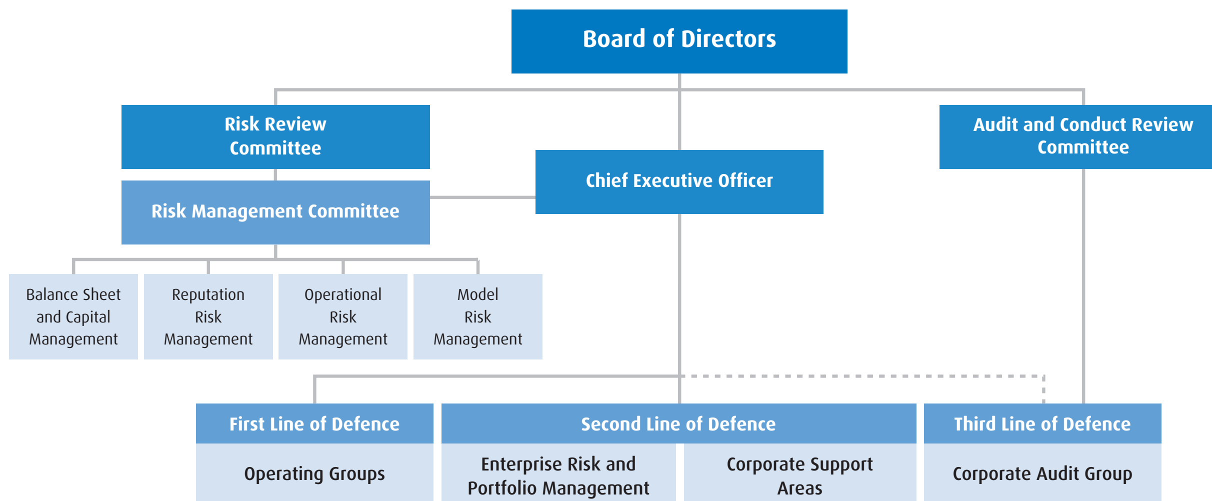
These risk framework elements are discussed in more detail in the sections that follow.

Risk Governance

Our enterprise-wide risk management framework is founded on a governance approach that includes a robust committee structure and a comprehensive set of corporate policies and limits, each of which is approved by the Board of Directors or its committees, as well as specific corporate standards and operating procedures. Our corporate policies outline frameworks and objectives for every significant risk type, so that risks to which the enterprise is exposed are appropriately identified, measured, managed, monitored, mitigated and reported in accordance with our risk appetite. Specific policies govern our key risks, such as credit, market, liquidity and funding, model and operational risks. This enterprise-wide risk management framework is governed at all levels through a hierarchy of committees and individual responsibilities, as outlined in the diagram below.

Our risk management framework is reviewed on a regular basis by the Risk Review Committee of the Board of Directors to thereby guide our risk-taking activities. In each of our operating groups, management, as the first line of defence, is responsible for governance activities, controls, and the implementation and operation of our risk management processes and procedures to provide effective risk management. Enterprise Risk and Portfolio Management, as the primary second line of defence, oversees the implementation and operation of our risk processes and procedures with a view to effectively aligning outcomes with our overall risk management framework. Individual governance committees establish and monitor further risk management limits, consistent with and in furtherance of Board-approved limits.

Risk Governance Framework



In addition to the enterprise-level risk governance framework, appropriate risk governance frameworks, supported by our three lines of defence, are in place in all our material businesses and entities.

Board of Directors is responsible for supervising the management of the business and affairs of BMO. The Board, either directly or through its committees, is responsible for oversight in the following areas: strategic planning, defining risk appetite, the identification and management of risk, capital management, fostering a culture of integrity, internal controls, succession planning and evaluation of senior management, communication, public disclosure and corporate governance.

Risk Review Committee of the Board of Directors (RRC) assists the Board in fulfilling its risk management oversight responsibilities. This includes overseeing the identification and management of BMO's risks, including our risk culture, adherence by operating groups to risk management corporate policies and procedures, compliance with risk-related regulatory requirements and the evaluation of the Chief Risk Officer (CRO), including input into succession planning for the CRO. Our risk management framework is reviewed on a regular basis by the RRC in order to provide guidance for the governance of our risk-taking activities.

Audit and Conduct Review Committee of the Board of Directors assists the Board in fulfilling its oversight responsibilities for the integrity of BMO's financial reporting; the effectiveness of BMO's internal controls; the independent auditor's qualifications, independence and performance; BMO's compliance with legal and regulatory requirements; transactions involving related parties; conflicts of interest and confidential information; and standards of business conduct and ethics.

Chief Executive Officer (CEO) is directly accountable to the Board for all of BMO's risk-taking activities. The CEO is supported by the CRO and the rest of ERPM.

Chief Risk Officer (CRO) reports directly to the CEO and is head of ERPM and chair of RMC. The CRO is responsible for providing independent review and oversight of enterprise-wide risks and leadership on risk issues, developing and maintaining a risk management framework and fostering a strong risk culture across the enterprise.

Risk Management Committee (RMC) is BMO management's senior risk committee. RMC reviews and discusses significant risk issues and action plans that arise in executing the enterprise-wide strategy. RMC provides risk oversight and governance at the highest levels of management. This committee is chaired by the CRO and its members include the heads of our operating groups, the CEO and the CFO.

RMC Sub-Committees have oversight responsibility for the risk implications and balance sheet impacts of management strategies, governance practices, risk measurement, model risk management and contingency planning. RMC and its sub-committees provide oversight of the processes whereby the risks undertaken across the enterprise are identified, measured, managed, monitored, mitigated and reported in accordance with policy guidelines, and are held within limits and risk tolerances.

Enterprise Risk and Portfolio Management (ERPM), as the risk management second line of defence, provides comprehensive risk management oversight. It promotes consistency in risk management practices and standards across the enterprise. ERPM supports a disciplined approach to risk-taking in fulfilling its responsibilities for independent transactional approval and portfolio management, policy formulation, risk reporting, stress testing, modelling and risk education. This approach seeks to meet enterprise objectives and to verify that any accepted risks are consistent with BMO's risk appetite.

Operating Groups are responsible for effectively managing risks by identifying, measuring, managing, monitoring, mitigating and reporting risk within their respective lines of business. They exercise business judgment and seek to ensure that effective policies, processes and internal controls are in place and that significant risk issues are reviewed with ERPM. Individual governance committees and ERPM establish and monitor further risk management limits that are consistent with and subordinate to the Board-approved limits.

Three-Lines-of-Defence Operating Model

Our risk management framework is anchored in the three-lines-of-defence approach to managing risk, which is fundamental to our operating model, as described below:

- Our operating groups are the bank's **first line of defence**. They are accountable for the risks arising from their businesses, activities and exposures. They are expected to pursue business opportunities within our established risk appetite and to identify, measure, manage, monitor, mitigate and report all risks in or arising from their businesses, activities and exposures. The first line discharges its responsibilities by using risk management and reporting methodologies and processes developed by the business and by the ERPM group and other Corporate Support areas, and may rely on corporate functions or other service providers to help discharge these responsibilities. Businesses are responsible for establishing appropriate internal controls in accordance with our risk management framework and for monitoring the efficacy of such controls. Such processes and controls help ensure businesses act within their delegated risk-taking authority and risk limits as set out in corporate policies and our risk appetite framework.
- The **second line of defence** is comprised of the ERPM group and in targeted areas, Corporate Support areas. The second line provides independent oversight, effective challenge and independent assessment of risks and risk management practices, including transaction, product and portfolio risk management decisions, processes and controls in the first line of defence. The second line establishes enterprise-wide risk management policies, infrastructure, processes, methodologies and practices that the first and second lines use to identify, assess, manage and monitor risks across the enterprise.
- Corporate Audit Division is the **third line of defence**. It provides an independent assessment of the effectiveness of internal controls across the enterprise, including controls that support our risk management and governance processes.

Risk Culture

At BMO, we believe that risk management is the responsibility of every employee within the organization. This key tenet shapes and influences our corporate culture and is evident in the actions and behaviours of our employees and leaders as they identify, interpret and discuss risks, and make decisions that balance risks and opportunities and seek to optimize risk-adjusted returns. Our senior management plays a critical role in fostering a strong risk culture among all employees by communicating this responsibility effectively, by the example of their own actions and by establishing and enforcing compensation plans and other incentives which are designed to drive desired behaviours. Our risk culture is deeply embedded within our policies, business processes, risk management framework, risk appetite, limits and tolerances, capital management and compensation practices, and is evident in every aspect of the way we operate across the enterprise. We actively solicit feedback on the effectiveness of our risk culture, including through standardized and anonymous employee surveys.

Our risk culture is grounded in a "Being BMO" risk management approach that encourages openness, constructive challenge and personal accountability. "Being BMO" values include integrity and a responsibility to make tomorrow better and "Being BMO" behaviours include balancing risk and opportunity, taking ownership, following through on commitments, speaking up and being candid. Timely and transparent sharing of information is also essential in engaging stakeholders in key decisions and strategy discussions, thereby bringing rigour and discipline to our decision-making. This not only leads to the timely identification, escalation and resolution of issues, but also encourages open communication, independent challenge and an understanding of the key risks faced by our organization, so that our employees are equipped and empowered to make decisions and take action in a coordinated and consistent manner, supported by a strong monitoring and control framework. Our governance and leadership forums, committee structures, learning curriculums and proactive communication also reinforce and foster our risk culture.

Certain elements of our risk culture that are embedded throughout the enterprise include:

- **Risk appetite** – promotes a clear understanding of the most prevalent risks that our businesses face, facilitates alignment of business strategies with our risk appetite, and provides a control and early warning framework through our key risk metrics, thereby leading to sound business decision-making and execution, supported by a strong monitoring framework.
- **Communication and escalation channels** – encourage engagement and sharing of information between ERPM and the operating groups, leading to greater transparency and open and effective communication. We also foster a culture that encourages the escalation of concerns associated with potential or emerging risks to senior management so that they can be evaluated and appropriately addressed.
- **Compensation philosophy** – pay is aligned with prudent risk-taking so that compensation and other incentives reward the appropriate use of capital and respect for the rules and principles in our enterprise-wide risk management framework, and do not encourage excessive risk-taking. Our risk managers have input into the design of incentive programs which may affect risk-taking, and provide input into the performance assessment of employees who take material risks or who are responsible for losses or events creating an unexpected risk of loss.
- **Training and education** – our programs are designed to foster a deep understanding of BMO's capital and risk management frameworks across the enterprise, providing employees and management with the tools and awareness they need to fulfill their responsibilities for independent oversight, regardless of their position in the organization. Our education strategy has been developed in partnership with BMO's Institute for Learning, our risk management professionals, external risk experts and teaching professionals.
- **Rotation programs** – two-way rotation allows employees to transfer between ERPM and the operating groups, effectively embedding our strong risk culture across the enterprise and ensuring many of our risk management professionals have a practical grounding in our business activities.

Risk Appetite Framework

Our Risk Appetite Framework consists of our Risk Appetite Statement and key risk metrics, and is supported by our corporate policies, standards and guidelines, including the related limits, concentration levels and controls defined therein. Our risk appetite defines the amount of risk that BMO is willing to assume given our guiding principles and capital capacity, and thus supports sound business initiatives, appropriate returns and targeted growth. Our risk appetite is integrated into our strategic and capital planning processes and performance management system. On an annual basis, senior management recommends our Risk Appetite Statement and key risk metrics to the RMC and the Board of Directors for approval. Our Risk Appetite Statement is articulated and applied consistently across the enterprise, with key businesses and entities developing their own respective risk appetite statements within this framework. Among other things, our approach to risk management through our Risk Appetite Statement requires BMO to:

Understand and Manage Risk

- take only those risks that are transparent, understood, measured, monitored and managed
- incorporate risk measures and risk-adjusted returns into our performance management system, including an assessment of performance against our risk appetite and return objectives in compensation decisions
- protect the assets of BMO and BMO's clients by maintaining a system of prudent risk limits and strong operational risk controls

Protect our Reputation

- be guided in everything we do by principles of honesty, integrity and respect, as well as high ethical standards
- maintain effective policies, procedures, guidelines, compliance standards and controls, and provide training and management that will guide the business practices and risk-taking activities of all employees so that they are able to optimize risk-adjusted returns and adhere to all legal and regulatory obligations, thus protecting BMO's reputation

Diversify. Limit Tail Risk

- use economic capital, regulatory capital and stress testing methodologies to understand our risks and guide our risk-return assessments
- limit exposure to low-frequency, high-severity events that could jeopardize BMO's credit ratings, capital or liquidity position or reputation

Maintain Strong Capital and Liquidity

- maintain strong capital, liquidity and funding positions that meet or exceed regulatory requirements and the expectations of the market
- maintain a robust recovery framework that enables an effective and efficient response in an extreme crisis
- maintain an investment grade credit rating at a level that allows competitive access to funding

Optimize Risk Return

- subject new products and initiatives to rigorous review and approval, and assess whether new acquisitions provide a good strategic, financial and cultural fit, and have a high likelihood of creating value for our shareholders
- set capital limits based on our risk appetite and strategy and require our lines of business to optimize risk-adjusted returns within those limits

Risk Limits

Our risk limits reflect our risk appetite framework, and inform our business strategies and decisions. In particular, we consider risk diversification, exposure to loss and risk-adjusted returns when setting limits. These limits are reviewed and approved by the Board of Directors and/or management committees and include:

- Credit and Counterparty Risk – limits on group and single-name exposures and material country, industry, and portfolio/product segments;
- Market Risk – limits on economic value and earnings exposures to stress scenarios and significant movements;
- Insurance Risk – limits on policy exposure and reinsurance arrangements;
- Liquidity and Funding Risk – limits on minimum levels of liquid assets and maximum levels of asset pledging and wholesale funding, as well as limits related to liability diversification and credit and liquidity facility exposures;
- Operational Risk – limits on specific operational risks and key risk metrics for measuring operational risks; and
- Model Risk – limits on model approval and modification exceptions, material deficiency extensions, and scheduled review extensions.

The Board of Directors, after considering recommendations from the RRC and the RMC, annually reviews and approves key risk limits and in turn delegates overall authority for these limits to the CEO. The CEO then delegates more specific authorities to the senior executives of the operating groups (first line of defence), who are responsible for the management of risk in their respective areas, and to the CRO (second line of defence). These delegated authorities allow risk officers to set risk tolerances, approve geographic and industry sector exposure limits within defined parameters, and establish underwriting and inventory limits for trading and investment banking activities. The criteria whereby more specific authorities may be delegated across the organization, as well as the requirements relating to documentation, communication and monitoring of those specific delegated authorities, are set out in corporate policies and standards.

Risk Identification, Review and Approval

Risk identification is an essential step in recognizing the key inherent risks that we face, understanding the potential for loss and then acting to mitigate this potential. A Risk Taxonomy is maintained to comprehensively identify and manage key risks, supporting the implementation of the bank's Risk Appetite Framework and assisting in identifying the primary risk categories for which economic capital is reported and stress capital consumption is estimated. Our enterprise-wide and targeted (industry/portfolio-specific or ad hoc) stress testing processes have been developed to assist in identifying and evaluating these risks. Risk review and approval processes are established based on the nature, size and complexity of the risks involved. Generally, this involves a formal review and approval by either an individual or a committee, independent of the originator. Delegated authorities and approvals by category are outlined below.

Portfolio transactions – transactions are approved through risk assessment processes for all types of transactions at all levels of the enterprise, which include operating group recommendations and ERPM approval of credit risk, and transactional and position limits for market risk.

Structured transactions – new structured products and transactions with significant legal, regulatory, accounting, tax or reputation risk are reviewed by the Reputation Risk Management Committee or the Trading Products Risk Committee, as appropriate, and are reviewed under our operational risk management process if they involve structural or operational complexity which may create operational risk.

Investment initiatives – documentation of risk assessments is formalized through our investment spending approval process, which is reviewed and approved by Corporate Support areas.

New products and services – policies and procedures for the approval of new or modified products and services offered to our customers are the responsibility of the first line of defence, including appropriate senior business leaders, and are reviewed and approved by subject matter experts and senior managers in Corporate Support areas, as well as by other senior management committees, including the Operational Risk Committee and Reputation Risk Management Committee, as appropriate.

Risk Monitoring

Enterprise-level risk transparency and monitoring and associated reporting are critical components of our risk management framework and corporate culture that allow senior management, committees and the Board of Directors to exercise their business management, risk management and oversight responsibilities at the enterprise, operating group and key legal entity levels. Internal reporting includes a synthesis of the key risks and associated metrics that the enterprise currently faces. Our reporting highlights our most significant risks, including assessments of our top and emerging risks, to provide the Board of Directors, its committees and any other appropriate executive and senior management committees with timely, actionable and forward-looking risk reporting. This reporting includes supporting metrics and materials to facilitate assessment of these risks relative to our risk appetite and the relevant limits established within our Risk Appetite Framework.

On a regular basis, reporting on risk issues is also provided to stakeholders, including regulators, external rating agencies and our shareholders, as well as to others in the investment community.

Risk-Based Capital Assessment

Two measures of risk-based capital are used by BMO: economic capital and advanced-approach regulatory capital. Both are aggregate measures of the risk that we take on in pursuit of our financial objectives and enable us to evaluate returns on a risk-adjusted basis. Our operating model provides for the direct management of each type of risk, as well as the management of all material risks on an integrated basis. Measuring the economic profitability of transactions or portfolios incorporates a combination of both expected and unexpected losses to assess the extent and correlation of risk before authorizing new exposures. Both expected and unexpected loss measures for a transaction or a portfolio reflect current market conditions, the inherent risk in the position and, as appropriate, its credit quality. Risk-based capital methods and material models are reviewed at least annually and, if appropriate, recalibrated or revalidated. Our risk-based capital models provide a forward-looking estimate of the difference between our maximum potential loss in economic (or market) value and our expected loss, measured over a specified time interval and using a defined confidence level.

