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 (1)

Enterprise-Wide Risk Management outlines our approach to managing key financial risks and other related risks that we face, as discussed in the following sections:

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81	Risk Management Overview	111	Model Risk
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87	Credit and Counterparty Risk	114	Business Risk
95	Market Risk	115	Strategic Risk
100	Insurance Risk	115	Environmental and Social Risk
100	Liquidity and Funding Risk	116	Reputation Risk

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, effectiveness, and efficiency in the management of risk.

Priorities

- Make our processes simple and accelerate our delivery times to match the increasing pace of business.
- Continue to develop technology and analytics that underpin our risk processes, risk assessment and monitoring, and our cyber and anti-money laundering defences.
- Focus on our people and how we work together to enhance our culture.

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 2018 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 148 and Note 5 on page 164 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 27.

(1) Surjit Rajpal will retire at the end of January 2019. Patrick Cronin, previously Group Head, BMO Capital Markets, was appointed Chief Risk Officer, BMO Financial Group, effective November 1, 2018.

Risks That May Affect Future Results

Top and Emerging Risks That May Affect Future Results

BMO is exposed to a variety of evolving risks that have the potential to affect our business, the results of our operations and our financial condition. The essential tasks in our risk management process are 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, and combines 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 related to our exposure to certain events.

In 2018, particular attention was given to the following:

Cyber Security, Information Security and Privacy Risk

Information security is integral to BMO's business activities, brand and reputation. In the past year, cyber-attacks and privacy breaches have been significant concerns across all industries, including banking, making this a top risk for BMO. Given our pervasive use of the internet and our reliance on advanced digital technologies, we face common banking information security risks, including the threat of hacking, loss or exposure of customer or employee information, 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. We continue to increase our investments in defensive technology, talent and processes in order to prevent or detect and manage cyber security threats within BMO and at our service providers. These measures include benchmarking and review of best practices across the banking and cyber security industries, external review of incidents related to cyber security, 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 our third-party service providers to monitor their alignment with standards, and we actively participate in thought leadership forums to learn about emerging threats. We also work with information security and industry groups to bolster our internal resources and technology capabilities in order to improve our ability to remain resilient in a rapidly evolving threat landscape.

Escalating Trade Conflicts

Notwithstanding the recent trade agreement between the United States, Canada and Mexico, support for protectionism and rising anti-globalization sentiment in the United States and other countries may slow global growth. In particular, a protracted and wide-ranging trade conflict between the United States and China could adversely affect global economic growth, and could be especially problematic for commodity-producing countries, such as Canada.

Although it is difficult to predict and mitigate the potential economic and financial consequences of trade-related events, we actively monitor global and North American trends and continually assess our portfolio and business strategies in the context of those trends. 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 address and offset the consequences of possible adverse political and/or economic developments. In addition, we have the advantage of an integrated North American strategy across diverse industries and geographies.

Our credit exposure by geographic region is provided in Tables 7, 8 and 11 to 13 on pages 132 to 137 and in Note 4 on page 157 of the consolidated financial statements.

Canadian Housing Market

While recent resale market activity suggests that the Canadian housing market is stabilizing, there are a range of economic and regulatory developments that could continue to weight on sales activity and home prices. These developments include rising interest rates and the prospect of future rate hikes by the Bank of Canada, regulatory changes in Ontario and British Columbia that are intended to prevent the Greater Toronto Area (GTA) and Greater Vancouver Area (GVA) housing markets from overheating, as well as stricter mortgage rules introduced by OSFI that took effect at the beginning of 2018. Lower levels of sales activity, particularly in the GTA and GVA, would impact mortgage origination volumes and, if property values were to decline, would reduce the value of collateral backing of our loans. It is not possible to accurately predict the full impact of these recent changes and any potential future changes, but robust economic conditions in these regions, including sustained economic growth, low unemployment and population growth, support our expectation of continued low 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 the 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 even significant price declines and recessionary economic conditions would result in manageable losses, in part due to insurance coverage and to the significant equity built up in seasoned loans.

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 less stringent regulatory requirements and oversight. New entrants may leverage new technologies, advanced data and analytical tools, lower costs to serve and/or faster processes in order to challenge traditional banks. These challenges could include new business models in retail payments, consumer and commercial lending and foreign exchange, as well as low-cost investment advisory services. Failure to keep pace with these new technologies and the competition they enable could 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 in order to keep pace with evolving customer expectations. This includes improving our mobile and internet banking capabilities, building new branch formats, and refining our credit decisioning, analytical and modelling data and tools, as well as bringing new and enhanced customer solutions to market. We further mitigate this risk by offering our customers access to banking services across different channels, focusing on improving customer trust and loyalty, and leveraging current and future partnerships with fintech companies in order to deliver a valued customer experience at a competitive cost and through 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.

Geopolitical Risk

Despite an easing of tensions between the United States and North Korea, geopolitical risk remains elevated, as a result of strained relations among many countries, including between the United States and Russia, China and Iran, and ongoing disputes across the Middle East and North Africa. Heightened geopolitical risk can give rise to uncertainty in global investment, which may lead to market disruptions and a decrease in growth and trade. Our core banking portfolio has limited direct exposure outside North America; however, our core customers and our international strategy depend on continued growth and trade. To mitigate our exposure to geopolitical risk, we maintain a diversified portfolio which we continually monitor and test, in addition to contingency plans that we establish for possible adverse developments.

Other Factors That May Affect Future Results

General Economic Conditions and Fiscal and Monetary Policies in the Countries in which We Conduct Business

Our earnings are affected by general economic conditions and the fiscal, monetary and other economic policies in place in Canada, the United States and other jurisdictions in which we conduct business. These policies and conditions 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 can have an impact on our earnings, the value of our investments, the credit quality of lending to our customers and our counterparty exposure, and the capital markets that we access. In the current environment of ongoing late-cycle growth and low unemployment, there is a heightened risk that inflation may exceed expectations, prompting faster than expected increases in interest rates. This in turn would increase the risk of a material slowdown in growth or a recession in our Canadian and U.S. markets. Conversely, 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 clients that have significant foreign earnings or input costs in CAD or USD. As BMO reports in Canadian dollars, the CAD/USD foreign exchange movements will impact our U.S. loan risk-weighted assets, and thus our capital ratio. The value of the Canadian dollar relative to USD will also affect the contribution of our U.S. operations to Canadian dollar profitability.

Hedging positions may be taken to manage interest rate exposures and partially offset the effects of CAD/USD exchange rate fluctuations on our financial results. Refer to the Foreign Exchange section on page 34, the Enterprise-Wide Capital Management section on page 69, and the Market Risk section on page 95 for a more complete discussion of our foreign exchange and interest rate risk exposures.