Stress Testing

Stress testing is a key element of our risk and capital management frameworks. It is integrated in our enterprise and group risk appetite statements and embedded in our management processes. To evaluate our risks, we regularly test a range of scenarios that vary in frequency, severity and complexity in our businesses and portfolios and across the enterprise. In addition, we participate in regulatory stress tests in multiple jurisdictions. Governance of the stress testing framework resides with senior management, including the Enterprise Stress Testing Steering Committee. This committee is comprised of business, risk and finance executives and is accountable for reviewing and challenging enterprise scenarios and stress test results. Stress testing and enterprise-wide scenarios associated with the Internal Capital Adequacy Assessment Process (ICAAP), including recommendations for actions that the enterprise could take in order to manage the impact of a stress event, are established by senior management and presented to the Board of Directors. Stress testing associated with the Comprehensive Capital Analysis and Review (CCAR) and the mid-year Dodd-Frank Act Stress Test (DFAST) – which are U.S. regulatory requirements for our subsidiary BMO Financial Corp. (BFC) – is similarly governed at the BFC level.

Quantitative models and qualitative approaches are utilized to assess the impact of changes in the macroeconomic environment on our income statement and balance sheet and the resilience of our capital over a forecast horizon. Models used for stress testing are approved and governed under the Model Risk Management framework and are used to establish a better understanding of our risks and to test our capital adequacy.

Enterprise Stress Testing

Enterprise stress testing supports our ICAAP and target-setting through analysis of the potential effects of low-frequency, high-severity events on our balance sheet, earnings, and liquidity and capital positions. Scenario selection is a multi-step process that considers the enterprise's material and idiosyncratic risks and the potential impact of new or emerging risks on our risk profile, as well as the macroeconomic environment. Scenarios may be defined by senior management or regulators, and the economic impacts are determined by our Economics group. The Economics group does this by translating the scenarios into macroeconomic and market variables that include but are not limited to GDP growth, yield curve estimates, unemployment rates, real estate prices, stock index growth and changes in corporate profits. These macroeconomic variables drive our stress loss models and the qualitative assessments that determine our estimated stress impacts. The scenarios are used by our operating, risk and finance groups to assess a broad range of financial impacts which could arise under a specific stress and the ordinary course and extraordinary actions that would be anticipated in response to that stress.

Stress test results, including mitigating actions, are benchmarked and challenged by relevant business units and senior management, including the Enterprise Stress Testing Steering Committee.

Targeted Portfolio and Ad Hoc Stress Testing

Our stress testing framework integrates stress testing at the line of business, portfolio, industry, geographic and product level and embeds it in strategy, business planning and decision-making. Targeted portfolio, industry and geographic analysis is conducted by risk management and by the lines of business to test risk appetite, limits, concentration and strategy. Ad hoc stress testing is conducted in response to changing economic or market conditions and to test business strategies.

Risk Types

Our enterprise-wide risk management framework provides for the robust management of individual risk types that could have a material impact on our business. These risk types are all managed with the same focus on the effective implementation and operation of our risk processes and procedures. These risk types are shown below, with risk types that lend themselves to management via quantitative analysis presented above those risks primarily managed through more qualitative techniques. Details on each of these risk types are provided starting on page 86.

	Credit and Counterparty	Market	Insurance	
	Liquidity and Funding	Operational	Model	
Legal and Regulatory	Business	Strategic	Reputation	Environmental and Social

We leverage our enterprise-wide risk management framework, including our policy framework and corresponding risk limits or risk tolerance guidance, to manage each of these risk types within our risk appetite through our first-line and second-line-of-defence business and risk management processes. As discussed below, management oversight of risk types is provided by management and Board committees and is supported by a robust control framework.

Credit and Counterparty Risk

Credit and counterparty risk is the potential for loss due to the failure of a borrower, endorser, guarantor or counterparty to repay a loan or honour another predetermined financial obligation.

Credit and counterparty risk underlies every lending activity that BMO enters into, and also arises in the holding of investment securities, transactions related to trading and other capital markets products and activities related to securitization. Credit risk is the most significant measurable risk BMO faces. Proper management of credit risk is essential to our success, since failure to effectively manage credit risk could have an immediate and significant impact on our earnings, financial condition and reputation.

Credit and Counterparty Risk Governance

The objective of our credit risk management framework is to ensure all material credit risks to which the enterprise is exposed are identified, measured, managed, monitored, mitigated and reported. The RRC has oversight of the management of all material risks faced by the enterprise, including the credit risk management framework. BMO's credit risk management framework incorporates governing principles that are defined in a series of corporate policies and standards and are applied to more specific operating procedures. These are reviewed on a regular basis and modified when necessary to keep them current and consistent with BMO's risk appetite. The structure, limits, collateral requirements, monitoring, reporting and ongoing management of our credit exposures are all governed by these credit risk management principles.

Lending officers in the operating groups are responsible for recommending credit decisions based on the completion of appropriate due diligence, and they assume accountability for the risks. Credit officers in ERPM approve these credit decisions and are accountable for providing both an objective assessment of the lending recommendations and independent oversight of the risks assumed by the lending officers. All of these skilled and experienced individuals are subject to a rigorous lending qualification process and operate in a disciplined environment with clear delegation of decision-making authority, including individually delegated lending limits, which are reviewed annually. The Board annually reviews our Credit Risk Management Policy and delegates to the CEO key exposure limits for further specific delegation to senior officers. Credit decision-making is conducted at the management level appropriate to the size and risk of each transaction in accordance with comprehensive corporate policies, standards and procedures governing the conduct of activities in which credit risk arises. Corporate Audit Division reviews and tests management processes and controls and samples credit transactions in order to assess adherence to credit terms and conditions, as well as to all applicable governing policies, standards and procedures.

All credit risk exposures are subject to regular monitoring. Performing accounts are reviewed on a regular basis, with most commercial and corporate accounts reviewed at least annually. The frequency of review increases in accordance with the likelihood and size of potential credit losses, with deteriorating higher-risk situations referred to specialized account management groups for closer attention, when appropriate. In addition, regular portfolio and sector reviews are carried out, including stress testing and scenario analysis based on current, emerging or prospective risks. Reporting is provided at least quarterly to RRC and senior management committees in order to keep them informed of credit risk developments in our portfolios, including changes in credit risk concentrations, watchlist accounts, impaired loans, allowance for credit losses, negative credit migration and significant emerging credit risk issues, and to facilitate any measures that they may decide to take, when necessary.

Counterparty credit risk (CCR) creates a bilateral risk of loss because the market value of a transaction can be positive or negative for either counterparty. CCR exposures are subject to the same credit oversight, limit framework and approval process as outlined above. However, given the nature of the risk, CCR exposures are also monitored through the market risk framework and many are collateralized. In order to reduce our CCR, we

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often use a central counterparty (CCP) that intermediates between counterparties for contracts in financial markets. CCPs aim to mitigate the risk through the use of margin requirements (both initial and variation) and a default management process, including a default fund and other resources.

Credit and Counterparty Risk Management

Collateral Management

Collateral is used for credit risk mitigation purposes to minimize losses that would otherwise be incurred in the event of a default. Depending on the type of borrower or counterparty, the assets available and the structure and term of the credit obligations, collateral can take various forms. For corporate and commercial borrowers, collateral can take the form of pledges of the assets of a business, such as accounts receivable, inventory, machinery, real estate, or personal assets pledged in support of guarantees. For counterparties, we may enter into legally enforceable netting agreements for on-balance sheet credit exposures, where possible. In our securities financing transaction business (including repurchase agreements and securities lending), we take eligible financial collateral that we control and can readily liquidate.

On a periodic basis, collateral is subject to regular revaluation specific to asset type. For loans, the value of collateral is initially established at the time of origination, and the frequency of revaluation is dependent on the type of collateral. For collateral in the form of investor-owned commercial real estate, a full external appraisal of the property is obtained at the time of loan origination, except where the loan is below a specified threshold amount, in which case an internal evaluation and a site inspection are conducted. Internal evaluations may consider property tax assessments, purchase prices, real estate listings or realtor opinions. The case for an updated appraisal is reviewed annually, with consideration given to the borrower risk rating, existing tenants and lease contracts, as well as current market conditions. In the event a loan is classified as impaired, depending on its size, a current external appraisal, evaluation or restricted use appraisal is obtained and updated every twelve months while the loan is classified as impaired. In Canada, for residential real estate that has a loan-to-value (LTV) ratio of less than 80%, an external property appraisal is routinely obtained at the time of loan origination. In certain low LTV ratio cases, we may use an external service provided by Canada Mortgage and Housing Corporation to assist in determining whether a full property appraisal is necessary. For high LTV ratio (greater than 80%) insured mortgages in Canada, we determine the value of the property through appraisal techniques and the default insurer confirms the value.

Collateral for our trading counterparty exposures is primarily comprised of cash and high-quality liquid securities (U.S. and Canadian treasury securities, U.S. agency securities and Canadian provincial government securities) that are monitored and revalued on a daily basis. Collateral is obtained under the contractual terms of standardized industry documentation. With limited exceptions, we utilize the International Swaps and Derivatives Association Inc. Master Agreement with a Credit Support Annex to document our collateralized trading relationships with our counterparties for over-the-counter (OTC) derivatives that are not centrally cleared. Credit Support Annexes entitle a party to demand collateral (or other credit support) when its OTC derivatives exposure to the other party exceeds an agreed amount (threshold). Collateral transferred can include an independent amount (initial margin) and/or variation margin. Credit Support Annexes contain, among other things, provisions setting out acceptable types of collateral and how they are to be valued (discounts are often applied to the market values), as well as thresholds, whether or not the collateral can be re-pledged by the recipient and how interest is to be calculated.

To document our contractual securities financing relationships with our counterparties, we utilize master repurchase agreements for repurchase transactions and, for securities lending transactions, we utilize master securities lending agreements. Many G20 jurisdictions will continue to implement new regulations that will require certain counterparties with significant OTC derivatives exposures to post or collect prescribed types and amounts of collateral for uncleared OTC derivatives transactions. See Legal and Regulatory Risk – Derivatives Reform on page 110.

Portfolio Management and Concentrations of Credit and Counterparty Risk

BMO's credit risk governance policies require an acceptable level of diversification to help ensure we avoid undue concentrations of credit risk. Concentrations of credit risk may exist if a number of clients are engaged in similar activities, are located in the same geographic region or have similar economic characteristics such that their ability to meet contractual obligations could be similarly affected by changes in economic, political or other conditions. Limits may be specified for several portfolio dimensions, including industry, specialty segments (e.g., hedge funds and leveraged lending), country, product and single-name concentrations. The diversification of our credit exposure may be supplemented by the purchase or sale of credit protection through guarantees, insurance or credit default swaps.

Our credit assets consist of a well-diversified portfolio representing millions of clients, the majority of them consumers and small to medium-sized businesses. From an industry viewpoint, our most significant exposure at October 31, 2017 was to individual consumers, comprising $223,962 million ($224,041 million in 2016).

Wrong-way Risk

Wrong-way risk occurs when exposure to a counterparty is highly correlated with the credit quality of collateral or some other intended mitigant of the risk related to that counterparty. There is specific wrong-way risk, which arises when the counterparty and the market risk factors affecting that mitigant display a high correlation, and general wrong-way risk, which arises when the credit quality of the counterparty, for non-specific reasons, is highly correlated with macroeconomic or other factors that affect the value of the mitigant. Our procedures require that specific wrong-way risk be identified in transactions and accounted for in the assessment of risk. Stress testing of replacement risk is conducted monthly and can be used to identify existing or emerging concentrations of general wrong-way risk in our portfolios.

Credit and Counterparty Risk Measurement

We quantify credit risk at both the individual borrower or counterparty and the portfolio level. In order to limit earnings volatility, manage expected credit losses and minimize unexpected losses, credit risk is assessed and measured using the following risk-based parameters:

Exposure at Default (EAD) represents an estimate of the outstanding amount of a credit exposure at the time a default may occur.

Loss Given Default (LGD) is a measure of our economic loss, such as the amount that may not be recovered in the event of a default, presented as a proportion of the exposure at default.

Probability of Default (PD) represents the likelihood that a borrower or counterparty will go into default over a one-year time horizon.

Expected Loss (EL) is a measure representing the loss that is expected to occur in the normal course of business in a given period of time. EL is calculated as a function of EAD, LGD and PD.

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For inclusion in regulatory capital calculations, OSFI permits three approaches for the measurement of credit risk: Standardized, Foundation Internal Ratings Based and Advanced Internal Ratings Based (AIRB). We apply the AIRB Approach for the measurement of credit risk in most of our portfolios, including portfolios of our subsidiary BMO Financial Corp. The risk-weighted assets determined through this and other advanced approaches are currently subject to a Basel I standardized floor. The Basel III Standardized Approach is currently being used for regulatory capital calculations related to the acquired Marshall & Isley Corporation and BMO Transportation Finance portfolios, and for a few other exposures that are considered to be immaterial. We continue to transition all material parts of these portfolios to the AIRB Approach.

Both our regulatory capital and economic capital frameworks use EAD to assess credit and counterparty risk. Exposures are classified as follows:

- Drawn loans include loans, acceptances, deposits with regulated financial institutions, and certain securities. For off-balance sheet amounts and undrawn amounts, EAD includes an estimate of any further amounts that may be drawn at the time of default.
- Undrawn commitments cover all unutilized authorizations associated with the drawn loans noted above, including those which are unconditionally cancellable. EAD for undrawn commitments is model generated based on internal empirical data.
- OTC derivatives are those in our proprietary accounts that attract credit risk in addition to market risk. EAD for OTC derivatives is equal to the positive replacement cost, after considering netting, plus any potential credit exposure amount.
- Other off-balance sheet exposures include items such as guarantees, standby letters of credit and documentary credits. EAD for other off-balance sheet items is based on management's best estimate.
- Repo-style transactions include repos, reverse repos and securities lending transactions, which represent both asset and liability exposures. EAD for repo-style transactions is the total amount drawn.
- Capital is calculated based on exposures that, where applicable, have been redistributed to a more favourable PD band or a different Basel asset class as a result of applying credit risk mitigation and considering credit risk mitigants, including collateral and netting.

Total non-trading exposures at default by industry sector, as at October 31, 2017 and 2016, based on the Basel III classifications are as follows:

(Canadian $ in millions)	Drawn		Commitments (undrawn)		OTC derivatives		Other off-balance sheet items		Repo-style transactions		Total (1)	
	2017	2016	**2017**	2016	**2017**	2016	**2017**	2016	**2017**	2016	**2017**	2016
Financial institutions	**89,681**	95,392	**19,457**	20,590	**1,474**	23	**4,137**	3,773	**139,188**	76,994	**253,937**	196,772
Governments	**36,829**	35,569	**2,243**	2,563	**–**	–	**682**	863	**10,626**	3,583	**50,380**	42,578
Manufacturing	**19,737**	18,430	**12,258**	12,279	**9**	14	**1,360**	1,216	**–**	–	**33,364**	31,939
Real estate	**26,991**	24,310	**6,472**	6,101	**–**	–	**829**	783	**–**	–	**34,292**	31,194
Retail trade	**18,242**	17,314	**3,410**	3,952	**–**	–	**523**	497	**–**	–	**22,175**	21,763
Service industries	**34,723**	33,650	**11,207**	11,503	**1**	1	**2,831**	2,909	**–**	–	**48,762**	48,063
Wholesale trade	**11,440**	10,726	**4,675**	4,282	**1**	–	**481**	413	**–**	–	**16,597**	15,421
Oil and gas	**8,185**	7,877	**7,706**	7,340	**–**	–	**1,496**	1,318	**–**	–	**17,387**	16,535
Individual	**180,612**	182,358	**43,223**	41,533	**–**	–	**127**	150	**–**	–	**223,962**	224,041
Others (2)	**35,523**	31,900	**15,709**	14,954	**3**	–	**6,617**	6,063	**–**	–	**57,852**	52,917
Total exposure at default	**461,963**	457,526	**126,360**	125,097	**1,488**	38	**19,083**	17,985	**149,814**	80,577	**758,708**	681,223

(1) Credit exposure excluding equity, securitization, trading book and other assets such as non-significant investments, goodwill, deferred tax assets and intangibles.
(2) Includes industries having a total exposure of less than 2%.

Certain comparative figures have been reclassified to conform with the current year's presentation.

Risk Rating Systems

BMO's risk rating systems are designed to assess and measure the risk of any exposure.

Credit risk-based parameters are reviewed, validated and monitored regularly. The monitoring is on a quarterly basis for both the wholesale and retail models. Please refer to pages 107 to 109 for a discussion of our model risk mitigation processes.

Retail (Consumer and Small Business)

The retail portfolios are comprised of a diversified group of individual customer accounts and include residential mortgages, personal loans, credit cards and small business loans. These loans are managed in pools of homogeneous risk exposures. For these pools, decision support systems are developed using established statistical techniques and expert systems for underwriting and monitoring purposes. Adjudication models, behavioural scorecards, decision trees and expert knowledge are combined to generate optimal credit decisions in a centralized and automated environment.

The retail risk rating system assesses the borrower's risk based on a narrow range of likely expected conditions, primarily more recent in nature, including delinquency, LTV ratio and loan utilization rate. Product lines within each of the retail risk areas are separately modelled so that the risk-based parameters capture the distinct nature of each product. A final segmentation then sorts each exposure within a product line into homogeneous pools of retail risk that reflect common risk-based parameters. Each pool is assigned a unique combination of PD, LGD and EAD parameters that captures its segment-specific credit risk.

The retail risk rating system is designed to generate estimates of the value of credit risk parameters as accurately as possible, but is subject to uncertainty. During the calibration process, adjustments are made at the parameter level for each segment to account for this uncertainty. The retail parameters are tested quarterly, and are calibrated on an annual basis to incorporate additional data points in the parameter estimation process, ensuring that the most recent experience is incorporated.

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Retail Credit Probability of Default Bands by Risk Rating

Risk profile	Probability of default band
Exceptionally low	≤ 0.05%
Very low	> 0.05% to 0.20%
Low	> 0.20% to 0.75%
Medium	> 0.75% to 7.00%
High	> 7.00% to 99.99%
Default	100%

Wholesale (Corporate, Commercial and Sovereign)

Within wholesale portfolios, we utilize an enterprise-wide risk rating framework that is applied to all of our sovereign, bank, corporate and commercial counterparties. One key element of this framework is the assignment of appropriate borrower or counterparty risk ratings (BRRs). A suite of general and sector-specific risk rating models has been developed for each asset class in order to capture the key quantitative and qualitative risk factors associated with borrowers in different industries and portfolios. Risk ratings are assigned using the appropriate internal model. BRRs are assessed and assigned at the time of loan origination and reviewed at least annually. More frequent reviews are conducted for borrowers with weaker risk ratings, borrowers that trigger a review through a rating change or that experience covenant breaches, and borrowers requiring or requesting changes to credit facilities. The assigned ratings are mapped to a PD over a one-year time horizon. As a borrower migrates between risk ratings, the PD associated with the borrower changes.

BMO employs a master scale with 14 BRRs above default, and PDs are assigned to each grade within an asset class to reflect the long-run average of one-year default rates. PD estimates are updated periodically based on internal default experience over a period of more than five years that covers at least one full economic cycle, supplemented by external benchmarking, as applicable.

BMO also assigns an LGD estimate to each separate facility provided to a borrower at the time of origination. An LGD estimate is a measure of the potential economic loss that could be incurred for a facility if the borrower were to default during a period of economic distress. The LGD estimate provides an inverse measure of the protection against loss afforded by the assigned collateral, as applicable, and considers the supporting structural elements of the facility, including seniority, margin arrangements, and product and sectoral characteristics. LGD models have been developed for each asset class using internal data that covers a period of more than seven years, and results are benchmarked using external data, when necessary.

As demonstrated in the table below, our internal risk rating system corresponds in a logical manner to those of external rating agencies.

Wholesale Borrower Risk Rating Scale

BMO rating	Moody's Investors Service implied equivalent	Standard & Poor's implied equivalent
Acceptable		
I-1 to I-3	Aaa to Aa3	AAA to AA-
I-4 to I-5	A1 to Baa1	A+ to BBB+
I-6 to I-7	Baa2 to Baa3	BBB to BBB-
S-1 to S-2	Ba1 to Ba2	BB+ to BB
S-3 to S-4	Ba3 to B1	BB- to B+
Watchlist		
P-1 to P-3	B2 to Ca	B to CC
Default / Impaired		
T1, D-1 to D-4	C	D

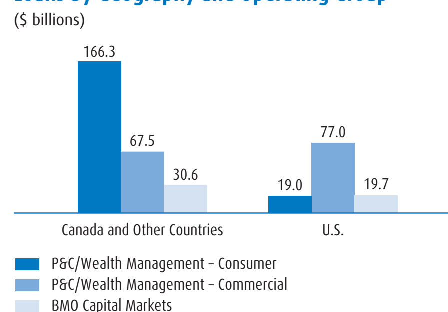
Credit Quality Information

Portfolio Review

Total enterprise-wide outstanding credit exposures were $759 billion at October 31, 2017, comprised of $414 billion in Canada, $291 billion in the United States and $54 billion in other jurisdictions. This represents an increase of $77 billion or 11% from the prior year.

BMO's loan book continues to be well-diversified by industry and geographic region. Gross loans and acceptances increased $6 billion or 2% from the prior year to $380 billion at October 31, 2017. The geographic mix of our Canadian and U.S. portfolios was relatively consistent with the prior year, and represented 66.2% and 30.4% of total loans, respectively, compared with 64.5% and 32.6% in 2016. Our loan portfolio is well-diversified, with the consumer loan portfolio representing 48.7% of the total portfolio, a modest decrease from 49.5% in 2016, and business and government loans representing 51.3% of the total portfolio, up from 50.5% in 2016.

Loans by Geography and Operating Group
($ billions)



MD&A

Material presented in a blue-tinted font above is an integral part of the 2017 annual consolidated financial statements (see page 78).

The following tables present our business and government and consumer gross loans and acceptances outstanding by risk rating as at October 31, 2017 and 2016.

Business and Government Gross Loans and Acceptances by Risk Rating

(Canadian $ in millions)	Business and government loans and acceptances	
	2017	2016
Acceptable		
Investment grade	**100,771**	96,059
Sub-investment grade	**88,424**	85,695
Watchlist	**4,209**	5,340
Default / Impaired	**1,374**	1,524
Total	**194,778**	188,618

Consumer Gross Loans by Risk Rating

(Canadian $ in millions)	Residential mortgages		Credit card, consumer instalment and other personal loans		Total	
	2017	2016	**2017**	2016	**2017**	2016
Exceptionally low (≤ 0.05%)	**–**	1	**21,709**	18,264	**21,709**	18,265
Very low (> 0.05% to 0.20%)	**75,721**	68,557	**14,616**	18,056	**90,337**	86,613
Low (> 0.20% to 0.75%)	**21,011**	23,379	**14,701**	14,996	**35,712**	38,375
Medium (> 0.75% to 7.00%)	**16,305**	17,629	**13,157**	15,247	**29,462**	32,876
High (> 7.00% to 99.99%)	**438**	421	**2,481**	2,287	**2,919**	2,708
Standardized performing / Not rated	**1,370**	1,858	**2,765**	3,311	**4,135**	5,169
Default / Impaired	**413**	432	**586**	620	**999**	1,052
Total	**115,258**	112,277	**70,015**	72,781	**185,273**	185,058

Loan Maturities and Interest Rate Sensitivity

The following table presents gross loans and acceptances by contractual maturity and by country of ultimate risk:

(Canadian $ in millions)	1 year or less		Over 1 year to 5 years		Over 5 years		Total	
	2017	2016	**2017**	2016	**2017**	2016	**2017**	2016
Canada								
Consumer	**55,568**	47,466	**106,023**	108,887	**4,349**	5,205	**165,940**	161,558
Commercial and corporate (excluding real estate)	**52,858**	48,997	**14,699**	14,467	**1,367**	1,370	**68,924**	64,834
Commercial real estate	**6,226**	5,803	**8,997**	7,471	**1,453**	1,417	**16,676**	14,691
United States	**33,382**	33,776	**61,394**	67,262	**20,947**	20,784	**115,723**	121,822
Other countries	**11,184**	9,036	**920**	1,173	**684**	562	**12,788**	10,771
Total	**159,218**	145,078	**192,033**	199,260	**28,800**	29,338	**380,051**	373,676

The following table presents net loans and acceptances by interest rate sensitivity:

(Canadian $ in millions)	**2017**	2016
Fixed rate	**190,254**	186,864
Floating rate	**171,418**	171,866
Non-interest sensitive (1)	**16,546**	13,021
Total	**378,218**	371,751

(1) Non-interest sensitive is comprised of customers' liability under acceptances.

Further details of our loan book, including detailed breakdowns by industry and geographic region, can be found in Tables 7 to 15 on pages 128 to 134. Details related to our credit exposures are presented in Note 4 on page 152 of the consolidated financial statements.

Real Estate Secured Lending

Residential mortgage and home equity line of credit (HELOC) exposures continue to be of interest in the current environment. BMO regularly performs stress testing on its residential mortgage and HELOC portfolios to evaluate the potential effects of high-impact events. These stress tests incorporate scenarios ranging from moderately to severely adverse. The credit losses forecast in these tests vary with the severity of the scenario and are considered to be manageable.

Provision for Credit Losses (PCL)

Total PCL of $774 million in 2017 decreased 5% from $815 million in 2016. Detailed discussions of our PCL, including historical trends in PCL, are provided on page 42, in Table 15 on page 134 and in Note 4 on page 152 of the consolidated financial statements.

Gross Impaired Loans (GIL)

Total GIL of $2,174 million in 2017 decreased 7% from $2,332 million in 2016, due to lower oil and gas impaired loans. GIL as a percentage of gross loans and acceptances also decreased to 0.57% compared to 0.62% in 2016.

Factors contributing to the change in GIL are outlined in the table below. Loans classified as impaired during the year decreased to $2,193 million from $2,512 million in 2016, in part due to a decrease in oil and gas impaired formations. On a geographic basis, the United States accounted for the majority of impaired loan formations, comprising 52.8% of total formations in 2017, compared with 56.8% in 2016. Detailed breakdowns of impaired loans by geographic region and industry can be found in Table 11 on page 130 and in Note 4 on page 152 of the consolidated financial statements.

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Changes in Gross Impaired Loans and Acceptances (1)

(Canadian $ in millions, except as noted) For the year ended October 31	**2017**	2016	2015
GIL, beginning of year	**2,332**	1,959	2,048
Classified as impaired during the year	**2,193**	2,512	1,921
Transferred to not impaired during the year	**(607)**	(577)	(556)
Net repayments	**(1,007)**	(869)	(700)
Amounts written off	**(623)**	(706)	(704)
Recoveries of loans and advances previously written off	**–**	–	–
Disposals of loans	**(46)**	(34)	(252)
Foreign exchange and other movements	**(68)**	47	202
GIL, end of year	**2,174**	2,332	1,959
GIL as a % of gross loans and acceptances	**0.57**	0.62	0.58

(1) GIL excludes purchased credit impaired loans.

MD&A

Allowance for Credit Losses

BMO employs a disciplined approach to provisioning and loan loss evaluation across all loan portfolios, with the prompt identification of problem loans being a key risk management objective. BMO maintains both a specific allowance and a collective allowance for credit losses. The specific allowance reduces the aggregate carrying value of credit assets for which there is evidence of deterioration in credit quality. BMO also maintains a collective allowance in order to cover any impairment in the existing loan portfolio that cannot yet be associated with individually identified loans. Our approach to establishing and maintaining the collective allowance is based on the requirements of IFRS, in conjunction with guidelines issued by our regulator, OSFI. Our collective allowance methodology groups loans on the basis of similar credit risk characteristics, and applies quantitative and qualitative factors to determine the appropriate level for the collective allowance. The quantitative component of the methodology measures expected long-run losses based on the PD, LGD and EAD risk parameters used in the models we employ to estimate risk-based capital.
For commercial and corporate loans, key determinants of incurred but not identified losses include the underlying risk rating of the borrower, industry sector, credit product and amount and quality of collateral held. For consumer and small business loans, exposures are pooled based on similar risk characteristics, and the levels of incurred but not identified losses are determined based on the long-run default and historical loss experience of each pool. The loss factors are back-tested and calibrated on a regular basis to ensure that they continue to reflect our best estimate of losses that have been incurred but not yet identified, on an individual basis, within the pools of loans. The qualitative component of the methodology reflects management's judgment with respect to current and near-term macroeconomic and business conditions, portfolio-specific considerations, credit quality trends, and model risk factors. We review the collective allowance on a quarterly basis.

BMO maintains an allowance for credit losses (ACL) at a level that we consider adequate to absorb credit-related losses. As at October 31, 2017, our ACL decreased $118 million to $1,996 million, due to a decrease in the collective allowance and the impact of the weaker U.S. dollar. This was comprised of specific allowances of $420 million and a collective allowance of $1,576 million, which also includes specific allowances of $27 million and a collective allowance of $136 million related to undrawn commitments and letters of credit that are considered other credit instruments and recorded in other liabilities. The specific allowance decreased $12 million in 2017 from $432 million in 2016. In addition, our coverage ratio remains adequate, with specific ACL as a percentage of GIL of 18.1%, compared with 17.4% in 2016.

The collective allowance decreased $106 million from $1,682 million in 2016, reflecting a decrease through PCL of $76 million and the impact of the weaker U.S. dollar.

IFRS 9 *Financial Instruments* (IFRS 9) is effective for the bank for the fiscal year beginning November 1, 2017, and addresses the impairment of financial assets. For a discussion on the adoption of IFRS 9 and the impact on our ACL, see the Future Changes in Accounting Policies section on page 116 and Note 1 on page 144 of the consolidated financial statements.

Factors contributing to the change in ACL are outlined in the table below. Further details on changes in ACL by country and portfolio can be found in Tables 12 and 13 on page 132 and in Note 4 on page 152 of the consolidated financial statements.

Changes in Allowance for Credit Losses (1)

(Canadian $ in millions, except as noted) For the year ended October 31	**2017**	2016	2015
Specific ACL, beginning of year	**432**	392	424
Specific PCL (charge to income statement)	**850**	815	612
Recoveries of amounts written off in previous years	**265**	343	456
Write-offs	**(982)**	(1,047)	(1,065)
Foreign exchange and other movements	**(145)**	(71)	(35)
Specific ACL, end of year	**420**	432	392
Collective ACL, beginning of year	**1,682**	1,660	1,542
Collective PCL (charge to income statement)	**(76)**	–	–
Foreign exchange and other movements	**(30)**	22	118
Collective ACL, end of year	**1,576**	1,682	1,660
Total ACL	**1,996**	2,114	2,052
Comprised of:			
Loans	**1,833**	1,925	1,855
Specific allowance for other credit instruments	**27**	27	35
Collective allowance for other credit instruments	**136**	162	162
Specific ACL as a % of GIL (2)	**18.1**	17.4	18.2

(1) Includes allowances related to other credit instruments that are included in other liabilities.
(2) Ratio excludes the specific allowance for other credit instruments that are included in other liabilities.

European Exposures

Some European countries have experienced credit concerns in the recent past, and exposure to this region has been of particular focus. BMO's geographic exposures are subject to a country risk management framework that incorporates economic and political assessments and management of exposures within limits based on product, entity and the country of ultimate risk. We closely monitor our European exposures, and our risk management processes incorporate stress tests as appropriate to assess our potential risk. Our exposure to European countries, as at October 31, 2017, including Greece, Ireland, Italy, Portugal and Spain (GIIPS), is set out in the tables that follow.

The table below outlines total net portfolio exposures for funded lending, securities (inclusive of credit default swap (CDS) activity), repo-style transactions and derivatives. Funded lending is detailed by counterparty type, as well as by total commitments compared to the funded amount, in the table on page 93.

European Exposure by Country and Counterparty (1)

(Canadian $ in millions) As at October 31, 2017	Funded lending (2)	Securities (3)(4)				Repo-style transactions and derivatives (5)(6)				Total net exposure
Country	Total	Bank	Corporate	Sovereign	Total	Bank	Corporate	Sovereign	Total	
GIIPS										
Greece	–	–	–	–	–	–	–	–	–	–
Ireland (7)	6	–	–	–	–	19	46	–	65	71
Italy	27	–	1	–	1	–	–	–	–	28
Portugal	–	–	–	–	–	–	–	–	–	–
Spain	118	–	–	–	–	–	–	–	–	118
Total – GIIPS	**151**	**–**	**1**	**–**	**1**	**19**	**46**	**–**	**65**	**217**
Eurozone (excluding GIIPS)										
France	107	162	–	131	293	42	20	12	74	474
Germany	358	1	26	862	889	23	3	2	28	1,275
Netherlands	554	84	11	–	95	18	43	–	61	710
Other (8)	101	–	96	195	291	1	19	14	34	426
Total – Eurozone (excluding GIIPS)	**1,120**	**247**	**133**	**1,188**	**1,568**	**84**	**85**	**28**	**197**	**2,885**
Rest of Europe										
Denmark	7	304	–	131	435	5	–	–	5	447
Sweden	49	99	–	230	329	5	–	–	5	383
United Kingdom	1,746	35	77	211	323	229	49	9	287	2,356
Other (8)	279	41	–	–	41	4	14	4	22	342
Total – Rest of Europe	**2,081**	**479**	**77**	**572**	**1,128**	**243**	**63**	**13**	**319**	**3,528**
Total – All of Europe (9)	**3,352**	**726**	**211**	**1,760**	**2,697**	**346**	**194**	**41**	**581**	**6,630**

As at October 31, 2016	Funded lending (2)	Securities (3)				Repo-style transactions and derivatives (5)(6)				Total net exposure
Country	Total	Bank	Corporate	Sovereign	Total	Bank	Corporate	Sovereign	Total	
Total – GIIPS	78	6	–	–	6	302	58	–	360	444
Total – Eurozone (excluding GIIPS)	1,064	464	48	1,580	2,092	103	84	32	219	3,375
Total – Rest of Europe	881	1,133	57	605	1,795	1,357	152	9	1,518	4,194
Total – All of Europe (9)	2,023	1,603	105	2,185	3,893	1,762	294	41	2,097	8,013

(1) BMO has the following indirect exposures to Europe as at October 31, 2017:
- Collateral of €426 million to support trading activity in securities (€21 million from GIIPS) and €176 million of cash collateral held.
- Guarantees of $1.1 billion ($37 million to GIIPS).

(2) Funded lending includes loans.
(3) Securities include cash products, insurance investments and traded credit.
(4) BMO's total net notional CDS exposure (embedded as part of the securities exposure in this table) to Europe was $208 million, with no net single-name* CDS exposure to GIIPS countries as at October 31, 2017 (*includes a net position of $178 million (bought protection) on CDS indices, of which 19% is comprised of GIIPS domiciled entities).
(5) Repo-style transactions are primarily with bank counterparties for which BMO holds collateral ($12.0 billion for Europe as at October 31, 2017).
(6) Derivatives amounts are marked-to-market, incorporating transaction netting where master netting agreements with counterparties have been entered into, and collateral offsets for counterparties where a Credit Support Annex is in effect.
(7) Does not include Irish subsidiary reserves we are required to maintain with the Irish Central Bank of $28 million as at October 31, 2017.
(8) Other Eurozone exposure includes 7 countries with less than $300 million net exposure. Other European exposure is distributed across 8 countries, with $4 million exposure to the Russian Federation as at October 31, 2017.
(9) Of our total net direct exposure to Europe, approximately 55% was to counterparties in countries with a rating of Aaa/AAA from at least one of Moody's and S&P.

European Lending Exposure by Country and Counterparty (9)

(Canadian $ in millions) Country	Lending (2) Funded lending as at October 31, 2017 Bank	 Corporate	 Sovereign	As at October 31, 2017 Commitments	 Funded	As at October 31, 2016 Commitments	 Funded
GIIPS							
Greece	–	–	–	–	–	–	–
Ireland (7)	–	6	–	103	6	126	25
Italy	26	1	–	27	27	–	–
Portugal	–	–	–	–	–	–	–
Spain	112	6	–	149	118	80	53
Total – GIIPS	**138**	**13**	**–**	**279**	**151**	206	78
Eurozone (excluding GIIPS)							
France	107	–	–	152	107	155	111
Germany	111	246	1	488	358	207	133
Netherlands	75	479	–	756	554	661	502
Other (8)	87	14	–	247	101	436	318
Total – Eurozone (excluding GIIPS)	**380**	**739**	**1**	**1,643**	**1,120**	1,459	1,064
Rest of Europe							
Denmark	7	–	–	7	7	11	11
Sweden	13	36	–	195	49	202	59
United Kingdom	12	1,734	–	2,285	1,746	808	543
Other (8)	66	213	–	502	279	415	268
Total – Rest of Europe	**98**	**1,983**	**–**	**2,989**	**2,081**	1,436	881
Total – All of Europe (9)	**616**	**2,735**	**1**	**4,911**	**3,352**	3,101	2,023

Refer to footnotes in the table on page 92.