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 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 our 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 and implement any necessary changes. We are currently working to restructure our European businesses in order to continue to service our European clients and counterparties while remaining compliant with new regulatory requirements, following the United Kingdom's announced intention to leave the European Union, effective March 29, 2019 (Brexit). In addition to changes in our client facing elements, we are addressing aspects of Brexit that impact our staff, suppliers and access to market infrastructure.

Failure to comply with applicable legal and regulatory requirements could result in litigation, financial losses, regulatory sanctions, enforcement actions, an inability to execute our business strategies, a decline in investor and customer confidence, and damage to our reputation. Refer to the Legal and Regulatory Risk and Enterprise-Wide Capital Management sections on pages 112 and 69, respectively, for a more complete discussion of our exposure to legal and regulatory risk.

Tax Legislation and Interpretations

Legislative changes and changes in tax policy, including their interpretation by taxing authorities and the courts, may impact our earnings. Tax laws, as well as interpretations 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 improve tax-related reporting. Refer to the Critical Accounting Estimates section on page 119 for further discussion of 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 reductions in 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.

Environmental Events
We face risks arising from environmental events, such as drought, floods, wildfires, earthquakes, and hurricanes and other storms. These events could potentially disrupt our operations, impact our customers and counterparties, and result in reduced earnings and higher losses. Factors contributing to increased environmental risks include the impacts of climate change and continued intensification of development in areas of greater environmental sensitivity. Our business continuity management provides us with the capability to restore, maintain and manage critical operations and processes in the event of a business disruption. In addition, we also support the recommendations of the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD), and we are considering the integration of climate-related scenario analysis into our risk management and strategic processes. This includes evaluation of credit risk associated with assumptions around the global transition to a low carbon economy identified by the TCFD. The goal is to enhance our understanding of the evolving impact of risks associated with environmental events and climate change, together with possible mitigation strategies. Refer to the Environmental and Social Risk section on page 115 for a discussion of our support of the TCFD.

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 page 121, as well as in Note 1 on page 148 of the consolidated financial statements.

The application of IFRS requires management to make significant judgments and estimates that affect the carrying amounts of certain assets and liabilities, certain amounts reported in net income and other related disclosures. 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 117.

Benchmark Interest Rate Reform
The London Interbank Offered Rate (LIBOR), Euro Interbank Offered Rate, Canadian Dollar Offered Rate and other rates and indices deemed to be benchmarks have been the subject of recent national and international regulatory guidance and proposals for reform. For example, in July 2017, the Financial Conduct Authority in the United Kingdom announced that it will no longer compel banks to participate in LIBOR after 2021.

Transition efforts in connection with these reforms are complex, with significant risks and challenges. Such reforms, and any future initiatives to regulate, reform or change the manner of administration of benchmarks, could result in adverse consequences for the return on, value and market for securities and other instruments with returns that are linked to any such benchmark, including those issued by BMO or its subsidiaries. Discontinuance of, or changes to, benchmark rates as a result of these developments, along with uncertainty about the timing and manner of implementation of such changes or discontinuances, may require adjustments to agreements in which current benchmark rates are referenced by us, our clients and other market participants, as well as to our systems and processes.

Caution
The Risks That May Affect Future Results section and the remainder of this Enterprise-Wide Risk Management section contain forward-looking statements. Please see the Caution Regarding 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 29. 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
- Diversify. Limit tail risk
- Maintain strong capital and liquidity
- Optimize risk return
- Protect our reputation

Our integrated and disciplined approach to risk management is fundamental to the success of our business. All elements of our risk management framework function 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 in order to achieve prudent and measured risk-taking that is integrated with our business strategy.

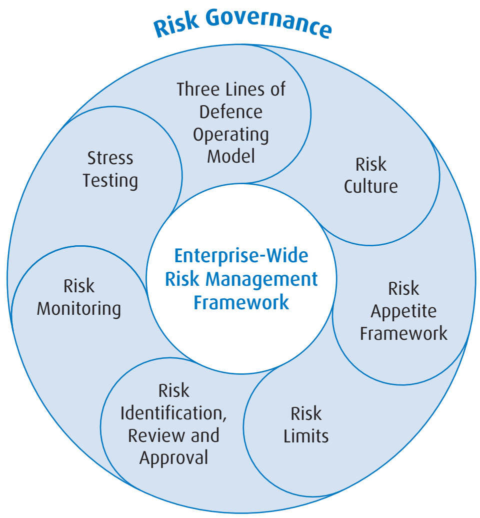
Framework and Risks

Culture and Conduct Framework

Our ethical culture influences how we conduct ourselves, enabling us to deliver positive outcomes for our customers and contribute to the orderly operation of financial markets. Misconduct is behaviour that falls short of legal, professional, internal conduct and ethical standards. Our management approach to culture and conduct is centred on the key themes of our people, customers and markets. We manage and mitigate the potential for misconduct through various risk management processes and procedures using their information and insights to develop an enterprise perspective.

Enterprise-Wide Risk Management Framework

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



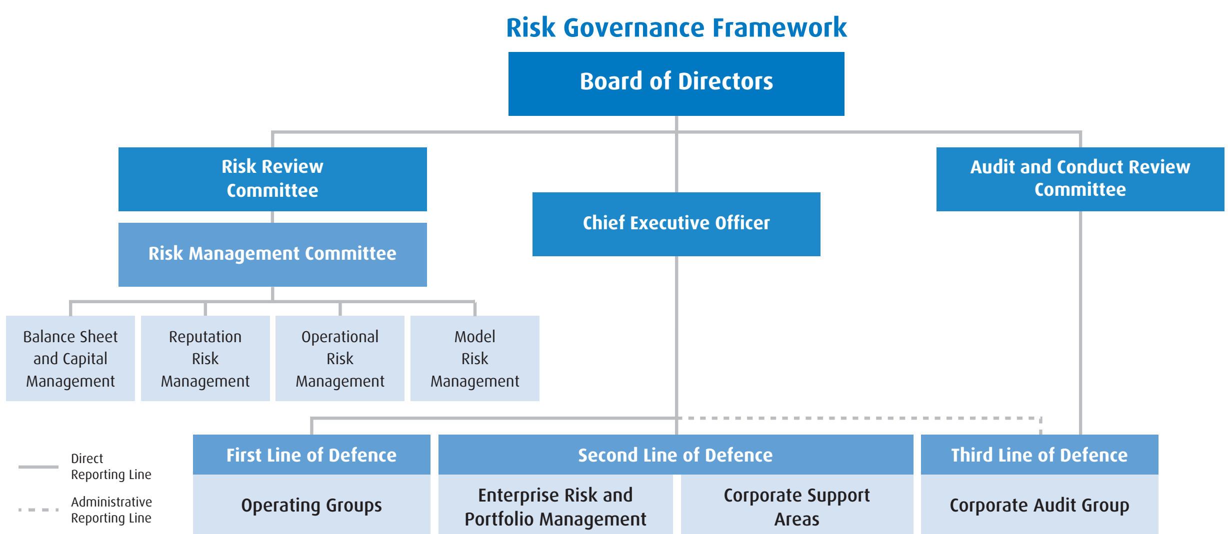
These risk framework elements are discussed in more detail in the sections that follow.

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

The diagram below outlines our risk governance framework, including both the direct and administrative reporting lines.



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 of 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 auditors' 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 Enterprise Risk and Portfolio Management.

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 Chief Financial Officer (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 risk 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 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 call 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 effectiveness 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 certain 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 seek to balance risks and opportunities and optimize risk-adjusted returns. Each member of our senior management plays a critical role in fostering a strong risk culture among all employees by effectively communicating this responsibility, by the example of their own actions and by establishing and enforcing compensation plans and other incentives that are designed to encourage and reward appropriate 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" approach to risk management 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 added 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 support our risk culture.

Certain elements of our risk culture are embedded across the enterprise, and these include:

- **Risk appetite** – promotes a clear understanding of the most prevalent risks that our businesses face, shapes and informs business strategies to align them 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. Our risk culture also 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 of our enterprise-wide risk management framework and do not encourage excessive risk-taking. Our risk managers have input into the design of incentive programs that may have an effect on risk-taking, and provide input into the performance assessment of employees who take material risks or who are responsible for losses or events that give rise to 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 role 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 that 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 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, thereby supporting 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, managed and monitored
- 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 setting and maintaining 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, standards and internal 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 while also adhering 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 also 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, as well as limits on value at risk and stress related to trading and underwriting activities
- Insurance Risk – limits on policy exposures 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
- 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 then delegates overall authority for these limits to the CEO. The CEO in turn 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 under which 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 that is 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 and regulatory, accounting, tax or reputation risk are reviewed by the Reputation Risk Management Committee or the Trading Products Risk Committee, as appropriate, and are also reviewed through our operational risk management process if they involve structural or operational complexity that may give rise to 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 based on the initiative's investment spend and inherent risk.
- **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 that the enterprise currently faces, along with associated metrics. 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 they 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 involves 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, are 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 into our enterprise and group risk appetite statements and embedded in our management processes. To evaluate our risks, we regularly test a range of scenarios, which vary in frequency, severity and complexity, in our portfolios and businesses 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 Committee. This committee is comprised of business, risk and finance executives, and is accountable for reviewing and challenging enterprise-wide 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 utilized 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. 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 that 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 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 assess 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 a similar focus on the effective application of our risk management processes and procedures. These risk types are shown below, with risk types that lend themselves to management by way of quantitative analysis presented above those risks primarily managed through more qualitative techniques. Details on each of these risk types are provided starting on page 87.

	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, 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 that all material credit risks to which the enterprise is exposed are identified, measured, managed, monitored and reported. The RRC has oversight of the management of all material risks that we face, 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 (both notional and capital-based), 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. With limited exceptions, credit officers in ERPM approve all credit transactions and are accountable for providing an objective independent assessment of the lending recommendations and risks assumed by the lending officers. All of these skilled and experienced individuals in the first and second lines of defence 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 discretionary lending 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 acceptable lending standards within the enterprise risk appetite, as well as compliance with 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 no less frequently than annually. The frequency of review increases in accordance with the likelihood and size of potential credit losses, and deteriorating higher-risk situations are 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, and more frequently where appropriate, 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, provisions for credit losses, negative credit migration and significant emerging credit risk issues. This facilitates the RRC and senior management committees to effect any measures they may decide to take.

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 also subject to the credit oversight, limit framework and approval processes 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 exposure to CCR, we often use a regulated central counterparty (CCP) that intermediates between counterparties for contracts in financial markets. CCPs aim to mitigate risk through the use of margin requirements (both initial and variation) and a default management process, including a default fund and other resources. Our exposures to CCPs are subject to the same credit risk governance, monitoring and rating framework we apply to all other corporate accounts.

Material presented in a blue-tinted font above is an integral part of the 2018 annual consolidated financial statements (see page 78).

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 trading counterparties, we may enter into legally enforceable netting agreements for on-balance sheet credit exposures, when 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.

Collateral for our derivatives trading counterparty exposures is primarily comprised of cash and high-quality liquid securities (U.S. and Canadian treasury securities, U.S. agency securities, Canadian provincial government securities and certain high-quality European sovereign 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, frequently 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 another party exceeds an agreed threshold. Collateral transferred can include an independent initial margin and/or variation margin. Credit Support Annexes contain, among other things, provisions setting out acceptable types of collateral and a method for their valuation (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.

Many G20 jurisdictions are implementing new regulations that require certain counterparties with significant OTC derivatives exposures to post or collect prescribed types and amounts of collateral for uncleared OTC derivatives transactions. For additional discussion, see Legal and Regulatory Risk – Derivatives Reform on page 114.

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.

On a periodic basis, collateral is subject to 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 commercial real estate collateral, a full external appraisal of the property is typically obtained at the time of loan origination, unless the exposure 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.

When a commercial loan is determined to be impaired, a thorough review of collateral is conducted and updated external appraisals or valuations may be obtained. Quarterly reviews are then completed and collateral positions are reviewed and updated as deemed appropriate.

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. We may use an external service provided by Canada Mortgage and Housing Corporation or an automated valuation model provided by our appraisal management company to assist with determining either the current value of a property or the necessity of a full property appraisal.

For insured mortgages in Canada with a high LTV ratio (greater than 80%), we determine the value of the property through the default insurer.

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 segment (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, 2018 was to individual consumers, comprising $238,400 million ($223,962 million in 2017).

Wrong-way Risk

Wrong-way risk occurs when our exposure to a counterparty or the magnitude of our potential loss is highly correlated with the counterparty's probability of default. There is specific wrong-way risk, which arises when the credit quality of the counterparty and the market risk factors affecting collateral or other risk mitigants 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 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 level 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 primarily use the AIRB approach to determine credit RWA in our portfolios, including portfolios of our subsidiary BMO Financial Corp. Exposures under AIRB capital treatment account for 94% of total EAD of Wholesale and Retail portfolios, and the remaining is under the Standardized Approach. Waivers and exemptions to existing AIRB models are subject to OSFI's approval. The risk-weighted assets determined through this and other advanced approaches are currently subject to a Basel II standardized floor, as well as regulatory floor factor reductions. The Basel III Standardized Approach is currently being used for regulatory capital calculations related to the acquired Marshall & Ilsley Corporation and BMO Transportation Finance portfolios, and for certain other exposures that are considered to be immaterial. We continue to transition all material exposures in these portfolios to the AIRB Approach. For securitization exposures, we apply the Basel Hierarchy of Approaches, including the Supervisory Formula Approach (SFA) and External Credit Assessment (ECA), as well as an internal credit assessment under our standard credit risk management practices.