Derivative Transactions

The following table presents the notional amounts of our over-the-counter (OTC) derivative contracts, comprised of those which are centrally cleared and settled through a designated clearing house or central counterparty (CCP) and those which are non-centrally cleared. CCPs are established under the supervision of central banks or other similar regulatory authorities and, as financial market infrastructure, must satisfy certain financial resilience requirements. Generally speaking, to centrally clear, BMO acquires a membership in the CCP and, in addition to providing collateral to protect the CCP against BMO risk, BMO is at risk as a member for its contribution to a default fund and may be called on to make additional contributions, or to provide other support in the event another member defaults.

The notional amounts of our derivatives represent the amount to which a rate or price is applied in order to calculate the amount of cash that must be exchanged under the contract. Notional amounts do not represent assets or liabilities and therefore are not recorded in our Consolidated Balance Sheet. The fair values of OTC derivative contracts are recorded in our Consolidated Balance Sheet.

Over-the-Counter Derivatives (Notional amounts)

(Canadian $ in millions) As at October 31	Non-centrally cleared **2017**	 2016	Centrally cleared **2017**	 2016	Total **2017**	 2016
Interest Rate Contracts						
Swaps	**479,177**	575,523	**2,723,188**	2,151,178	**3,202,365**	2,726,701
Forward rate agreements	**1,442**	1,288	**193,700**	429,219	**195,142**	430,507
Purchased options	**29,107**	29,508	**–**	–	**29,107**	29,508
Written options	**37,247**	43,921	**–**	–	**37,247**	43,921
Total interest rate contracts	**546,973**	650,240	**2,916,888**	2,580,397	**3,463,861**	3,230,637
Foreign Exchange Contracts						
Cross-currency swaps	**85,586**	89,354	**–**	–	**85,586**	89,354
Cross-currency interest rate swaps	**434,210**	382,666	**–**	–	**434,210**	382,666
Forward foreign exchange contracts	**370,762**	391,039	**31,946**	18,150	**402,708**	409,189
Purchased options	**23,812**	29,876	**–**	–	**23,812**	29,876
Written options	**29,023**	30,405	**78**	–	**29,101**	30,405
Total foreign exchange contracts	**943,393**	923,340	**32,024**	18,150	**975,417**	941,490
Commodity Contracts						
Swaps	**18,713**	13,603	**–**	–	**18,713**	13,603
Purchased options	**7,080**	6,828	**–**	–	**7,080**	6,828
Written options	**4,905**	4,672	**–**	–	**4,905**	4,672
Total commodity contracts	**30,698**	25,103	**–**	–	**30,698**	25,103
Equity Contracts	**63,528**	58,313	**–**	–	**63,528**	58,313
Credit Default Swaps						
Purchased	**1,640**	1,730	**1,018**	1,303	**2,658**	3,033
Written	**114**	793	**334**	188	**448**	981
Total credit default swaps	**1,754**	2,523	**1,352**	1,491	**3,106**	4,014
Total	**1,586,346**	1,659,519	**2,950,264**	2,600,038	**4,536,610**	4,259,557

Certain comparative figures have been reclassified to conform with the current year's presentation.

Market Risk

Market risk is the potential for adverse changes in the value of BMO's assets and liabilities resulting from changes in market variables such as interest rates, foreign exchange rates, equity and commodity prices and their implied volatilities, and credit spreads, and includes the risk of credit migration and default in our trading book.

Market risk arises from BMO's trading and underwriting activities, as well as its structural banking activities. The magnitude and importance of these activities to the enterprise, along with the potential volatility of market variables, call for diligent governance and a robust market risk management framework to provide effective identification, measurement, reporting and control of market risk exposures.

Trading and Underwriting Market Risk Governance

BMO's market risk-taking activities are subject to a comprehensive governance framework. The RRC provides oversight of the management of market risk on behalf of the Board of Directors and approves limits governing market risk exposures that are consistent with our risk appetite. The RMC regularly reviews and discusses significant market risk exposures and positions, and provides ongoing senior management oversight of BMO's risk-taking activities. Both of these committees are kept apprised of specific market risk exposures and other factors that could expose BMO to unusual, unexpected or unquantified risks associated with market exposures, as well as other current and emerging market risks. In addition, all businesses and individuals authorized to conduct trading and underwriting activities on behalf of BMO are required to work within BMO's risk governance framework and, as part of their first-line-of-defence responsibilities, they must adhere to all relevant corporate policies, standards and procedures and maintain and manage market risk exposures within specified limits and risk tolerances. In support of BMO's risk governance framework, our market risk management framework is comprised of the processes, infrastructure and supporting documentation which, together, help ensure that the bank's market risk exposures are appropriately identified, accurately measured, and independently monitored and controlled on an ongoing basis.

Trading and Underwriting Market Risk

Our trading and underwriting businesses give rise to market risk associated with buying and selling financial products in the course of servicing customer requirements, market making and related financing activities, and from assisting clients to raise funds by way of securities issuance.

Identification and Measurement of Trading and Underwriting Market Risk

As the first step in the management of market risk, thorough assessment processes are in place to identify market risk exposures associated with both new products and the evolving risk profile of existing products, including on- and off-balance sheet positions, trading and non-trading positions and market risk exposures arising from the domestic and foreign operations of our operating groups.

Reflecting the multi-dimensional nature of market risk, various metrics and techniques are then employed to measure identified market risk exposures. These metrics primarily include Value at Risk, Stressed Value at Risk, and regulatory and economic capital attribution, as well as stress testing. Other techniques include the analysis of the sensitivity of our trading and underwriting portfolios to various market risk factors, position concentrations, notional values and trading losses.

Value at Risk (VaR) is measured for specific classes of risk in BMO's trading and underwriting activities related to interest rates, foreign exchange rates, credit spreads, equity and commodity prices and their implied volatilities. This measure calculates the maximum loss likely to be experienced in the trading and underwriting portfolios, measured at a 99% confidence level over a one-day holding period.

Stressed Value at Risk (SVaR) is measured for specific classes of risk in BMO's trading and underwriting activities related to interest rates, foreign exchange rates, credit spreads, equity and commodity prices and their implied volatilities, where model inputs are calibrated to historical data from a period of significant financial stress. This measure calculates the maximum loss likely to be experienced in the trading and underwriting portfolios, measured at a 99% confidence level over a one-day holding period.

Although it is a valuable indicator of risk, like any model-driven metric, VaR has limitations. Among these limitations is the assumption that all positions can be liquidated within the assigned one-day holding period, which may not be the case under illiquid market conditions. Generally, market liquidity horizons are reviewed for suitability and updated where appropriate for relevant risk metrics. Further limitations of the VaR metric include the assumption that historical data can be used as a proxy to forecast future market events, and the fact that positions at the close of business, upon which the VaR calculation is based, do not reflect the impact of intra-day trading activity.

We use a variety of methods to verify the integrity of our risk models, including the application of back-testing against hypothetical losses and approval by an independent model valuation team. Back-testing assumes there are no changes in the previous day's closing positions and then isolates the effects of each day's price movements against those closing positions. Models are validated in part by assessing how often the calculated hypothetical losses exceed the VaR measure over a defined period. This testing is aligned with defined regulatory expectations, and its results confirm the reliability of our models. The volatility data and correlations that underpin our models are updated frequently, so that VaR measures reflect current conditions.

Probabilistic stress testing and scenario analysis are used daily to determine the potential impact of plausible but severe market changes on our portfolios. In addition, historical event stresses are tested on a weekly basis, including tests of scenarios such as the stock market crash of 1987 and the collapse of Lehman Brothers in 2008. Targeted analyses of risks and portfolios, along with other ad hoc analyses, are also conducted to examine our sensitivity to hypothetical, low-frequency, high-severity scenarios. Scenarios are amended, added or removed to better reflect changes in underlying market conditions and the results are reported to the lines of business, the RMC and the RRC on a regular basis.

Neither VaR nor stress testing should be viewed as definitive predictors of the maximum amount of losses that could occur in any one day, as their results are based on models and estimates, are subject to confidence levels and estimates could be exceeded under unforeseen market conditions.

Material presented in a blue-tinted font above is an integral part of the 2017 annual consolidated financial statements (see page 78).

Monitoring and Control of Trading and Underwriting Market Risk

A comprehensive set of limits is applied to these metrics, and they are subject to regular monitoring and reporting, with any breach of the limits escalated to the appropriate level of oversight. Risk profiles of our trading and underwriting activities are maintained within our risk appetite and supporting limits, and are monitored and reported to traders, management, senior executives and Board committees. Other significant controls include the independent valuation of financial assets and liabilities, as well as compliance with our model risk management framework to mitigate model risk.

Trading Market Risk Measures

Trading VaR and SVaR

Total Trading VaR and Total Trading Stressed VaR decreased year over year. Lower exposures and reduced market volatility resulted in a reduction in VaR figures, particularly for interest rates. SVaR reduced as well, with lower interest rate, foreign exchange and equity components from reduced exposure, partially offset by increased Credit SVaR from a methodology change relating to market risk associated with the valuation of uncollateralized derivatives.

Total Trading Value at Risk (VaR) Summary (1)

As at or for the year ended October 31 (pre-tax Canadian $ equivalent in millions)	2017				2016
	Year-end	**Average**	**High**	**Low**	Year-end
Commodity VaR	**(0.9)**	**(0.9)**	**(1.7)**	**(0.4)**	(0.7)
Equity VaR	**(3.3)**	**(3.1)**	**(8.5)**	**(2.2)**	(4.5)
Foreign exchange VaR	**(0.3)**	**(0.8)**	**(3.1)**	**(0.1)**	(1.8)
Interest rate VaR	**(5.0)**	**(6.1)**	**(11.4)**	**(3.9)**	(10.3)
Credit VaR	**(1.9)**	**(2.3)**	**(4.1)**	**(1.5)**	(2.0)
Diversification	**5.9**	**7.0**	**nm**	**nm**	9.3
Total Trading VaR	**(5.5)**	**(6.2)**	**(10.0)**	**(4.3)**	(10.0)

Total Trading Stressed Value at Risk (SVaR) Summary (1)(2)

As at or for the year ended October 31 (pre-tax Canadian $ equivalent in millions)	2017				2016
	Year-end	**Average**	**High**	**Low**	Year-end
Commodity SVaR	**(1.7)**	**(1.8)**	**(6.0)**	**(0.7)**	(1.4)
Equity SVaR	**(16.2)**	**(12.4)**	**(19.3)**	**(8.9)**	(18.7)
Foreign exchange SVaR	**(0.3)**	**(1.3)**	**(4.5)**	**(0.1)**	(3.2)
Interest rate SVaR	**(15.2)**	**(17.1)**	**(25.1)**	**(11.9)**	(23.1)
Credit SVaR	**(18.3)**	**(12.9)**	**(33.8)**	**(6.6)**	(6.5)
Diversification	**27.1**	**25.0**	**nm**	**nm**	25.8
Total Trading SVaR	**(24.6)**	**(20.5)**	**(34.6)**	**(13.4)**	(27.1)

(1) One-day measure using a 99% confidence interval. Losses are presented in brackets and benefits are presented as positive numbers.
(2) Stressed VaR is produced weekly.
nm – not meaningful

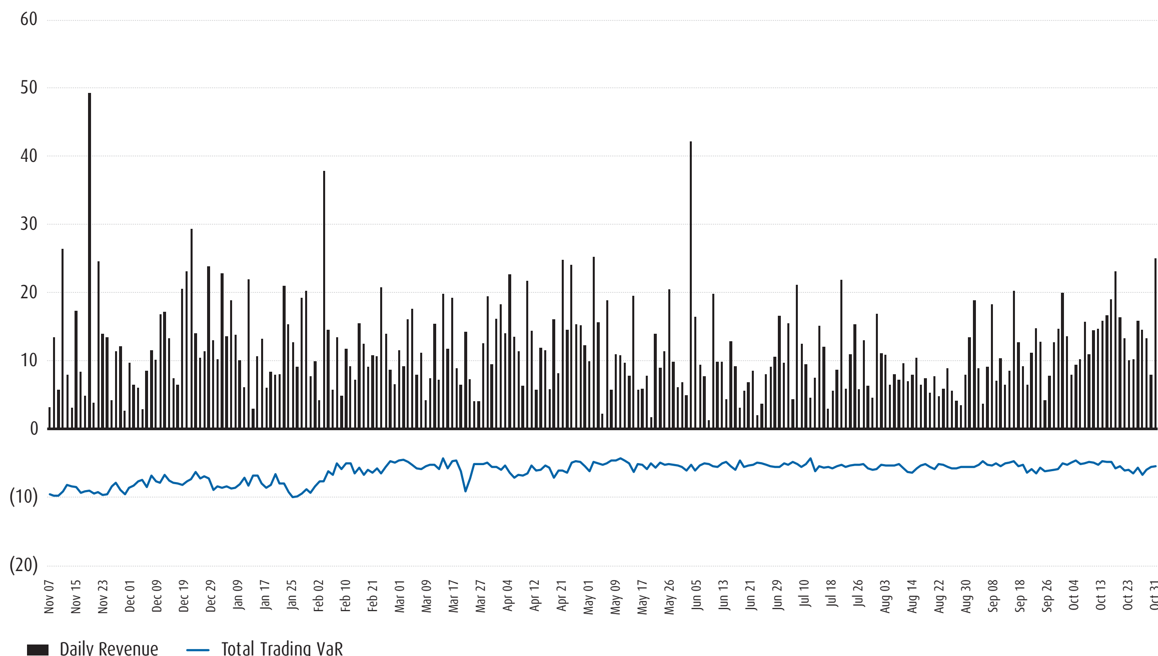
Material presented in a blue-tinted font above is an integral part of the 2017 annual consolidated financial statements (see page 78).

Trading Net Revenue

The charts below present daily net revenues plotted against Total Trading VaR, along with a representation of daily net revenue distribution. In 2017, we did not incur any daily net trading losses.

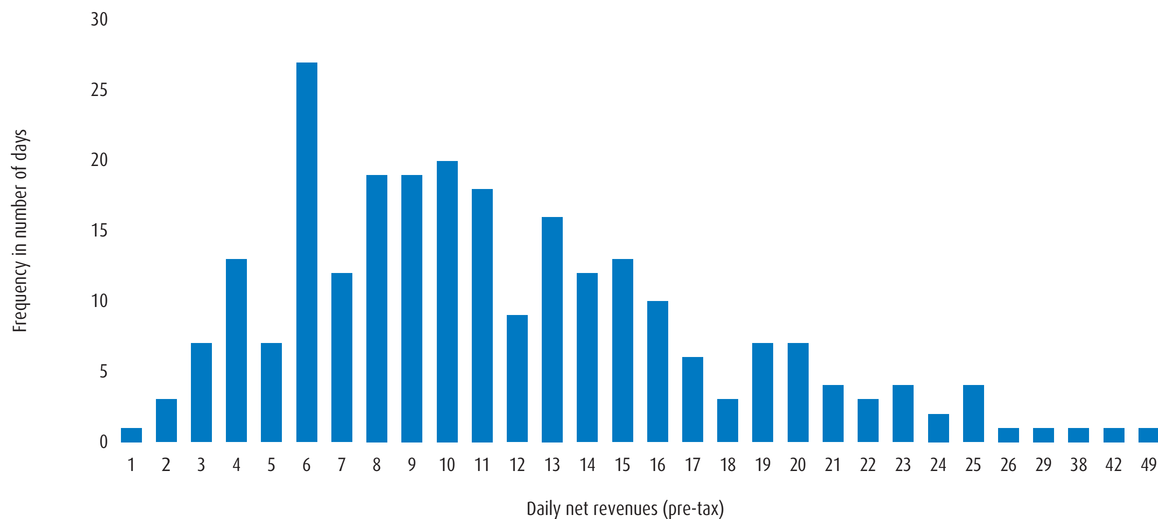
Trading Net Revenues versus Value at Risk

(pre-tax basis and in millions of Canadian dollars)
November 1, 2016 to October 31, 2017 ($ millions)



Frequency Distribution of Daily Net Revenues

November 1, 2016 to October 31, 2017 ($ millions)



Structural (Non-Trading) Market Risk

Structural market risk is comprised of interest rate risk arising from our banking activities (loans and deposits) and foreign exchange risk arising from our foreign currency operations and exposures.

Structural Market Risk Governance

BMO's Corporate Treasury group is responsible for the ongoing management of structural market risk across the enterprise, with independent oversight provided by the Market Risk group. In addition to Board-approved limits on earnings at risk and economic value sensitivities due to price changes in interest rates, more granular management limits are in place to guide the daily management of this risk.

The RRC has oversight of the management of structural market risk, annually approves the structural market risk plan and limits, and regularly reviews structural market risk positions. The RMC and the Balance Sheet and Capital Management Committee (BSCMC) regularly review structural market risk positions and provide senior management oversight.

Structural Market Risk Measurement

Interest Rate Risk

Structural interest rate risk arises when changes in interest rates affect the cash flows, earnings and values of assets and liabilities related to our banking activities. The objective of structural interest rate risk management is to maintain high-quality earnings and maximize sustainable product spread, while managing the risk to the economic value of our assets due to changes in interest rates.

Structural interest rate risk is primarily comprised of interest rate mismatch risk and product embedded option risk.

Interest rate mismatch risk arises when there are differences in the scheduled maturities, repricing dates or reference rates of assets, liabilities and derivatives. The net interest rate mismatch, representing residual assets funded by common shareholders' equity, is managed to a target profile through interest rate swaps and securities.

Product embedded option risk arises when product features allow customers to alter cash flows, such as scheduled maturity or repricing dates, usually in response to changes in market conditions. Product embedded options include loan prepayments, deposit redemption privileges and committed rates on unadvanced mortgages. Product embedded options and associated customer behaviours are captured in risk modelling and hedging programs may be used to manage this risk to low levels.

Structural interest rate risk is measured using simulations, earnings sensitivity and economic value sensitivity analysis, stress testing and gap analysis, in addition to other treasury risk metrics.

Earnings Sensitivity is a measure of the impact of potential changes in interest rates on the projected 12-month pre-tax net income of a portfolio of assets, liabilities and off-balance sheet positions in response to prescribed parallel interest rate movements.