Our regulatory capital and economic capital frameworks both 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 calculated exposure, net of collateral.
- Capital is calculated based on exposures that, where applicable, have been redistributed to a more favourable PD band, LGD 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, 2018 and 2017, 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)	
	2018	2017	**2018**	2017	**2018**	2017	**2018**	2017	**2018**	2017	**2018**	2017
Financial institutions	**102,552**	89,681	**21,741**	19,457	**1,649**	1,474	**5,016**	4,137	**177,094**	139,187	**308,052**	253,936
Governments	**44,552**	36,829	**2,118**	2,243	**1**	–	**667**	682	**8,401**	10,626	**55,739**	50,380
Manufacturing	**22,580**	19,737	**13,490**	12,258	**10**	9	**1,396**	1,360	**–**	–	**37,476**	33,364
Real estate	**31,534**	26,991	**8,170**	6,472	**1**	–	**820**	829	**–**	–	**40,525**	34,292
Retail trade	**19,961**	18,242	**3,617**	3,410	**–**	–	**559**	523	**–**	–	**24,137**	22,175
Service industries	**39,067**	34,723	**12,666**	11,207	**1**	1	**2,389**	2,831	**–**	–	**54,123**	48,762
Wholesale trade	**14,659**	11,440	**4,531**	4,675	**2**	1	**436**	481	**–**	–	**19,628**	16,597
Oil and gas	**9,131**	8,185	**10,410**	7,706	**–**	–	**1,804**	1,496	**–**	–	**21,345**	17,387
Individual	**190,688**	180,612	**47,586**	43,223	**–**	–	**126**	127	**–**	–	**238,400**	223,962
Others (2)	**35,617**	35,523	**18,197**	15,709	**88**	3	**6,474**	6,617	**–**	–	**60,376**	57,852
Total exposure at default	**510,341**	461,963	**142,526**	126,360	**1,752**	1,488	**19,687**	19,083	**185,495**	149,813	**859,801**	758,707

(1) Credit exposure excluding equity, securitization, trading book and other assets such as non-significant investments, goodwill, deferred tax asset 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 111 to 112 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, auto loans and small business loans. These loans are managed in pools of homogeneous risk exposures for risk rating purposes. 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 risk based on individual loan characteristics. BMO has a range of internally developed PD, LGD and EAD models for each of the major retail portfolios. The major product lines within each of the retail risk areas are modelled separately, so that the risk-based parameters capture the distinct nature of each product. The models, in general, are designed based on internal data recorded over a period of more than seven years, and adjustments are made at the parameter level to account for any uncertainty. The retail parameters are tested and calibrated on an annual basis, if required, to incorporate additional data points in the parameter estimation process, ensuring that the most recent experience is incorporated. Our largest retail portfolios are the Canadian mortgage, Canadian home equity line of credit and Canadian retail credit card portfolio.

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PD is the probability that an entity and/or credit facility will default within the next 12 months and is expressed as a percentage between 0% and 100%. The rating philosophy aligns each exposure to a homogenous PD pool with a current view of its default risk over the next 12 months and incorporates a future outlook beyond the 12-month period by calibrating the PD estimates to reflect long-run historical experience.

LGD is the amount of economic loss that BMO anticipates it may incur on a credit facility or pool as a result of default. BMO uses the economic LGD calculation, which discounts future recovery payments to the time of default, including collection costs. For capital purposes, the estimates are calibrated to reflect a downturn scenario.

EAD is the portion of a credit facility that is anticipated to be outstanding upon the occurrence of default. It is defined as the balance at default divided by the credit limit at the beginning of the year. The credit conversion factor (CCF), the undrawn factor, is the ratio of the additional amount drawn during the period from the beginning of the year to default over the undrawn amount at the beginning of the year. For non-revolving products, such as mortgages, EAD is equal to 100% of the current outstanding balance and has no undrawn component. For capital purposes, EAD and CCF estimates are calibrated to reflect a downturn scenario.

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, Bank and Sovereign)

Within our wholesale portfolios, we utilize an enterprise-wide risk rating framework that is applied to all our sovereign, bank, corporate and commercial counterparties. One key element of this framework is the assignment of appropriate borrower or counterparty risk ratings (BRRs). BMO has a range of internally designed general and sector-specific BRR models, as well as portfolio-level LGD and EAD models for each of the corporate, commercial, bank and sovereign portfolios.

The BRR models capture the key financial and non-financial characteristics of the borrowers and generate a borrower-level rating that reflects the ranking ordering of the default risk. The models are primarily designed by using internal data, supplemented with judgment as necessary, for low default portfolios. BRRs are assessed and assigned at the time of loan origination, and reassessed when borrowers request changes to credit facilities or when events trigger a review, such as an external rating change or covenant breach. BRRs are reviewed no less frequently than annually, and more frequent reviews are conducted for borrowers with less acceptable risk ratings. 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 rating within an asset class to reflect the long-run average of one-year default rates. PD estimates are updated annually and recalibrated, as required, to ensure alignment with long-run default rates over the economic cycle, supplemented by external benchmarking, as necessary.

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 model captures the priority of claim, collateral, product and sector characteristics of the credit facility extended to a borrower, and generates a facility-level LGD estimate.

An EAD estimate is the portion of a credit facility that is anticipated to be outstanding upon the occurrence of default. The model captures the facility type, sector and facility utilization rate characteristics of the credit facility extended to a borrower and generates a facility-level EAD estimate. The EAD credit conversion factor is calculated for eligible facilities by comparing usage amounts at time of default and one year prior to default. The authorization and drawn amounts, one year prior to default, are used to split each facility into its respective drawn and undrawn portions, where applicable.

LGD and EAD models have been developed for each asset class using internal data from a period of more than seven years that includes at least one full economic cycle, and results are benchmarked using external data, when necessary. For capital purposes, the models are calibrated to reflect a downturn scenario. The LGD and EAD estimates are updated annually and recalibrated as required by comparing the estimates to observed historical experience.

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	C to D

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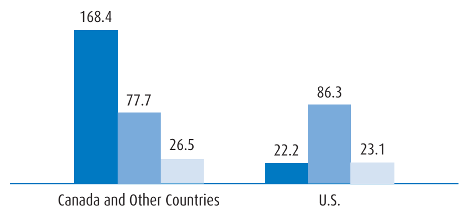
Credit Quality Information

Portfolio Review

Total enterprise-wide credit risk exposures were $860 billion at October 31, 2018, comprised of $445 billion in Canada, $347 billion in the United States and $68 billion in other jurisdictions. This represents an increase of $101 billion or 13% from the prior year.