Economic Value Sensitivity is a measure of the impact of potential changes in interest rates on the market value of a portfolio of assets, liabilities and off-balance sheet positions in response to prescribed parallel interest rate movements.

The models used to measure structural interest rate risk use projected changes in interest rates and predict how customers would likely react to these changes. For customer loans and deposits with scheduled maturity and repricing dates (such as mortgages and term deposits), our models measure the extent to which customers are likely to use embedded options to alter those scheduled terms. For customer loans and deposits without scheduled maturity and repricing dates (such as credit card loans and chequing accounts), we measure our exposure using models that adjust for elasticity in product pricing and reflect historical and forecasted trends in balances. The results of these structural market risk models by their nature have inherent uncertainty, as they reflect potential anticipated pricing and customer behaviours, which may differ from actual experience. These models have been developed using statistical analysis and are independently validated and periodically updated through regular model performance assessment, back-testing processes and ongoing dialogue with the lines of business. Models developed to predict customer behaviour are also used in support of product pricing. All models are subject to our model risk management framework described in more detail on page 107.

Structural interest rate earnings and economic value sensitivity to an immediate parallel increase or decrease of 100 basis points in the yield curve are disclosed in the following table. The interest rate gap position is disclosed in Note 19 on page 180 of the consolidated financial statements.

During the 2017 fiscal year, we introduced new deposit models in both Canada and the United States that better reflect expected customer behaviour and product pricing as interest rates change. There were no other significant changes in our structural market risk management framework during the year.

Structural economic value exposure to rising interest rates primarily reflects a lower market value for fixed rate loans. Structural economic value sensitivity to falling interest rates primarily reflects the impact of a higher market value for fixed rate loans and minimum modelled client deposit rates. Structural economic value exposure to rising interest rates increased relative to October 31, 2016, primarily owing to modelled deposit pricing being more rate-sensitive at higher interest rate levels following the increase in market rates during the year. The structural economic value benefit to falling interest rates relative to October 31, 2016 increased owing to the greater extent to which interest rates can now fall. Structural earnings sensitivity quantifies the potential impact of interest rate changes on structural balance sheet pre-tax net income over the next 12 months. Structural earnings exposure to falling interest rates primarily reflects the risk of fixed and floating rate loans repricing at lower rates and the more limited ability to reduce deposit pricing as rates fall. Canadian and U.S. long-term and short-term rates increased during the year. While this benefits current earnings, it results in higher earnings exposures to falling interest rates because interest rates can now fall further than they could previously. Structural earnings benefit to rising interest rates primarily reflects the benefit of widening deposit spreads as interest rates rise. The structural earnings benefit to rising interest rates decreased modestly relative to October 31, 2016, primarily owing to a lower modelled benefit of subsequent interest rate increases over the next 12 months following the increase in market rates during the year.

Material presented in a blue-tinted font above is an integral part of the 2017 annual consolidated financial statements (see page 78).

Structural Balance Sheet Interest Rate Sensitivity (1) (2) (3) (4)

(Canadian $ in millions)	As at October 31, 2017 Economic value sensitivity (Pre-tax)	As at October 31, 2017 Earnings sensitivity over the next 12 months (Pre-tax)	As at October 31, 2016 Economic value sensitivity (Pre-tax)	As at October 31, 2016 Earnings sensitivity over the next 12 months (Pre-tax)
100 basis point increase	**(957.8)**	**136.9**	(680.2)	149.0
100 basis point decrease	**78.6**	**(433.4)**	7.3	(168.9)

(1) Earnings and value sensitivities to falling interest rates assume Canadian and U.S. central banks do not decrease overnight interest rates below nil. The scenarios with decreasing interest rates therefore limit the decrease in both Canadian and U.S. short-term interest rates to 100 basis points for shorter terms as of October 31, 2017 (50 basis points as of October 31, 2016). Longer-term interest rates do not decrease below the assumed level of short-term interest rates.
(2) Certain non-trading AFS holdings are managed under the bank's trading risk framework.
(3) Losses are presented in brackets and benefits are presented as positive numbers.
(4) For BMO's Insurance businesses, a 100 basis point increase in interest rates at October 31, 2017 results in an increase in earnings before tax of $52 million and an increase in economic value before tax of $417 million ($90 million and $623 million, respectively, at October 31, 2016). A 100 basis point decrease in interest rates at October 31, 2017 results in a decrease in earnings before tax of $50 million and a decrease in economic value before tax of $507 million ($87 million and $744 million, respectively, at October 31, 2016). These impacts are not reflected in the table above.

MD&A

Foreign Exchange Risk

Structural foreign exchange risk arises primarily from translation risk related to the net investment in our U.S. operations and from transaction risk associated with our U.S.-dollar-denominated net income.

Translation risk represents the impact that changes in foreign exchange rates can have on BMO's reported shareholders' equity and capital ratios. BMO may enter into arrangements to offset the impact of foreign exchange movements on its capital ratios and did so during the 2017 fiscal year. Please see the Enterprise-Wide Capital Management section on page 69 for further information.

Transaction risk represents the impact that fluctuations in the Canadian/U.S. dollar exchange rate may have on the Canadian dollar equivalent of BMO's U.S.-dollar-denominated financial results. Exchange rate fluctuations will affect future results measured in Canadian dollars and the impact on those results is a function of the periods during which revenues, expenses and provisions for credit losses arise. Hedging positions may be taken to partially offset the pre-tax effects of Canadian/U.S. dollar exchange rate fluctuations on financial results. If future results are consistent with results in 2017, each one cent increase (decrease) in the Canadian/U.S. dollar exchange rate would be expected to increase (decrease) the Canadian dollar equivalent of our U.S. segment net income before income taxes for the year by $11 million, in the absence of hedging transactions. Refer to the Foreign Exchange section on page 36 for a more complete discussion of the effects of changes in exchange rates on the bank's results.

Linkages between Balance Sheet Items and Market Risk Disclosures

The table below presents items reported in our Consolidated Balance Sheet that are subject to market risk, comprised of balances that are subject to either traded risk or non-traded risk measurement techniques.

	As at October 31, 2017				As at October 31, 2016				
		Subject to market risk				Subject to market risk			
(Canadian $ in millions)	Consolidated Balance Sheet	Traded risk (1)	Non-traded risk (2)	Not subject to market risk	Consolidated Balance Sheet	Traded risk (1)	Non-traded risk (2)	Not subject to market risk	Main risk factors for non-traded risk balances
Assets Subject to Market Risk									
Cash and cash equivalents	**32,599**	**–**	**32,599**	**–**	31,653	–	31,653	–	Interest rate
Interest bearing deposits with banks	**6,490**	**346**	**6,144**	**–**	4,449	258	4,191	–	Interest rate
Securities									
Trading	**99,069**	**90,449**	**8,620**	**–**	84,458	76,297	8,161	–	Interest rate, credit spread, equity
Available-for-sale	**54,075**	**–**	**54,075**	**–**	55,663	–	55,663	–	Interest rate, credit spread
Held-to-maturity	**9,094**	**–**	**9,094**	**–**	8,965	–	8,965	–	Interest rate
Other	**960**	**–**	**960**	**–**	899	–	899	–	Equity
Securities borrowed or purchased under resale agreements	**75,047**	**–**	**75,047**	**–**	66,646	–	66,646	–	Interest rate
Loans (net of allowance for credit losses)	**361,672**	**–**	**361,672**	**–**	358,730	–	358,730	–	Interest rate, foreign exchange
Derivative instruments	**28,951**	**27,359**	**1,592**	**–**	39,183	37,768	1,415	–	Interest rate, foreign exchange
Customers' liability under acceptances	**16,546**	**–**	**16,546**	**–**	13,021	–	13,021	–	Interest rate
Other assets	**25,077**	**–**	**9,762**	**15,315**	24,268	–	9,149	15,119	Interest rate
Total Assets	**709,580**	**118,154**	**576,111**	**15,315**	687,935	114,323	558,493	15,119	
Liabilities Subject to Market Risk									
Deposits	**483,488**	**13,674**	**469,814**	**–**	473,372	11,604	461,768	–	Interest rate, foreign exchange
Derivative instruments	**27,804**	**26,122**	**1,682**	**–**	38,227	36,132	2,095	–	Interest rate, foreign exchange
Acceptances	**16,546**	**–**	**16,546**	**–**	13,021	–	13,021	–	Interest rate
Securities sold but not yet purchased	**25,163**	**25,163**	**–**	**–**	25,106	25,106	–	–	
Securities lent or sold under repurchase agreements	**55,119**	**–**	**55,119**	**–**	40,718	–	40,718	–	Interest rate
Other liabilities	**52,077**	**–**	**51,719**	**358**	50,724	–	50,401	323	Interest rate
Subordinated debt	**5,029**	**–**	**5,029**	**–**	4,439	–	4,439	–	Interest rate
Total Liabilities	**665,226**	**64,959**	**599,909**	**358**	645,607	72,842	572,442	323	

(1) Primarily comprised of BMO's balance sheet items that are subject to the trading and underwriting risk management framework and fair valued through profit or loss.
(2) Primarily comprised of BMO's balance sheet items that are subject to the structural balance sheet and insurance risk management framework, or are available-for-sale securities.

Certain comparative figures have been reclassified to conform with the current year's presentation.

Material presented in a blue-tinted font above is an integral part of the 2017 annual consolidated financial statements (see page 78).

Insurance Risk

Insurance risk is the potential for loss as a result of actual experience being different from that assumed when an insurance product was designed and priced. It generally entails the inherent unpredictability that can arise from assuming long-term policy liabilities or from the uncertainty of future events. Insurance provides protection against the financial consequences of insured risks by transferring those risks to the insurer (under specific terms and conditions) in exchange for premiums. Insurance risk is inherent in all our insurance products, including annuities and life, accident and sickness, and creditor insurance, as well as in our reinsurance business.

Insurance risk consists of:

- Claims risk – the risk that the actual magnitude or frequency of claims will differ from those assumed in the pricing or underwriting process, including mortality risk, morbidity risk, longevity risk and catastrophe risk;
- Policyholder behaviour risk – the risk that the behaviour of policyholders in regard to premium payments, withdrawals or loans, policy lapses and surrenders, and other voluntary terminations will differ from the behaviour assumed in the pricing process; and
- Expense risk – the risk that actual expenses arising from acquiring and administering policies and processing claims will exceed the expenses assumed in the pricing process.

BMO's risk governance practices provide effective independent oversight and control of risk within BMO Insurance. BMO's Insurance Risk Management Framework comprises the identification, assessment, management and reporting of risks. The framework includes: the risk appetite statement and key risk metrics; insurance risk policies and processes, including limits; capital requirements; stress testing; risk reports; Own Risk and Solvency Assessment; and ongoing monitoring of experience. Senior management within the various lines of business uses this framework and is primarily responsible for, as the first line of defence, managing insurance risk. Second-line-of-defence oversight is provided by the CRO, BMO Insurance, who reports to the CRO, Wealth Management. Internal risk committees, the Boards of Directors of BMO Insurance's subsidiaries and senior management provide senior governance and review. In particular, the Insurance Risk Management Committee at BMO Insurance oversees and reports on risk management activities on a quarterly basis to the insurance companies' Boards of Directors. In addition, the Audit and Conduct Review Committee of the Board acts as the Audit and Conduct Review Committee for BMO Life Insurance Company.

A robust product approval process is a cornerstone of BMO Insurance's risk management framework, as it identifies, assesses and mitigates risks associated with new insurance products or changes to existing products. This process, along with guidelines and practices for underwriting and claims management, promotes the effective identification, measurement and management of insurance risk. Reinsurance, which involves transactions that transfer insurance risk to independent reinsurance companies, is also used to mitigate our exposure to insurance risk by diversifying risk and limiting claims. Our reinsurance business, on the other hand, assumes property catastrophe and other reinsurance risks from independent reinsurers in various jurisdictions worldwide, in accordance with BMO Insurance's risk management framework, to control reinsurance exposures.

Liquidity and Funding Risk

Liquidity and funding risk is the potential for loss if BMO is unable to meet financial commitments in a timely manner at reasonable prices as they become due. Financial commitments include liabilities to depositors and suppliers, and lending, investment and pledging commitments.

Managing liquidity and funding risk is essential to maintaining a safe and sound enterprise, depositor confidence and earnings stability. It is BMO's policy to ensure that sufficient liquid assets and funding capacity are available to meet financial commitments, even in times of stress.

Liquidity and Funding Risk Governance

The Corporate Treasury group and the operating groups, as the first line of defence, are responsible for the ongoing management of liquidity and funding risk across the enterprise. BMO's Corporate Treasury group is responsible for identifying, understanding, managing, monitoring, mitigating and reporting on BMO's liquidity and funding risks. The Corporate Treasury group develops and recommends the Liquidity and Funding Risk Management Framework and the related risk appetite and limits, monitors compliance with the relevant corporate policies and assesses the impact of market events on liquidity and funding requirements on an ongoing basis.

Enterprise Market Risk Management, as the second line of defence, provides oversight, independent risk assessment and effective challenge of liquidity and funding management, frameworks, policies, limits, monitoring and reporting across the enterprise. The RMC and BSCMC provide senior management oversight and also review and discuss significant liquidity and funding policies, issues and developments that arise in the pursuit of our strategic priorities. The RRC provides oversight of the management of liquidity and funding risk, annually approves applicable policies, limits and the contingency plan, and regularly reviews liquidity and funding positions.

Liquidity and Funding Risk Management

BMO's Liquidity and Funding Risk Management Framework is defined and authorized under Board-approved corporate policies and management-approved standards. These policies and standards outline key management principles, liquidity and funding metrics and related limits, as well as roles and responsibilities for the management of liquidity and funding risk across the enterprise.

BMO has a robust limit structure in place in order to manage liquidity and funding risk. Limits define the enterprise-level risk appetite for our key Net Liquidity Position (NLP) measure, regulatory liquidity ratios, secured and unsecured funding appetite, for both trading and structural activities, and enterprise collateral pledging. Limits also establish the tolerance for concentrations of maturities, requirements for diversifying counterparty liabilities, business pledging activity, and the size and type of uncommitted and committed credit and liquidity facilities that may be outstanding. Operating within these limits helps to confirm that liquidity and funding risk is appropriately managed. An enterprise-wide contingency plan that will facilitate effective management in the event of a disruption is also in place. Early warning indicators identified in the contingency plan are regularly monitored in order to detect any signs of growing liquidity or funding risk in the market or risks specific to BMO.

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BMO legal entities include regulated and foreign subsidiaries and branches, and as a result, movements of funds between entities in the corporate group are subject to, among other things, the liquidity, funding and capital adequacy requirements of these entities. As such, liquidity and funding positions are managed on both a consolidated and key legal entity basis. Liquidity and funding risk management policies and limits are in place for key legal entities, which are informed by the legal and regulatory requirements that apply to each entity, and positions are regularly reviewed at the key legal entity level to confirm compliance with applicable requirements.

BMO employs funds transfer pricing and liquidity transfer pricing practices to help ensure that appropriate economic signals for the pricing of products for customers are provided to the lines of business and to assess the performance of each business. These practices capture both the cost of funding assets and the value of deposits under normal operating conditions, as well as the cost of holding supplemental liquid assets to meet contingent liquidity requirements.

Liquidity and Funding Risk Measurement

A key component of liquidity risk management is the measurement of liquidity risk under stress. BMO uses the NLP as a key measure of liquidity risk. The NLP represents the amount by which liquid assets exceed potential funding needs under a severe combined enterprise-specific and systemic stress scenario. Potential funding needs may arise from obligations to repay retail, commercial and wholesale deposits that are withdrawn or not renewed or to fund drawdowns on available credit and liquidity lines, obligations to pledge collateral due to ratings downgrades or market volatility, and the continuing need to fund new assets or strategic investments. Potential funding needs are quantified by applying factors to various business activities based on management's view of the relative level of liquidity risk related to each activity. These factors vary by depositor classification (e.g., retail, small business, non-financial corporate or wholesale counterparties) and deposit type (e.g., insured, uninsured, operational or non-operational deposits), as well as by commitment type (e.g., uncommitted or committed credit or liquidity facilities by counterparty type). The stress scenario also considers the time horizon over which liquid assets can be monetized and management's assessment of the liquidity value of those assets under conditions of market stress. These funding needs are assessed under severe systemic and enterprise-specific stress scenarios and a combination thereof. BMO focuses on maintaining an NLP sufficient to withstand each scenario.

Stress testing results are evaluated against BMO's stated risk tolerance and are considered in management decisions on setting limits and internal liquidity transfer pricing, and they also help to shape the design of business plans and contingency plans. The Liquidity and Funding Risk Management Framework is integrated with enterprise-wide stress testing.

In addition to the NLP, we regularly monitor positions in relation to the limits and liquidity ratios noted in the Liquidity and Funding Risk Management section above. These include regulatory metrics such as the Liquidity Coverage Ratio (LCR) and Net Cumulative Cash Flow (NCCF).

Unencumbered Liquid Assets

Unencumbered liquid assets include high-quality assets that are marketable, can be pledged as security for borrowings, and can be converted to cash in a time frame that meets our liquidity and funding requirements. Liquid assets are primarily held in our trading businesses, as well as in supplemental liquidity pools that are maintained for contingent liquidity risk management purposes. The liquidity value recognized for different asset classes under our management framework reflects management's assessment of the liquidity value of those assets under a severe stress scenario. Liquid assets held in the trading businesses include cash on deposit with central banks, short-term deposits with other financial institutions, highly-rated debt and equity securities and short-term reverse repurchase agreements. Supplemental liquidity pool assets are predominantly comprised of cash on deposit with central banks and securities and short-term reverse repurchase agreements of highly-rated Canadian federal and provincial and U.S. federal government and agency debt. Substantially all supplemental liquidity pool assets meet the definition of high-quality liquid assets under Basel III. Approximately 75% of the supplemental liquidity pool is held at the parent bank level in Canadian- and U.S.-dollar-denominated assets, with the majority of the remaining supplemental liquidity pool held at BMO Harris Bank in U.S.-dollar-denominated assets. The size of the supplemental liquidity pool is integrated with our measurement of liquidity risk. To meet local regulatory requirements, certain of our legal entities maintain their own minimum liquidity positions. There may be legal and regulatory restrictions on our ability to use liquid assets held at one legal entity to support the liquidity requirements of another legal entity.