BMO's loan book continues to be well-diversified by industry and geographic region. Gross loans and acceptances increased $27 billion or 7% from the prior year to $404 billion at October 31, 2018. The geographic mix of our Canadian and U.S. portfolios represented 65.1% and 32.5% of total loans, respectively, compared with 66.3% and 30.6% in 2017. Our loan portfolio is well-diversified, with the consumer loan portfolio representing 47.3% of the total portfolio, a decrease from 49.2% in 2017, and business and government loans representing 52.7% of the total portfolio, up from 50.8% in 2017.

Loans by Geography and Operating Group
($ billions)



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	
	2018	2017	**2018**	2017	**2018**	2017	**2018**	2017
Canada								
Consumer	**54,375**	55,568	**109,991**	106,023	**4,199**	4,349	**168,565**	165,940
Commercial and corporate (excluding real estate)	**57,530**	49,693	**16,438**	14,699	**1,750**	1,367	**75,718**	65,759
Commercial real estate	**7,397**	6,226	**10,143**	8,997	**1,275**	1,453	**18,815**	16,676
United States	**33,688**	33,382	**71,928**	61,394	**25,955**	20,947	**131,571**	115,723
Other countries	**8,628**	11,184	**624**	920	**294**	684	**9,546**	12,788
Total	**161,618**	156,053	**209,124**	192,033	**33,473**	28,800	**404,215**	376,886

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

(Canadian $ in millions)	**2018**	2017
Fixed rate	**193,661**	190,254
Floating rate	**190,330**	168,253
Non-interest sensitive (1)	**18,585**	16,546
Total	**402,576**	375,053

(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 of the Supplemental Information section on pages 132 to 138. Details of our credit exposures are presented in Note 4 on page 157 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 $662 million in 2018 decreased 11% from $746 million in 2017. Detailed discussions of our PCL, including historical trends in PCL, are provided on page 40, in Table 15 on page 138 and in Note 4 on page 157 of the consolidated financial statements.

Gross Impaired Loans (GIL)

Total GIL of $1,936 million in 2018 decreased 13% from $2,220 million in 2017, with the largest decrease in impaired loans in service industries and the oil and gas sector. GIL as a percentage of gross loans and acceptances also decreased to 0.48%, compared with 0.59% in 2017.

Factors contributing to the change in GIL are outlined in the table below. Loans classified as impaired during the year decreased to $2,078 million from $2,193 million in 2017, driven by lower impaired loan formations in the transportation and services industries. On a geographic basis, Canada accounted for the majority of impaired loan formations, comprising 55.7% of total formations in 2018, compared with 44.6% in 2017. Detailed breakdowns of impaired loans by geographic region and industry can be found in Table 11 of the Supplemental Information section on page 134 and in Note 4 on page 157 of the consolidated financial statements.

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MD&A

Changes in Gross Impaired Loans and Acceptances (1)

(Canadian $ in millions, except as noted) For the year ended October 31	**2018**	2017	2016
GIL, beginning of year	**2,220**	2,383	2,004
Classified as impaired during the year	**2,078**	2,193	2,512
Transferred to not impaired during the year	**(708)**	(607)	(577)
Net repayments	**(1,051)**	(1,017)	(875)
Amounts written off	**(618)**	(618)	(694)
Recoveries of loans and advances previously written off	**–**	–	–
Disposals of loans	**(11)**	(46)	(34)
Foreign exchange and other movements	**26**	(68)	47
GIL, end of year	**1,936**	2,220	2,383
GIL as a % of gross loans and acceptances	**0.48**	0.59	0.64

(1) GIL excludes purchased credit impaired loans.

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 an allowance for credit losses (ACL) at a level that we consider appropriate to absorb credit-related losses on our loans and other credit instruments. As at October 31, 2018, our ACL was $1,870 million, a decrease of $126 million from the prior year. The decrease was due to a $70 million reduction in ACL related to the adoption of IFRS 9, a $38 million net recovery in the allowance for performing loans and the impact of the weaker U.S. dollar. The ACL is comprised of an allowance for impaired loans of $397 million and an allowance for performing loans of $1,473 million, which also includes an allowance for impaired loans of $27 million and an allowance for performing loans of $204 million related to undrawn commitments and letters of credit that are considered other credit instruments and recorded in other liabilities. The allowance for impaired loans decreased $23 million from $420 million in the prior year. Our coverage ratio remains adequate, with ACL on impaired loans as a percentage of GIL of 19.1%, compared with 17.7% in 2017.

Further details on the continuity in ACL by each product type can be found in Tables 12 and 13 of the Supplemental Information section on page 136 and 137 and in Note 4 on page 157 of the consolidated financial statements.

European Exposures

Some European countries have experienced credit concerns in recent years, and exposure to this region has been a 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 country of ultimate risk. Our exposure to European countries, as at October 31, 2018, 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 with the funded amount, in the table on page 94.

European Exposure by Country and Counterparty (1)

(Canadian $ in millions) As at October 31, 2018	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)	5	–	44	–	44	–	138	–	138	187
Italy	15	–	–	–	–	1	–	–	1	16
Portugal	–	–	–	–	–	–	–	–	–	–
Spain	301	–	–	–	–	26	–	–	26	327
Total – GIIPS	**321**	**–**	**44**	**–**	**44**	**27**	**138**	**–**	**165**	**530**
Eurozone (excluding GIIPS)										
France	136	6	1	165	172	33	24	11	68	376
Germany	461	229	41	4,755	5,025	6	5	–	11	5,497
Netherlands	298	503	3	–	506	18	50	–	68	872
Other (8)	186	–	2	175	177	4	74	19	97	460
Total – Eurozone (excluding GIIPS)	**1,081**	**738**	**47**	**5,095**	**5,880**	**61**	**153**	**30**	**244**	**7,205**
Rest of Europe										
Norway	323	313	1	–	314	1	3	–	4	641
Sweden	28	204	3	298	505	5	–	–	5	538
Switzerland	244	–	–	–	–	7	44	49	100	344
United Kingdom	942	31	642	3,934	4,607	93	114	26	233	5,782
Other (8)	29	125	–	–	125	6	–	1	7	161
Total – Rest of Europe	**1,566**	**673**	**646**	**4,232**	**5,551**	**112**	**161**	**76**	**349**	**7,466**
Total – All of Europe (9)	**2,968**	**1,411**	**737**	**9,327**	**11,475**	**200**	**452**	**106**	**758**	**15,201**

As at October 31, 2017	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	151	–	1	–	1	19	46	–	65	217
Total – Eurozone (excluding GIIPS)	1,120	247	133	1,188	1,568	84	85	28	197	2,885
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

(1) BMO has the following indirect exposures to Europe as at October 31, 2018:
- Collateral of €229 million to support trading activity in securities (€33 million from GIIPS) and €93 million of cash collateral held.
- Guarantees of $1.5 billion ($86 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 $162 million, with no net single-name* CDS exposure to GIIPS countries as at October 31, 2018 (*includes a net position of $110 million (bought protection) on a CDS Index, of which 18% is comprised of GIIPS domiciled entities).
(5) Repo-style transactions are primarily with bank counterparties for which BMO holds collateral ($26.0 billion for Europe as at October 31, 2018).
(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 $23 million as at October 31, 2018.
(8) Other Eurozone exposure includes 6 countries with less than $300 million net exposure. Other European exposure is distributed across 3 countries as at October 31, 2018.
(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)	Lending (2)						
	Funded lending as at October 31, 2018			As at October 31, 2018		As at October 31, 2017	
Country	Bank	Corporate	Sovereign	Commitments	Funded	Commitments	Funded
GIIPS							
Greece	–	–	–	–	–	–	–
Ireland (7)	–	5	–	5	5	103	6
Italy	13	2	–	15	15	27	27
Portugal	–	–	–	–	–	–	–
Spain	295	6	–	318	301	149	118
Total – GIIPS	**308**	**13**	**–**	**338**	**321**	279	151
Eurozone (excluding GIIPS)							
France	136	–	–	186	136	152	107
Germany	301	160	–	522	461	488	358
Netherlands	148	150	–	443	298	756	554
Other (8)	100	86	–	313	186	247	101
Total – Eurozone (excluding GIIPS)	**685**	**396**	**–**	**1,464**	**1,081**	1,643	1,120
Rest of Europe							
Norway	39	284	–	687	323	287	153
Sweden	28	–	–	87	28	195	49
Switzerland	27	217	–	303	244	156	99
United Kingdom	19	923	–	1,638	942	2,285	1,746
Other (8)	4	25	–	548	29	66	34
Total – Rest of Europe	**117**	**1,449**	**–**	**3,263**	**1,566**	2,989	2,081
Total – All of Europe (9)	**1,110**	**1,858**	**–**	**5,065**	**2,968**	4,911	3,352

Refer to footnotes in the table on page 93.

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 risk related to BMO, we are exposed to risk as a member for our contribution to a default fund, and we may be called on to make additional contributions, or to provide other support in the event another member defaults. As part of BMO's preparations, we are closely monitoring the implications of the United Kingdom's exit from the European Union (Brexit) and the potential impact on CCPs in both jurisdictions.

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)	Non-centrally cleared		Centrally cleared		Total	
As at October 31	**2018**	2017	**2018**	2017	**2018**	2017
Interest Rate Contracts						
Swaps	**453,976**	479,177	**3,378,021**	2,723,188	**3,831,997**	3,202,365
Forward rate agreements	**10,031**	1,442	**401,542**	193,700	**411,573**	195,142
Purchased options	**35,023**	29,107	**–**	–	**35,023**	29,107
Written options	**48,721**	37,247	**–**	–	**48,721**	37,247
Total interest rate contracts	**547,751**	546,973	**3,779,563**	2,916,888	**4,327,314**	3,463,861
Foreign Exchange Contracts						
Cross-currency swaps	**92,916**	85,586	**–**	–	**92,916**	85,586
Cross-currency interest rate swaps	**455,232**	434,210	**–**	–	**455,232**	434,210
Forward foreign exchange contracts	**438,754**	370,762	**33,569**	31,946	**472,323**	402,708
Purchased options	**21,093**	23,812	**375**	–	**21,468**	23,812
Written options	**23,622**	29,023	**396**	78	**24,018**	29,101
Total foreign exchange contracts	**1,031,617**	943,393	**34,340**	32,024	**1,065,957**	975,417
Commodity Contracts						
Swaps	**24,366**	18,713	**–**	–	**24,366**	18,713
Purchased options	**6,182**	7,080	**–**	–	**6,182**	7,080
Written options	**4,233**	4,905	**–**	–	**4,233**	4,905
Total commodity contracts	**34,781**	30,698	**–**	–	**34,781**	30,698
Equity Contracts	**53,107**	63,528	**–**	–	**53,107**	63,528
Credit Default Swaps						
Purchased	**1,448**	1,640	**1,599**	1,018	**3,047**	2,658
Written	**23**	114	**420**	334	**443**	448
Total credit default swaps	**1,471**	1,754	**2,019**	1,352	**3,490**	3,106
Total	**1,668,727**	1,586,346	**3,815,922**	2,950,264	**5,484,649**	4,536,610

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 that ensures 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, 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 and the review of position concentrations, notional values and trading losses.

Value at Risk (VaR) measures 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. VaR is calculated 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.

Stressed Value at Risk (SVaR) measures 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, with model inputs calibrated to historical data from a period of significant financial stress. SVaR is calculated 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.

Incremental Risk Charge (IRC) complements the VaR and SVaR metrics and represents an estimate of the default and migration risks of non-securitization products held in the trading book with exposure to interest rate risk, measured over a one-year horizon at a 99.9% confidence level.

A consistent set of VaR and SVaR models is used for both management and regulatory purposes across all BMO Financial Group legal entities in which trading and/or underwriting activities are conducted.

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 validation team. 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 risk 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.

VaR, SVaR, IRC and stress testing should not 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 and are subject to confidence levels, and the estimates could be exceeded under unforeseen market conditions. 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. The bank's VaR model is back-tested daily, and the one-day 99% confidence level VaR at the local and consolidated BMO levels is compared with the estimated daily profit and loss (P&L) that would be recorded if the portfolio composition remained unchanged. If this 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 senior management and reported to our regulators.

Material presented in a blue-tinted font above is an integral part of the 2018 annual consolidated financial statements (see page 78).

Although it is a valuable indicator of risk, as with any model-driven metric, VaR has limitations. Among these limitations is the assumption that all positions can be liquidated within the assumed 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 VaR calculations are based upon portfolio positions at the close of business and do not reflect the impact of intra-day trading activity.

Monitoring and Control of Trading and Underwriting Market Risk

A comprehensive set of limits is applied to these metrics, and these limits are subject to regular monitoring and reporting, with any breach of the limits escalated to the appropriate level of management. 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

Average Total Trading VaR increased year-over-year, driven by increased equity exposures from client facilitation activities, increased credit exposure from the acquisition of KGS-Alpha, and a general increase in the volatility of historical market data used in the calculation. Changes in total trading SVaR are also attributable to an increase in client facilitation activities, as well as the acquisition and a related increase in certain types of inventory with price behaviour that was particularly volatile during the historical period used to compute SVaR.