In the ordinary course of business, BMO may encumber a portion of cash and securities holdings as collateral in support of trading activities and participation in clearing and payment systems in Canada and abroad. In addition, BMO may receive liquid assets as collateral and may re-pledge these assets in exchange for cash or as collateral in support of trading activities. Net unencumbered liquid assets, defined as on-balance sheet assets such as BMO-owned cash and securities and securities borrowed or purchased under resale agreements, plus other off-balance sheet eligible collateral received, less collateral encumbered, totalled $213.8 billion at October 31, 2017, compared with $197.7 billion at October 31, 2016. The increase in unencumbered liquid assets was due to higher cash and security balances, partially offset by the impact of the weaker U.S. dollar. Net unencumbered liquid assets are primarily held at the parent bank level, at BMO Harris Bank, our U.S. bank entity, and in our broker/dealer operations. In addition to liquid assets, BMO has access to the Bank of Canada's lending assistance programs, the Federal Reserve Bank discount window in the United States and European Central Bank standby liquidity facilities. We do not rely on central bank facilities as a source of available liquidity when assessing the strength of BMO's liquidity position.

In addition to cash and securities holdings, BMO may also pledge other assets, including mortgages and loans, to raise long-term secured funding. As part of the Liquidity and Funding Risk Management Framework, a Pledging of Assets Corporate Policy sets out the framework and pledging limits for financial and non-financial assets.

BMO's total encumbered assets and unencumbered liquid assets are summarized in the table below. See Note 25 on page 192 of the consolidated financial statements for further information on pledged assets.

Material presented in a blue-tinted font above is an integral part of the 2017 annual consolidated financial statements (see page 78).

Liquid Assets

(Canadian $ in millions)	Carrying value/on-balance sheet assets (1)	Other cash and securities received	Total gross assets (2)	Encumbered assets	Net unencumbered assets (3)	Net unencumbered assets (3)
	As at October 31, 2017					As at October 31, 2016
Cash and cash equivalents	**32,599**	**–**	**32,599**	**1,435**	**31,164**	29,696
Deposits with other banks	**6,490**	**–**	**6,490**	**–**	**6,490**	4,449
Securities and securities borrowed or purchased under resale agreements						
Sovereigns / Central banks / Multilateral development banks	**126,394**	**20,745**	**147,139**	**87,725**	**59,414**	58,365
Mortgage-backed securities and collateralized mortgage obligations	**22,402**	**583**	**22,985**	**4,220**	**18,765**	19,746
Corporate debt	**18,254**	**7,929**	**26,183**	**3,815**	**22,368**	23,855
Corporate equity	**71,195**	**21,012**	**92,207**	**39,591**	**52,616**	41,175
Total securities and securities borrowed or purchased under resale agreements	**238,245**	**50,269**	**288,514**	**135,351**	**153,163**	143,141
NHA mortgage-backed securities (reported as loans at amortized cost) (4)	**25,441**	**–**	**25,441**	**2,501**	**22,940**	20,436
Total liquid assets	**302,775**	**50,269**	**353,044**	**139,287**	**213,757**	197,722
Other eligible assets at central banks (not included above) (5)	**65,169**	**–**	**65,169**	**393**	**64,776**	109,258
Undrawn credit lines granted by central banks	**–**	**–**	**–**	**–**	**–**	–
Total liquid assets and other sources	**367,944**	**50,269**	**418,213**	**139,680**	**278,533**	306,980

(1) The carrying values outlined in this table are consistent with the carrying values reported in BMO's balance sheet as at October 31, 2017.

(2) Gross assets include on-balance sheet and off-balance sheet assets.

(3) Net unencumbered liquid assets are defined as on-balance sheet assets, such as BMO-owned cash and securities and securities borrowed or purchased under resale agreements, plus other off-balance sheet eligible collateral received, less encumbered assets.

(4) Under IFRS, NHA mortgage-backed securities that include mortgages owned by BMO as the underlying collateral are classified as loans. Unencumbered NHA mortgage-backed securities have liquidity value and are included as liquid assets under BMO's Liquidity and Funding Management Framework. This amount is shown as a separate line item, NHA mortgage-backed securities.

(5) Represents loans currently lodged at central banks that could potentially be used to access central bank funding. Loans available for pledging as collateral do not include other sources of additional liquidity that may be realized from the loan portfolio, including incremental securitization, covered bond issuances and Federal Home Loan Bank (FHLB) advances. Other eligible assets at central banks decreased as at Q4-2017 as a result of a change in the criteria for eligible loan collateral that can be accepted by the Bank of Canada effective Q1-2017.

Asset Encumbrance

(Canadian $ in millions) As at October 31, 2017	Total gross assets (1)	Encumbered (2) Pledged as collateral	Encumbered (2) Other encumbered	Net unencumbered Other unencumbered (3)	Net unencumbered Available as collateral (4)
Cash and deposits with other banks	**39,089**	**–**	**1,435**	**3**	**37,651**
Securities (5)	**313,955**	**109,110**	**28,742**	**9,692**	**166,411**
Loans and acceptances	**336,231**	**63,438**	**393**	**207,624**	**64,776**
Other assets					
Derivative instruments	**28,951**	**–**	**–**	**28,951**	**–**
Customers' liability under acceptances	**16,546**	**–**	**–**	**16,546**	**–**
Premises and equipment	**2,033**	**–**	**–**	**2,033**	**–**
Goodwill	**6,244**	**–**	**–**	**6,244**	**–**
Intangible assets	**2,159**	**–**	**–**	**2,159**	**–**
Current tax assets	**1,371**	**–**	**–**	**1,371**	**–**
Deferred tax assets	**2,865**	**–**	**–**	**2,865**	**–**
Other assets	**10,405**	**–**	**–**	**10,405**	**–**
Total other assets	**70,574**	**–**	**–**	**70,574**	**–**
Total assets	**759,849**	**172,548**	**30,570**	**287,893**	**268,838**

(Canadian $ in millions) As at October 31, 2016	Total gross assets (1)	Encumbered (2) Pledged as collateral	Encumbered (2) Other encumbered	Net unencumbered Other unencumbered (3)	Net unencumbered Available as collateral (4)
Cash and deposits with other banks	36,102	–	1,957	11	34,134
Securities (5)	286,783	95,584	27,622	9,075	154,502
Loans and acceptances	335,778	57,308	398	168,814	109,258
Other assets					
Derivative instruments	39,183	–	–	39,183	–
Customers' liability under acceptances	13,021	–	–	13,021	–
Premises and equipment	2,147	–	–	2,147	–
Goodwill	6,381	–	–	6,381	–
Intangible assets	2,178	–	–	2,178	–
Current tax assets	906	–	–	906	–
Deferred tax assets	3,101	–	–	3,101	–
Other assets	9,555	–	–	9,555	–
Total other assets	76,472	–	–	76,472	–
Total assets	735,135	152,892	29,977	254,372	297,894

(1) Gross assets include on-balance sheet and off-balance sheet assets.
(2) Pledged as collateral refers to the portion of on-balance sheet assets and other cash and securities that is pledged through repurchase agreements, securities lent, derivative contracts, minimum required deposits at central banks and requirements associated with participation in clearing houses and payment systems. Other encumbered assets include assets that are restricted for legal or other reasons, such as restricted cash and short sales.
(3) Other unencumbered assets include select liquid asset holdings that management believes are not readily available to support BMO's liquidity requirements. These include cash and securities of $9.7 billion as at October 31, 2017, which include securities held at BMO's insurance subsidiary, significant equity investments, and certain investments held at our merchant banking business. Other unencumbered assets also include mortgages and loans that may be securitized to access secured funding.
(4) Loans included as available as collateral represent loans currently lodged at central banks that could potentially be used to access central bank funding. Loans available for pledging as collateral do not include other sources of additional liquidity that may be realized from the loan portfolio, including incremental securitization, covered bond issuances and FHLB advances.
(5) Includes securities, securities borrowed or purchased under resale agreements and NHA mortgage-backed securities (reported as loans at amortized cost).

BMO's Liquidity Coverage Ratio (LCR) is summarized in the table on the following page. The average daily LCR for the quarter ended October 31, 2017 was 152%. The LCR is calculated on a daily basis as the ratio of the stock of High-Quality Liquid Assets (HQLA) to total net stressed cash outflows over the next 30 calendar days. The average LCR was up from 131% last year, due to a decrease in net cash outflows. Net cash outflows decreased primarily due to higher inflows associated with certain types of trading activities. While banks are required to maintain an LCR greater than 100% in normal conditions, banks are also expected to be able to utilize HQLA during a period of stress, which may result in an LCR of less than 100% during that period. BMO's HQLA are primarily comprised of cash, highly-rated debt issued or backed by governments, highly-rated covered bonds and non-financial corporate debt, and non-financial equities that are part of a major stock index. Net cash flows include outflows from deposits, secured and unsecured wholesale funding, commitments and potential collateral requirements, offset by permitted inflows from loans, securities lending activities and other non-HQLA debt maturing over a 30-day horizon. OSFI-prescribed weights are applied to cash flows and HQLA to arrive at the weighted values and the LCR. The LCR is only one measure of a bank's liquidity position and does not fully capture all of the bank's liquid assets or the funding alternatives that may be available during a period of stress. BMO's total liquid assets are shown in the Liquid Assets table on page 101.

Liquidity Coverage Ratio

(Canadian $ in billions, except as noted)	For the quarter ended October 31, 2017 Total unweighted value (average) (1) (2)	 Total weighted value (average) (2) (3)
High-Quality Liquid Assets		
Total high-quality liquid assets (HQLA)	*	**130.3**
Cash Outflows		
Retail deposits and deposits from small business customers, of which:	**162.1**	**10.0**
Stable deposits	**88.0**	**2.6**
Less stable deposits	**74.1**	**7.4**
Unsecured wholesale funding, of which:	**135.3**	**76.5**
Operational deposits (all counterparties) and deposits in networks of cooperative banks	**53.3**	**13.2**
Non-operational deposits (all counterparties)	**54.1**	**35.4**
Unsecured debt	**27.9**	**27.9**
Secured wholesale funding	*	**12.9**
Additional requirements, of which:	**128.3**	**27.7**
Outflows related to derivatives exposures and other collateral requirements	**10.5**	**5.6**
Outflows related to loss of funding on debt products	**2.7**	**2.7**
Credit and liquidity facilities	**115.1**	**19.4**
Other contractual funding obligations	**0.5**	**–**
Other contingent funding obligations	**323.4**	**5.2**
Total cash outflows	*	**132.3**
Cash Inflows		
Secured lending (e.g. reverse repos)	**113.3**	**16.7**
Inflows from fully performing exposures	**11.2**	**8.5**
Other cash inflows	**21.3**	**21.3**
Total cash inflows	**145.8**	**46.5**

	Total adjusted value (4)
Total HQLA	**130.3**
Total net cash outflows	**85.8**
Liquidity Coverage Ratio (%)	**152**

For the quarter ended October 31, 2016	Total adjusted value (4)
Total HQLA	132.3
Total net cash outflows	100.7
Liquidity Coverage Ratio (%)	131

* Disclosure is not required under the LCR disclosure standard.

(1) Unweighted values are calculated at market value (for HQLA) or as outstanding balances maturing or callable within 30 days (for inflows and outflows).

(2) Values are calculated based on the simple average of the daily LCR over 63 business days in the fourth quarter of 2017. The LCR in prior periods, up to and including the fourth quarter of 2016, is based on the average of the month-end values in the quarter.

(3) Weighted values are calculated after the application of the weights prescribed under the OSFI Liquidity Adequacy Requirements (LAR) Guideline for HQLA and cash inflows and outflows.

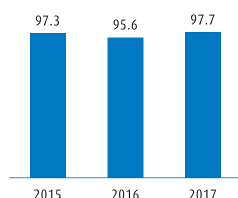
(4) Adjusted values are calculated based on total weighted values after applicable caps as defined by the LAR Guideline.

Funding Strategy

Our funding philosophy requires that secured and unsecured wholesale funding used to support loans and less liquid assets must be of a term (typically maturing in two to ten years) that will support the effective term to maturity of these assets. Wholesale secured and unsecured funding for liquid trading assets is largely shorter term (maturing in one year or less), is aligned with the liquidity of the assets being funded, and is subject to limits on aggregate maturities that are permitted across different time periods. Supplemental liquidity pools are funded with a mix of wholesale term funding.

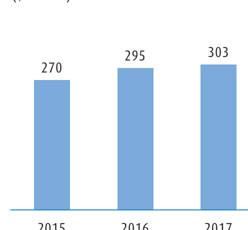
BMO maintains a large and stable base of customer deposits that, in combination with our strong capital base, is a source of strength. It supports the maintenance of a sound liquidity position and reduces our reliance on wholesale funding. Customer deposits totalled $303.1 billion at October 31, 2017, up from $295.1 billion in 2016, as strong deposit growth was partially offset by the impact of the weaker U.S. dollar. BMO also receives deposits in support of certain trading activities and receives non-marketable deposits from corporate and institutional customers. These deposits totalled $33.5 billion as at October 31, 2017.

Customer Deposits and Capital-to-Customer Loans Ratio (%)



Our large customer base and strong capital position reduce our reliance on wholesale funding.

Customer Deposits
($ billions)



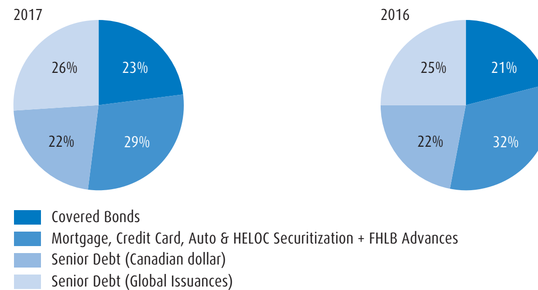
Customer deposits provide a strong funding base.

Material presented in a blue-tinted font above is an integral part of the 2017 annual consolidated financial statements (see page 78).

Total wholesale funding outstanding, largely consisting of negotiable marketable securities, was $180.5 billion at October 31, 2017, with $57.0 billion sourced as secured funding and $123.5 billion sourced as unsecured funding. Wholesale funding outstanding increased from $170.3 billion at October 31, 2016, due to wholesale funding issuances. The mix and maturities of BMO's wholesale term funding are outlined in the table below. Additional information on deposit maturities can be found in Note 29 on page 199 of the consolidated financial statements. BMO maintains a sizeable portfolio of unencumbered liquid assets, totalling $213.8 billion as at October 31, 2017, that can be monetized to meet potential funding requirements, as described in the Unencumbered Liquid Assets section on page 100.

Diversification of our wholesale funding sources is an important part of our overall liquidity management strategy. BMO's wholesale funding activities are well-diversified by jurisdiction, currency, investor segment, instrument and maturity profile. BMO maintains ready access to long-term wholesale funding through various borrowing programs, including a European Note Issuance Program, Canadian, Australian and U.S. Medium-Term Note programs, Canadian and U.S. mortgage securitizations, Canadian credit card, auto and home equity line of credit (HELOC) securitizations, covered bonds, and Canadian and U.S. senior unsecured deposits.

Wholesale Capital Market Term Funding Composition (%)



BMO's wholesale funding plan seeks to ensure sufficient funding capacity is available to execute business strategies. The funding plan considers expected maturities, as well as asset and liability growth projected for our businesses in our forecasting and planning process, and assesses funding needs in relation to the funding sources available. The funding plan is reviewed annually by the BSCMC and RMC and approved by the RRC, and is regularly updated to reflect actual results and incorporate updated forecast information.

Wholesale Funding Maturities (1)

	As at October 31, 2017								As at October 31, 2016
(Canadian $ in millions)	Less than 1 month	1 to 3 months	3 to 6 months	6 to 12 months	Subtotal less than 1 year	1 to 2 years	Over 2 years	Total	Total
Deposits from banks	3,611	241	4	–	3,856	–	106	3,962	6,295
Certificates of deposit and commercial paper	14,578	16,584	10,880	14,718	56,760	3,880	–	60,640	55,260
Bearer deposit notes	665	1,098	1,042	10	2,815	–	–	2,815	5,344
Asset-backed commercial paper (ABCP)	1,175	2,066	481	–	3,722	–	–	3,722	3,968
Senior unsecured medium-term notes	–	2,000	4,353	5,416	11,769	7,422	28,898	48,089	42,876
Senior unsecured structured notes (2)	19	–	–	–	19	–	2,983	3,002	2,193
Covered bonds and securitizations									
Mortgage and HELOC securitizations	–	570	900	1,114	2,584	2,550	12,801	17,935	18,105
Covered bonds	–	557	–	–	557	3,756	18,912	23,225	19,778
Other asset-backed securitizations (3)	–	54	614	290	958	1,449	2,753	5,160	4,303
Subordinated debt (4)	–	–	–	–	–	–	5,028	5,028	5,666
Other (5)	645	5,161	484	–	6,290	–	645	6,935	6,538
Total	20,693	28,331	18,758	21,548	89,330	19,057	72,126	180,513	170,326
Of which:									
Secured	1,820	8,408	2,479	1,404	14,111	7,755	35,111	56,977	52,692
Unsecured	18,873	19,923	16,279	20,144	75,219	11,302	37,015	123,536	117,634
Total (6)	20,693	28,331	18,758	21,548	89,330	19,057	72,126	180,513	170,326

(1) Wholesale unsecured funding primarily includes funding raised through the issuance of marketable, negotiable instruments. Wholesale funding excludes repo transactions and bankers' acceptances, which are disclosed in the contractual maturity table in Note 29 on page 199 of the consolidated financial statements, and excludes ABCP issued by certain ABCP conduits that is not consolidated for financial reporting purposes.
(2) Primarily issued to institutional investors.
(3) Includes credit card and auto securitizations.
(4) Includes certain subordinated debt instruments reported as deposits or other liabilities for accounting purposes. Subordinated debt is reported in this table in accordance with recommended Enhanced Disclosure Task Force disclosures.
(5) Refers to FHLB advances.
(6) Total wholesale funding consists of Canadian-dollar-denominated funding of $49.5 billion and U.S.-dollar and other foreign-denominated funding of $131.0 billion as at October 31, 2017.