Total Trading Value at Risk (VaR) Summary (1)(2)

As at or for the year ended October 31 (pre-tax Canadian $ equivalent in millions)	2018				2017			
	Year-end	**Average**	**High**	**Low**	Year-end	Average	High	Low
Commodity VaR	**0.7**	**0.9**	**13.6**	**0.3**	0.9	0.9	1.7	0.4
Equity VaR	**4.4**	**4.4**	**7.8**	**2.9**	3.3	3.1	8.5	2.2
Foreign exchange VaR	**0.5**	**0.6**	**2.2**	**0.1**	0.3	0.8	3.1	0.1
Interest rate VaR	**6.1**	**5.9**	**8.7**	**3.6**	5.0	6.1	11.4	3.9
Credit VaR	**7.4**	**2.6**	**7.4**	**1.5**	1.9	2.3	4.1	1.5
Diversification	**(8.3)**	**(6.8)**	**nm**	**nm**	(5.9)	(7.0)	nm	nm
Total Trading VaR	**10.8**	**7.6**	**17.5**	**4.7**	5.5	6.2	10.0	4.3
Total Trading SVaR	**56.3**	**26.8**	**56.3**	**16.6**	24.6	20.5	34.6	13.4

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

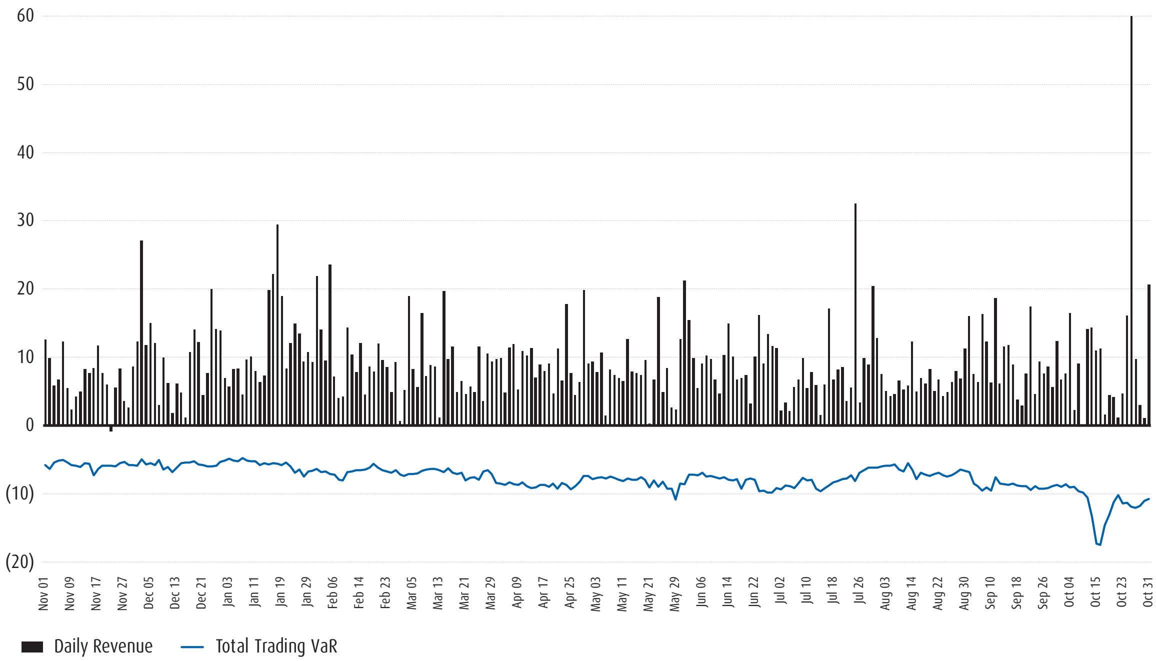
Material presented in a blue-tinted font above is an integral part of the 2018 annual consolidated financial statements (see page 78).

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 2018, we incurred net trading losses on one day totalling $0.8 million. The loss occurred on November 22, 2017, and did not exceed VaR.

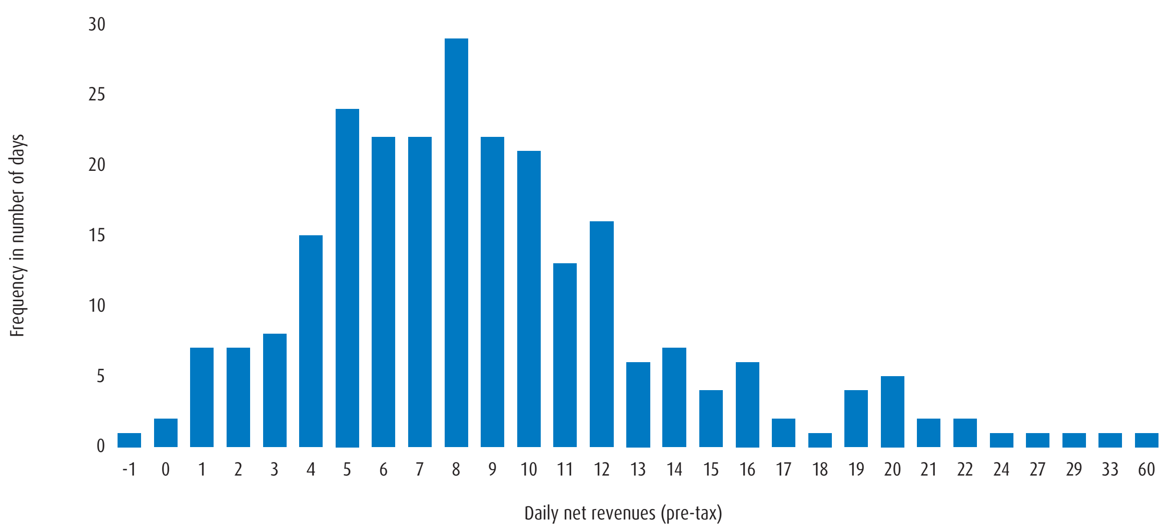
Trading Net Revenues versus Value at Risk

(pre-tax basis and in millions of Canadian dollars)
November 1, 2017 to October 31, 2018 ($ millions)



Frequency Distribution of Daily Net Revenues

November 1, 2017 to October 31, 2018 ($ 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 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 market value, cash flows and earnings 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 arising from 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, which is described in more detail on page 111.

Structural interest rate earnings and economic value sensitivity to an immediate parallel increase or decrease of 100 basis points in the yield curve is disclosed in the following table.

There were no 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, 2017, 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, 2017, 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. The structural earnings exposures to falling interest rates decreased relative to October 31, 2017, primarily owing to the increased extent to which certain deposits can reprice lower following the increase in market rates during the year. The structural earnings benefit to rising interest rates primarily reflects the benefit of widening deposit spreads as interest rates rise and was relatively unchanged year-over-year.

Material presented in a blue-tinted font above is an integral part of the 2018 annual consolidated financial statements (see page 78).