Regulatory Developments

The Net Stable Funding Ratio (NSFR) is a regulatory liquidity metric that assesses the stability of a bank's funding profile in relation to the liquidity value of the bank's assets. While this metric was expected to come into force on January 1, 2018, OSFI has extended the domestic implementation timeline to January 2019, given the uncertainty about whether key foreign jurisdictions will implement the new standard by the January 2018 deadline. This also extends the time available for OSFI to clarify the details of the NSFR rules as they relate to the Canadian market.

Credit Ratings

The credit ratings assigned to BMO's short-term and senior long-term debt securities by external rating agencies are important in the raising of both capital and funding to support our business operations. Maintaining strong credit ratings allows us to access the capital markets at competitive pricing levels. Should our credit ratings experience a downgrade, our cost of funding would likely increase and our access to funding and capital through the capital markets could be reduced. A material downgrade of our ratings could also have other consequences, including those set out in Note 8 on page 159 of the consolidated financial statements.

The credit ratings assigned to BMO's senior debt by rating agencies are indicative of high-grade, high-quality issues. Standard & Poor's (S&P) and Fitch have a stable outlook on BMO. Moody's and DBRS have a negative outlook. On May 10, 2017, Moody's revised its Macro Profile for Canada to Strong+ from Very Strong-, resulting in a downgrade of Moody's ratings of six Canadian banks, including BMO. The Macro Profile change reflects Moody's expectation of a more challenging operating environment for banks in Canada that could lead to a deterioration in the banks' asset quality and increase their sensitivity to external shocks. The Baseline Credit Assessment, long-term debt and deposit ratings and Counterparty Risk Assessment assigned to BMO by Moody's were each downgraded by one notch.

As at October 31, 2017

Rating agency	Short-term debt	Senior long-term debt	Subordinated debt – NVCC	Outlook
Moody's	P-1	A1	Baa2	Negative
S&P	A-1	A+	BBB	Stable
Fitch	F1+	AA-	A+	Stable
DBRS	R-1 (high)	AA	A (low)	Negative

Operational Risk

Operational risk is the potential for loss resulting from inadequate or failed internal processes or systems, human interactions or external events, but excludes business risk, credit risk and market risk.

Operational risk is inherent in all our business and banking activities and has the potential to significantly impact our business and financial results, including financial loss, restatements and damage to our reputation. Like other financial services organizations operating in multiple jurisdictions, BMO is exposed to a variety of operational risks that arise from the potential for failures of our internal processes, employees and systems, as well as from external threats. Potential losses may result from process and control failures, theft and fraud, unauthorized transactions by employees, regulatory non-compliance, business disruption, information security breaches, cyber security threats and exposure related to outsourcing, as well as the risk of damage to physical assets. Given the large volume of transactions we process on a daily basis, and the complexity and speed of our business, there is a possibility that certain operational or human errors may be repeated or compounded before they are discovered and rectified.

Operational risk is not only inherent in our business and banking activities, it is inherent in the processes and controls used to manage our risks. There is the potential for errors to occur, as well as the possibility of failure in our internal processes or systems, which could lead to financial loss and reputational harm. Shortcomings or failures of our internal processes, employees or systems, or of services and products provided by third parties, including any of our financial, accounting or other data processing systems, could lead to financial loss or restatements and damage our reputation.

The nature of our business also exposes us to the risk of theft and fraud when we enter into credit transactions with customers or counterparties. In extending credit, we rely on information and other representations made by customers and counterparties and that information provided is accurate and complete. While we conduct appropriate due diligence on such customer information and, where practical and economical, engage valuation experts, and other experts or sources of information to assist with assessing collateral and other customer risks, our financial results may be adversely impacted if the information provided by customers or counterparties is materially misleading and that is not discovered during the due diligence process.

We utilize various risk management frameworks to manage and mitigate all of these risks, including internal controls, limits and governance processes. However, despite the contingency plans we have in place to maintain our ability to serve our clients and minimize disruptions and adverse impacts, and the contingency plans our third-party service providers have in place, our ability to conduct business may be adversely affected by a disruption to the infrastructure that supports both our operations and the communities in which we do business, including but not limited to disruption caused by public health emergencies or terrorist acts.

We regularly review our top and emerging risks, and assess our preparedness to proactively manage the risks that we face or could face in the future. For more information on these and other factors that may affect future results, please refer to the discussion on page 80.

Consistent with the management of risk across the enterprise, we employ the three-lines-of-defence approach to operational risk. Operational risk is managed by business units and corporate functions as the first line of defence. It is overseen by ERPM Operational Risk Management (ORM), along with the Corporate Support areas in targeted areas, as the second line of defence, governed by a robust committee structure and supported by a comprehensive Operational Risk Management Framework (ORMF). The Corporate Audit Division, as the third line of defence, assesses our adherence to controls and highlights opportunities to strengthen our processes.

Operational Risk Governance

The Operational Risk Committee (ORC), a sub-committee of the RMC, is the primary oversight and governance committee for all operational risk management matters. As part of its governance responsibilities, the ORC provides effective challenge to the policies, standards, operating guidelines, methodologies and tools that comprise the governing principles of the ORMF. These governance documents are reviewed on a regular basis to ensure they incorporate sound practices and are consistent with our risk appetite. Regular analysis and reporting of our enterprise operational risk profile to the various committees (ORC, RMC and RRC) are important elements of our risk governance framework. Enterprise reporting provides an integrated view of top and emerging risks, trends in loss data, capital consumption, key risk indicators and operating group profiles. We continue to invest in our reporting platforms to support timely and comprehensive reporting capabilities to enhance risk transparency and facilitate the proactive management of operational risk exposures.

Operational Risk Management

The operating groups, as the first line of defence, are accountable for the day-to-day management of operational risk, with the CROs of businesses providing governance and oversight for their respective units and Corporate Support areas providing additional governance and oversight in targeted areas. Independent risk management oversight is provided by the ORM team, which is responsible for operational risk strategy, tools and policies, and for second-line oversight, effective challenge and governance. ORM establishes and maintains the ORMF, which defines the processes used by the first line of defence to identify, measure, manage, mitigate, monitor and report on key operational risk exposures, losses and near-miss operational risk events with significant potential impact. The ORMF also defines the processes by which ORM, as the second line of defence, develops, communicates, supports, monitors and assesses the first line in its management of operational risk. Operational Risk Officers (OROs) within ORM independently assess group operational risk profiles, identify material exposures and potential weaknesses in processes and controls, and recommend appropriate mitigation strategies and actions. Executing our ORMF strategy also involves continuing to strengthen our risk culture by promoting greater awareness and understanding of operational risk within all three lines of defence, learning from loss events and near-misses and providing other training and communication, as well as day-to-day execution and oversight of the ORMF. We also continue to strengthen our second-line-of-defence support and oversight.

The following are the key programs, methodologies and processes in the ORMF that assist us in the ongoing review of our operational risk profile:

- Risk Control Self-Assessment (RCSA) is an established process used by our operating groups to identify the key risks associated with their businesses and the controls required for risk mitigation. The RCSA process provides a forward-looking view of the impact of the business environment and internal controls on operating group risk profiles, enabling the proactive prevention, mitigation and management of risk. ORM produces an independent enterprise-level view of operational risk relative to our risk appetite, so that key risks can be appropriately identified, documented, managed and mitigated.
- Process Risk Assessment (PRA) and Operational Risk Management Investigations (ORMI) provide a deeper view by identifying key risks and controls in our important business processes, which may span multiple business and functional units. PRAs and ORMIs enable a greater understanding of our key processes, issues and risk mitigation activities, which facilitates more effective oversight and appropriate risk management.
- BMO's initiative assessment and approval process is used to assess, document and approve qualifying initiatives when a new business, service or product is developed or existing services and products are enhanced. The process seeks to ensure that due diligence, approval, monitoring and reporting requirements are appropriately addressed at all levels of the organization.
- Key risk indicators (KRIs) provide an early indication of any adverse changes in risk exposure. Operating groups and corporate functions identify metrics related to their material operational risks. These KRIs are used in monitoring operational risk profiles and their overall relation to our risk appetite, are subject to review and challenge by ORM, and are linked to thresholds that trigger management intervention.
- Internal loss data serves as an important means of assessing our operational risk exposure and identifying opportunities for future risk prevention measures. In this assessment, internal loss data is analyzed and benchmarked against available external data. Material trends are regularly reported to the ORC, RMC and RRC in order to enable preventative or corrective action to be taken where appropriate. BMO is a member of the Operational Risk Data Exchange Association, the American Bankers Association and other national and international associations of banks that share loss data information anonymously to assist in risk identification, assessment and modelling.
- BMO's operational risk management training programs seek to ensure that our employees are qualified and equipped to execute the ORMF consistently, effectively and efficiently.
- Effective business continuity management provides us with the capability to maintain, manage and recover critical operations and processes in the event of a business disruption, thereby minimizing any adverse effects on our customers and other stakeholders.
- BMO's Corporate Risk & Insurance team provides a second level of mitigation for certain operational risk exposures. We purchase insurance where required by law, regulation or contractual agreement, and where it is economically attractive and practicable to mitigate our risks, in order to provide adequate protection against unexpected material loss.

A primary objective of the ORMF, and our implementation and oversight of this framework and its provisions, is to ensure that our operational risk profile is consistent with our risk appetite and supported by adequate capital.

Cyber Security Risk

Information security is integral to BMO's business activities, brand and reputation. Given our pervasive use of the internet and reliance on advanced digital technologies, we face common banking information security risks, including the threat of hacking, identity theft and corporate espionage, as well as the possibility of denial of service resulting from efforts targeted at causing system failure and service disruption. BMO continues to proactively invest in defensive technology, talent and processes to prevent or detect and manage cyber security threats within BMO and at service providers. These include benchmarking and review of best practices across the banking and cyber security industries, evaluation of the effectiveness of our key controls and development of new controls, as needed, with ongoing investments in both technology and human resources. BMO performs assessments of third-party service providers to monitor alignment with BMO standards. We also work with cyber security and software suppliers to bolster our internal resources and technology capabilities in order to better enable us to remain resilient in a rapidly evolving threat landscape.

Anti-Money Laundering

Anti-Money Laundering, Anti-Terrorist Financing (AML/ATF) and Sanctions Measures compliance is an essential part of safeguarding BMO, our customers and the communities in which we operate. BMO is committed to prudently managing AML/ATF risks, including complying with all regulatory requirements. Risks related to non-compliance include regulatory enforcement actions or penalties, legal actions and loss of reputation. BMO promotes effective AML/ATF governance through our AML/ATF program, which establishes minimum standards and guidelines across all BMO businesses, so that we are able to take prudent measures to prevent money laundering, terrorist financing and sanctioned activity. This program is designed to be dynamic and adaptable to the evolving nature of AML/ATF risks, and is delivered by employees who use analytics, technology and professional expertise to deter, detect and report suspicious activity.

Operational Risk Capital and Stress Testing

BMO currently uses the Advanced Measurement Approach (AMA), a risk-sensitive capital model, to determine both economic capital and, along with the Standardized Approach in certain areas, regulatory capital requirements for managing operational risk. The AMA Capital Model uses a loss distribution approach, along with the four elements required to support the measurement of our operational risk exposure. Internal and external loss data are used as inputs for the AMA Capital Model and, based on shared attributes, are grouped into cells which include operating group, business activity or event type. Minimum enterprise operational risk capital is determined at a specific upper confidence limit of the enterprise total loss distribution (99.9% quantile for regulatory capital and 99.95% quantile for economic capital). Business environment and internal control factors are used for post-modelling adjustments, and these are subject to regular review in order to identify and understand risk drivers and to confirm consistency in application across the enterprise. Scenarios are used to verify the distributions and correlations used to model capital, to provide management with a better understanding of low-frequency, high-severity events and to assess enterprise preparedness for events which could create risks that exceed our risk appetite. We are monitoring potential regulatory capital developments that may lead to the replacement of AMA with a new Standardized Measurement Approach. We also use scenario analysis as part of our stress testing program, which measures the potential impact of plausible operational, economic, market and credit events on our operations and capital position, and allows us to manage tail risk exposure and confirm the adequacy of our operational risk capital.

Model Risk

Model risk is the potential for adverse consequences following from decisions that are based on incorrect or misused model results. These adverse consequences can include financial loss, poor business decision-making or damage to reputation.

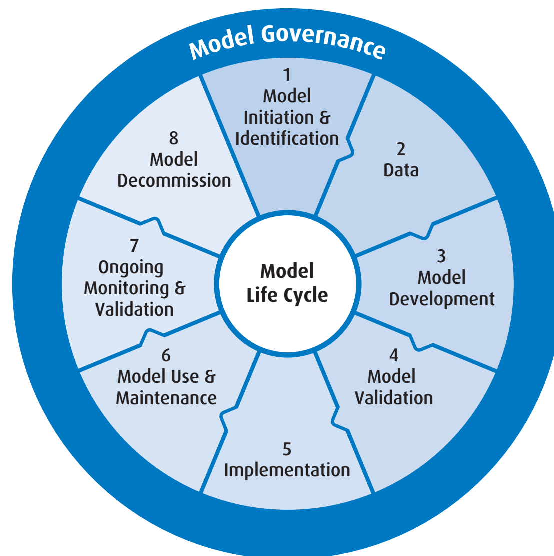
Models are quantitative tools that apply statistical, economic and other quantitative techniques and assumptions to process input data into quantitative estimates. BMO uses models ranging from very simple models that produce straightforward estimates to highly sophisticated models that value complex transactions or provide a broad range of forward-looking estimates.

The results from these models are used to inform business, risk and capital management decision-making and to assist in making daily lending, trading, underwriting, funding, investment and operational decisions. For example, BMO uses models as a core risk management tool to measure exposure to specific risks through stress testing, to value and price transactions, to evaluate credit, market and operational risk regulatory capital requirements and to measure risks on an integrated basis using economic capital.

Quantitative tools provide important insights and are effective when used within a framework that identifies key assumptions, limitations and controls and mitigates model risk. In addition to applying judgment to evaluate the reliability of model results, BMO mitigates model risk by maintaining strong controls over the development, validation, implementation and use of models across all model categories. BMO also takes steps to ensure that qualitative model overlays and non-statistical approaches to evaluating risks are intuitive, experience-based, well-documented and subject to effective challenge by those with sufficient expertise and knowledge to provide reasonable results.

Model Risk Management

Risk is inherent in models because model results are estimates that rely on statistical techniques and data to simulate reality or provide estimates of future outcomes. Model risk also arises from the potential misuse of models. Model risk is governed at BMO by the enterprise-wide Model Risk Management Framework, which covers the model life cycle.



This framework sets out an end-to-end approach for model risk governance across the model life cycle and helps to ensure that model risk remains within BMO's enterprise-wide risk appetite. The framework includes BMO's Model Risk Corporate Policy, Model Risk Corporate Standard and Model Risk Guidelines, which outline explicit principles for managing model risk, detail model risk management processes and define the roles and responsibilities of all stakeholders across the model life cycle. Model owners, developers and users are the first line of defence, the Model Validation and the Model Governance groups are the second line of defence, and the Corporate Audit Division is the third line of defence.

The Model Governance group is responsible for the development and maintenance of the Model Risk Management Framework, oversight of the effectiveness of our model processes and the overall aggregation and assessment of model risk. The Model Risk Management Committee (MRMC) is a cross-functional group representing all key stakeholders across the enterprise (model owners, users, developers and validators and the Model Governance group) and a sub-committee of the RMC. The MRMC meets regularly to help direct the bank's use of models, to oversee the development, implementation and maintenance of the Model Risk Management Framework, to provide effective challenge and to discuss governance of the enterprise's models.

Model Development and Validation

Models are developed, implemented and used to meet specific business objectives, including complying with certain regulatory requirements and meeting risk management objectives. Model owners, in consultation with model developers and other stakeholders, determine the design, objectives, intended use and desired functionality of the models, and have overall responsibility for ensuring that each model complies with BMO's policies and approved terms of use. Model developers assist the model owners by proposing model solutions, identifying data availability and limitations, and developing and implementing models that address their intended purposes. Developers do so by engaging model owners and other key stakeholders in the development and implementation processes, and by evaluating and documenting model characteristics, outputs, strengths and weaknesses, limitations and assumptions, and alternatives. Our independent Model Validation group reviews the development documentation, results and analysis generated by the model developers to evaluate whether a proposed model is conceptually and statistically sound, achieves its objectives and is fit for its intended use without creating material model risk. Observations are made for the guidance of model owners, users and developers, remediation or mitigation of model issues may be required and, unless an exception is obtained in accordance with BMO's Model Risk Management Framework, approval from the Model Validation group is required before a model can be used. Where a methodology or quantitative tool is not considered to be materially reliant on advanced statistical techniques or does not otherwise meet the definition of a model, the developers and users of such methodology or tool are nevertheless expected to provide appropriate documentation and effective independent review and challenge by knowledgeable BMO employees and managers.

Model Use and Monitoring

Model owners and other model users are accountable for the appropriate use of models in business decision-making, including an understanding of model assumptions and limitations, and for the proper care and maintenance of models over the model life cycle. The development and validation processes provide guidance to ensure that models can be used effectively within an appropriate range of use, that any model limitations are identified and that appropriate risk mitigants are implemented. When in use, models are subject to ongoing monitoring, including outcomes analysis and periodic reviews. Ongoing monitoring and outcomes analysis are part of the evaluation process, which confirms the continuing validity and adequate performance of each model over time. These techniques and other controls are applied to mitigate potential issues and to help ensure that the models continue to perform acceptably. All models in use are subject to periodic revalidation, with the frequency based on a model's risk rating, and to earlier reviews if business judgment or ongoing monitoring tools indicate that a model's performance may be inadequate. Revalidation requires the model owners and developers to assess a model's continuing suitability for use, and such assessment is subject to independent review by the Model Validation group.

Outcomes Analysis and Back-Testing

Once models are validated, approved and in use, they are subject to regular revalidation and ongoing monitoring and outcomes analysis. As a key component of outcomes analysis, back-testing compares model results against actual observed outcomes. Variances between model forecasts and actual outcomes experienced are measured against defined risk materiality thresholds. To ensure that variances remain within the tolerance range, actions such as model review and parameter recalibration are taken. Performance is assessed by analyzing model overrides and tests conducted during model development. This analysis serves to confirm the validity of a model's performance over time, and helps to ensure that appropriate controls are in place to address identified issues and enhance the model's overall performance.

All models used within BMO are subject to validation and ongoing monitoring, and are used in accordance with our Model Risk Management Framework. The framework applies to a wide variety of models, ranging from stress loss, market, credit and operational risks to pricing and valuation and anti-money laundering models. We highlight a few key applications of this framework below:

Credit Risk – The Model Risk Guidelines support BMO's Model Risk Corporate Policy. These guidelines include clear and detailed requirements for the back-testing of all credit risk rating models.

The process for back-testing the probability of default (PD) model computations includes comparing PD estimates generated by credit risk models to the actual or realized default rates across borrower ratings. This process also includes examining statistical evidence to confirm that default rates accurately capture sampling variability over time.

The comprehensive validation of a risk rating system involves various prescribed tests and analyses that assess discriminatory power, calibration and dynamic properties, with support from migration analysis. Additional tests or analyses are used to validate borrower risk rating grades and probability of default results.

As with any analysis, judgment is applied in determining which of the various factors, such as data limitations, might affect the overall relevance of a given validation approach or interpretation of statistical analysis. Similar back-testing is applied to the loss given default and exposure at default model computations.

Annual validations of all material models in use are conducted to confirm that they perform as intended and continue to be fit for use. An annual validation includes a qualitative and quantitative assessment conducted by model developers, which is reviewed and effectively challenged by the Model Validation group, with all conclusions reported to senior management.

Trading and Underwriting Market Risk – All internal models used in determining regulatory capital and economic capital for trading and underwriting market risk have their Value at Risk (VaR) results back-tested regularly. The bank's internal VaR model is back-tested daily, and the one-day 99% confidence level VaR at the local and consolidated BMO levels is compared to the realized theoretical Profit & Loss (P&L) calculation, which is the daily change in portfolio value that would occur if the portfolio composition remained unchanged. If the theoretical P&L result is negative and its absolute value is greater than the previous day's VaR, a back-testing exception occurs. Each exception is investigated, explained and documented, and the back-testing results are reviewed by Market Risk, senior management and the Board, and are reported to our regulators. This process monitors the quality and accuracy of the internal VaR model results and assists in refining overall risk measurement procedures.

Structural Market Risk – Back-testing of our structural market risk models is performed monthly and reported on quarterly. For products with a scheduled term, such as mortgages and term deposits, the model forecasts of prepayments or redemptions are compared to the actual outcomes observed. For products without a scheduled term, such as credit card loans and chequing accounts, the modelled balance run-off profiles are compared to actual balance trends.

Legal and Regulatory Risk

Legal and regulatory risk is the potential for loss or harm created by failing to comply with laws or satisfy contractual obligations or regulatory requirements. This includes the risks of failing to: comply with the law (in letter or in spirit) or maintain standards of care; implement legislative or regulatory requirements; enforce or comply with contractual terms; assert non-contractual rights; effectively manage disputes; or act in a manner so as to maintain our reputation.

BMO's success relies in part on our ability to prudently manage our exposure to legal and regulatory risk. The financial services industry is highly regulated, and we anticipate intense ongoing scrutiny from our supervisors in the oversight process and strict enforcement of regulatory requirements as governments and regulators around the world continue with reforms intended to strengthen the stability of the financial system. Banks globally continue to be subject to fines and penalties for a number of regulatory and conduct issues. As rulemaking and supervisory expectations evolve, we monitor developments to enable BMO to respond to and implement any required changes.

Under the direction of the General Counsel, the Legal and Compliance Group (LCG) maintains enterprise-wide frameworks that identify, measure, manage, monitor and report on legal and regulatory risk. LCG also works with the operating groups and other Corporate Support areas to identify legal and regulatory requirements, trends and potential risks, recommend mitigation strategies and actions, and oversee litigation involving BMO. BMO is subject to litigation arising in the ordinary course of business and the unfavourable resolution of any such litigation could have a material adverse effect on our financial results and damage our reputation. Another area of focus for the operating groups and legal and compliance risk management is the oversight of fiduciary risk related to any of BMO's businesses that provide products or services giving rise to fiduciary duties to clients. Of particular importance are policies and practices that address the responsibilities of a business to a client, including service requirements and expectations, client suitability determinations, and disclosure obligations and communications.

Safeguarding our employees, customers, information and assets from criminal risk is a top priority. Criminal risk is the potential for loss or harm created by failing to comply with criminal laws and includes acts by employees against BMO, acts by external parties against BMO and acts by external parties using BMO to engage in unlawful conduct such as fraud, theft, money laundering, violence, cyber-crime, bribery and corruption. BMO has transformed its management of criminal risk through the implementation of a robust Criminal Risk Framework that is designed to prevent, detect, respond to and report on criminal risk using a three-lines-of-defence approach, as well as through enhanced centralized management and oversight.

As governments globally seek to curb corruption and counter its negative effects on political stability, sustainable economic development, international trade and investment and in other areas, BMO's Anti-Corruption Office, through its global program, has articulated a set of key principles and activities necessary for the effective oversight of compliance with anti-corruption legislation in jurisdictions where BMO operates, including guidance that sets out an approach to both identifying and avoiding corrupt practices and rigorously investigating allegations of corrupt activity.

International regulators continue to focus on anti-money laundering and other related concerns, raising their expectations concerning the quality and efficacy of anti-money laundering and related programs and penalizing institutions that fail to meet these expectations. Under the direction of the Chief Anti-Money Laundering Officer, the Anti-Money Laundering Office is responsible for the governance, oversight and assessment of the principles and procedures designed to help ensure compliance with both regulatory requirements and internal risk parameters related to anti-money laundering, anti-terrorist financing and sanctions measures.

All of these frameworks reflect the three-lines-of-defence operating model described previously. The operating groups and Corporate Support areas manage day-to-day risks by complying with corporate policies and standards, while LCG teams specifically aligned with each of the operating groups provide advice and independent legal and regulatory risk management oversight.

Heightened regulatory and supervisory scrutiny has a significant impact on the way we conduct business. Working with the operating groups and other Corporate Support areas, LCG continues to diligently assess and analyze the implications of regulatory changes. We devote substantial resources to the implementation of the systems and processes required to comply with new regulations while also helping us meet the needs and demands of our customers. We continue to strive to put our customers first as a mitigant to compliance and consumer protection issues. Failure to comply with applicable legal and regulatory requirements may result in litigation, financial losses, regulatory sanctions, enforcement actions, an inability to execute our business strategies, a decline in investor and customer confidence and harm to our reputation.

We continue to respond to other global regulatory developments, including capital and liquidity requirements under the Basel Committee on Banking Supervision (BCBS) global standards (Basel III), which we expect will put upward pressure on the amount of capital we are required to hold over time. Other global regulatory developments include over-the-counter (OTC) derivatives reform, consumer protection measures and specific financial reforms, such as the *Dodd-Frank Wall Street Reform and Consumer Protection Act* (Dodd-Frank). For additional discussion of the regulatory developments relating to capital management and liquidity and funding risk, please refer to the Enterprise-Wide Capital Management section starting on page 69 and the Liquidity and Funding Risk section starting on page 99. For additional discussion of the impact of certain potential fiscal policy and tax legislation changes on our results, please see Critical Accounting Estimates – Income Taxes and Deferred Tax Assets on page 114, Tax Legislation and Interpretations on page 80 and Fiscal and Monetary Policies on page 80.

Bank Resolution and Bail-in – In June 2016, legislation required to implement a bail-in regime was passed by the Canadian government in order to enhance Canada's bank resolution capabilities, in line with international efforts. In June 2017, the Department of Finance Canada and OSFI released for comment a package of draft regulations and guidelines setting out details of Canada's bail-in framework and the related total loss-absorbing capacity (TLAC) requirements for Canada's six domestic systemically important banks. For additional discussion of the bail-in regime and TLAC requirements, please refer to the Enterprise-Wide Capital Management section starting on page 69.

Housing Market Reforms – In October 2017, OSFI published the final version of *Guideline B-20 – Residential Mortgage Underwriting Practices and Procedures*. The revised Guideline comes into effect on January 1, 2018. The revisions reinforce OSFI's expectation that banks and other federally regulated mortgage lenders remain vigilant in their mortgage underwriting practices, with focus on the minimum qualifying rate for uninsured mortgages, expectations around loan-to-value (LTV) frameworks and limits, and restrictions on transactions designed to circumvent those LTV limits.

Federal Financial Sector Legislation – The Department of Finance Canada has released a second consultation paper related to the 2019 Review of Federal Financial Sector Legislation. The consultation paper focuses on potential policy measures that could lead to legislative changes prior to the statutory sunset date of March 29, 2019, or that might inform the federal government's longer-term approach to the financial sector. Potential policy measures include clarifying the business powers of banks and facilitating collaboration among those banks in the context of new financial technologies; streamlining bank entry and exit frameworks for small and mid-sized banks to increase competition; examining the merits of open banking; and modifying corporate governance provisions to more closely align them with the *Canada Business Corporations Act*. The consultation includes the government's review of the federal consumer protection framework applicable to banks, with reference to the cross-jurisdictional survey of consumer protection rules conducted by the Financial Consumer Agency of Canada (FCAC), and the reviews of sales practices currently being conducted by the FCAC and OSFI. These initiatives will help inform potential policy measures in advance of further changes to the consumer protection framework applicable to banks.

Derivatives Reform – G20 jurisdictions continue to implement new regulations as part of the OTC derivatives regulatory reform program. Margin requirements for non-centrally cleared derivatives have been adopted in a number of jurisdictions, including Canada, Europe and the United States. Margin rules will require the exchange of variation margin and initial margin, both of which are designed to secure performance on non-centrally cleared derivatives transactions between covered entities. BMO has been subject to variation margin rules since March 1, 2017, and will be subject to initial margin rules beginning no earlier than September 1, 2018 and no later than September 1, 2019. In a number of jurisdictions, OTC derivatives transactions must now be reported to designated trade repositories and clearing, execution and business conduct regulations continue to be implemented. BMO is preparing for the impact of these rules and requirements.

DOL Fiduciary Rule – The U.S. Department of Labor (DOL) fiduciary rule became effective in June 2017. Sales of investment products and services to individual retirement accounts and employee benefit plans are generally considered to be fiduciary activities that require an exemption to complete the sale. The exemption requirements partially apply as of June 2017, with full compliance scheduled for January 1, 2018. BMO implemented procedures to address these requirements before the June 2017 deadline. In August 2017, the DOL filed proposed amendments, which would extend the January 2018 compliance date to July 1, 2019. While details of the proposed amendments remain uncertain, we expect a delay and further changes to the rule.

The General Counsel and the Chief Compliance Officer (CCO) regularly report to the Audit and Conduct Review Committee (ACRC) of the Board and senior management on the effectiveness of our Enterprise Compliance Program (ECP), which, using a risk-based approach, identifies, assesses and manages compliance with applicable legal and regulatory requirements. The ECP directs operating groups and Corporate Support areas to maintain

compliance policies, procedures and controls that meet these requirements. Under the direction of the CCO, LCG identifies and reports on gaps and deficiencies, and tracks remedial action plans. The Chief Anti-Money Laundering Officer also regularly reports to the ACRC.

All BMO employees must complete annual legal and regulatory training on topics such as anti-corruption, anti-money laundering and privacy. This is done in conjunction with our Code of Conduct training, which tests employees' knowledge and understanding of how they are required to behave as employees of BMO.

Business Risk

Business risk arises from the specific business activities of an enterprise and the effects these could have on its earnings.

Business risk encompasses the potential causes of earnings volatility that are distinct from credit, market or operational risk factors. The management of business risk identifies and addresses factors related to the risk that volumes will decrease or margins will shrink without the enterprise having the ability to compensate for these developments by cutting costs.

BMO faces many risks that are similar to those faced by non-financial firms, principally that our profitability, and hence value, may be eroded by changes in the business environment or by failures of strategy or execution. Sources of these risks include, but are not limited to, changing client expectations, heightened competition, technology driver changes, adverse business developments and relatively ineffective responses to industry changes. For example, client retention can be influenced by a number of factors, including service levels, prices for products and services, delivery platforms, ease of access to products and services, the quality of the customer experience, our reputation and the actions of our competitors.

Within BMO, each operating group is responsible for controlling its respective business risk by assessing, managing and mitigating the risks arising from changes in business volumes and cost structures, among other factors.

Strategic Risk

Strategic risk is the potential for loss due to changes in the external business environment and/or failure to properly respond to these changes as a result of inaction, ineffective strategies or poor implementation of strategies.

Strategic risk arises from external risks inherent in the business environment within which BMO operates, as well as the potential for loss if BMO is unable to address those external risks effectively. While external strategic risks – including economic, geopolitical, regulatory, technological, social and competitive risks – cannot be controlled, the likelihood and magnitude of their impact can be mitigated through an effective strategic management framework, and certain of these risks, including economic, geopolitical and regulatory risks, can be assessed through stress testing.

BMO's Office of Strategic Management (OSM) oversees our strategic planning process and works with the lines of business, along with ERPM, Finance and Corporate Support areas, to identify, monitor and mitigate strategic risk across the enterprise. Our rigorous strategic management framework encourages a consistent approach in developing strategies and incorporates information linked to financial commitments.

The OSM works with the lines of business and key corporate stakeholders during the strategy development process to promote consistency and adherence to strategic management standards, including a consideration of the results of stress testing as an input into strategic decision-making. The potential impacts of changes in the business environment, such as broad industry trends and the actions of competitors, are considered as part of this process and inform strategic decisions within each of our lines of business. Enterprise and group strategies are reviewed with the Executive Committee and the Board of Directors annually in interactive sessions that challenge assumptions and strategies in the context of both the current and the potential future business environment.

Our ability to execute on the strategic plans developed by management influences our financial performance. If these strategic plans do not meet with success or if there is a change in the strategic plans, our earnings could grow at a slower pace or decline. Performance objectives established through the strategic management process are monitored regularly and reported on quarterly, using both leading and lagging indicators of performance, so that strategies can be reviewed and adjusted where necessary. Regular strategic and financial updates are also monitored closely in order to identify any significant emerging risk issues.

Environmental and Social Risk

Environmental and social risk is the potential for loss or damage to BMO's reputation resulting from environmental or social concerns related to BMO or its customers. Environmental and social risk is often associated with credit, operational and reputation risk.

Environmental and social risk covers a broad spectrum of issues, such as climate change, biodiversity, ecosystem health, pollution, waste and the unsustainable use of water and other resources, as well as risks to the livelihoods, health, human rights and cultural heritage of communities.

Our Sustainability Principles are the guidelines we follow as a responsibly managed bank that considers environmental, social and governance (ESG) issues as we pursue sustainable growth. These principles reinforce the deeper sense of responsibility that informs all aspects of our business strategy.

BMO's Sustainability Council, which is comprised of senior leaders from business and Corporate Support areas across our organization, provides oversight and leadership for our ESG strategy.

The ESG group is responsible for coordinating the development and maintenance of an enterprise-wide strategy that meets BMO's overarching environmental and social responsibilities. The Environmental Sustainability (ES) group is responsible for establishing and maintaining an environmental management system that is aligned with the framework set out in ISO 14001, and for setting objectives and targets related to the bank's operations and its Environmental Policy. BMO's Procurement and Corporate Real Estate groups are responsible for establishing environmental management processes.

The ESG group and ES group work in partnership with the lines of business and Corporate Support areas to manage environmental and social risk within our business. We work with external stakeholders to understand the consequences and impacts of our operations and financing decisions. As part of our enterprise risk management framework and credit risk management framework, we evaluate the environmental and social risk associated with credit and counterparty transactions and exposures. We have developed and implemented specific financing guidelines to address environmental and social risk for specific lines of business. To assess exposure to clients' environmental risks, we apply enhanced due diligence to transactions with clients operating in environmentally sensitive industry sectors, and we avoid doing business with borrowers that have poor environmental and social risk management track records.

We consider the impact our decisions have on our stakeholders. Our Board-approved Code of Conduct reflects our commitment to manage our business responsibly. We expect our suppliers to be aware of, understand and respect the principles of our Supplier Code of Conduct, which outlines our standards for integrity, fair dealing and sustainability. We issued our first statement under the United Kingdom *Modern Slavery Act* and we updated our Supplier Code of Conduct to reflect this legislation.

BMO has been a signatory to the Equator Principles since 2005 and applies its credit risk management framework to identify, assess and manage environmental and social risk in project finance transactions. We also apply the World Bank/International Finance Corporation environmental and social screening process to categorize and assess projects based on the magnitude of their potential impacts and risks. These principles have been integrated into our credit risk management framework. We are a long-time signatory to and participant in the Carbon Disclosure Project – a global initiative that assembles and publishes corporate disclosure on greenhouse gas emissions and climate change.

BMO is a signatory to the United Nations Principles for Responsible Investment, a framework designed to encourage sustainable investing through the integration of ESG issues into investment, decision-making and ownership practices. We are a partner in the Carbon Pricing Leadership Coalition, a voluntary partnership that supports the effective implementation of carbon pricing around the world.

To keep informed of emerging issues, we participate in global forums with our peers, maintain an open dialogue with our internal and external stakeholders, and continuously monitor and evaluate policy and legislative changes in the jurisdictions where we operate. We publicly report our environmental and social performance and targets in our annual Environmental, Social and Governance (ESG) Report and Public Accountability Statement (PAS), and on our Corporate Responsibility website. Selected environmental and social indicators in the ESG Report and PAS are assured by a third party.

Reputation Risk

Reputation risk is the potential for loss or harm to the BMO brand. It may arise even if other risks are managed effectively.

BMO's reputation is built on our commitment to high standards of business conduct and ethics, and is one of our most valuable assets. By protecting and maintaining our reputation, we safeguard our brand, increase shareholder value, reduce our cost of capital, improve employee engagement and maintain customer loyalty.

We believe that active, ongoing and effective management of reputation risk is best achieved by considering reputation risk issues in the course of strategy development, strategic and operational implementation, and transactional or initiative decision-making, as well as in day-to-day decision-making.

BMO's Code of Conduct provides our employees and directors with guidance on the behaviour that is expected of them, so that they can make the right choice in decisions that affect their work. The Code of Conduct is the foundation of our ethical culture, and we continually reinforce the principles it sets out for our employees in order to minimize risks to our reputation that may result from poor decisions or behaviour.

Reputation risk is also managed through our corporate governance practices and our enterprise risk management framework. BMO's Reputation Risk Management Committee reviews instances of significant or heightened exposure to reputation risk for BMO.