Structural Interest Rate Sensitivity (1)

(Pre-tax Canadian $ equivalent in millions)	**As at October 31, 2018**		As at October 31, 2017	
	Economic value sensitivity	**Earnings sensitivity over the next 12 months**	Economic value sensitivity	Earnings sensitivity over the next 12 months
100 basis point increase	**(1,079.2)**	**136.5**	(957.8)	136.9
100 basis point decrease	**626.5**	**(304.1)**	78.6	(433.4)

(1) Losses are presented in brackets and benefits are presented as positive numbers.

Insurance Market Risk

Insurance market risk includes interest rate and equity market risk arising from BMO's insurance business activities. A 100 basis point increase in interest rates at October 31, 2018 would result in an increase in earnings before tax of $37 million ($52 million at October 31, 2017). A 100 basis point decrease in interest rates at October 31, 2018 would result in a decrease in earnings before tax of $37 million ($50 million at October 31, 2017). On an unhedged basis, a 10% decrease in equity market values at October 31, 2018 would result in a decrease in earnings before tax of $44 million ($40 million at October 31, 2017). A 10% increase in equity market values at October 31, 2018 would result in an increase in earnings before tax of $42 million ($40 million at October 31, 2017). During the quarter, a hedging program was put in place that will limit the decrease in earnings before tax due to decreases in equity market values to a maximum of $34 million in a quarter. The impact on earnings from insurance market risk is reflected in insurance claims, commissions and changes in policy benefit liabilities on the Consolidated Statement of Income and the corresponding change in the fair value of our policy benefit liabilities is reflected in Other Liabilities on the Consolidated Balance Sheet. Insurance market risk impacts are not reflected in the table above.

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 could 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 2018 fiscal year. Please see the Enterprise-Wide Capital Management section on page 69 for further discussion.

Transaction risk represents the impact that fluctuations in the Canadian/U.S. dollar exchange rate could 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, although no hedges were executed in the year. If future results are consistent with results in 2018, 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 $14 million, in the absence of hedging transactions. Refer to the Foreign Exchange section on page 34 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.

(Canadian $ in millions)	**As at October 31, 2018**				As at October 31, 2017				
		Subject to market risk				Subject to market risk			
	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	**42,142**	**–**	**42,142**	**–**	32,599	–	32,599	–	Interest rate
Interest bearing deposits with banks	**8,305**	**250**	**8,055**	**–**	6,490	346	6,144	–	Interest rate
Securities	**180,935**	**99,561**	**81,374**	**–**	163,198	90,449	72,749	–	Interest rate, credit spread, equity
Securities borrowed or purchased under resale agreements	**85,051**	**–**	**85,051**	**–**	75,047	–	75,047	–	Interest rate
Loans (net of allowance for credit losses)	**383,991**	**–**	**383,991**	**–**	358,507	–	358,507	–	Interest rate, foreign exchange
Derivative instruments	**26,204**	**24,401**	**1,803**	**–**	28,951	27,359	1,592	–	Interest rate, foreign exchange
Customers' liability under acceptances	**18,585**	**–**	**18,585**	**–**	16,546	–	16,546	–	Interest rate
Other assets	**28,835**	**–**	**13,829**	**15,006**	28,242	–	12,927	15,315	Interest rate
Total Assets	**774,048**	**124,212**	**634,830**	**15,006**	709,580	118,154	576,111	15,315	
Liabilities Subject to Market Risk									
Deposits	**522,051**	**15,309**	**506,742**	**–**	479,792	13,674	466,118	–	Interest rate, foreign exchange
Derivative instruments	**24,411**	**21,380**	**3,031**	**–**	27,804	26,122	1,682	–	Interest rate, foreign exchange
Acceptances	**18,585**	**–**	**18,585**	**–**	16,546	–	16,546	–	Interest rate
Securities sold but not yet purchased	**28,804**	**28,804**	**–**	**–**	25,163	25,163	–	–	
Securities lent or sold under repurchase agreements	**66,684**	**–**	**66,684**	**–**	55,119	–	55,119	–	Interest rate
Other liabilities	**61,004**	**–**	**60,881**	**123**	55,773	–	55,415	358	Interest rate
Subordinated debt	**6,782**	**–**	**6,782**	**–**	5,029	–	5,029	–	Interest rate
Total Liabilities	**728,321**	**65,493**	**662,705**	**123**	665,226	64,959	599,909	358	

(1) Primarily comprised of balance sheet items that are subject to the trading and underwriting risk management framework and recorded at fair value through profit or loss.

(2) Primarily comprised of balance sheet items that are subject to the structural balance sheet and insurance risk management framework.

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 2018 annual consolidated financial statements (see page 78).

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Insurance Risk

Insurance risk is the potential for loss as a result of actual experience differing 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 of 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 addresses 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 as the first line of defence, and has the primary responsibility for managing insurance risk. Second-line-of-defence oversight is provided by the CRO, BMO Insurance, who reports to the Head of Market Risk and CRO, BMO Capital Markets. Internal risk committees, the boards of directors of the BMO Insurance subsidiaries and senior management provide senior governance and review. In particular, the Risk Committee, 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 our BMO Insurance 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 transactions that transfer insurance risk from BMO Insurance to independent reinsurance companies are also used to mitigate our exposure to insurance risk by diversifying risk and limiting claims. Our reinsurance business, in turn, assumes property catastrophe and other reinsurance risks from independent reinsurers in various jurisdictions worldwide in order to diversify our geographic reinsurance exposures in accordance with our BMO Insurance risk management framework.

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. The Corporate Treasury group is responsible for identifying, assessing, managing, monitoring, mitigating and reporting on 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 Risk and Portfolio 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 Risk Management Committee (RMC) and Balance Sheet and Capital Management Committee (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 Risk Review Committee (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 counterparty liability diversification, 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 designed to 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, which are informed by the legal and regulatory requirements that apply to each entity, are in place for key legal entities, 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.

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 inform and 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.

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 government debt 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-dollar- 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 $242.6 billion at October 31, 2018, compared with $213.8 billion at October 31, 2017. The increase in unencumbered liquid assets was primarily due to higher cash and securities balances and the impact of the stronger U.S. dollar. Net unencumbered liquid assets are primarily held at the parent bank level, at our U.S. bank entity BMO Harris Bank, 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 soundness 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 24 on page 201 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 2018 annual consolidated financial statements (see page 78).

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Liquid Assets

(Canadian $ in millions)	As at October 31, 2018 Carrying value/on-balance sheet assets (1)	Other cash and securities received	Total gross assets (2)	Encumbered assets	Net unencumbered assets (3)	As at October 31, 2017 Net unencumbered assets (3)
Cash and cash equivalents	**42,142**	**–**	**42,142**	**1,655**	**40,487**	31,164
Deposits with other banks	**8,305**	**–**	**8,305**	**–**	**8,305**	6,490
Securities and securities borrowed or purchased under resale agreements						
Sovereigns / Central banks / Multilateral development banks	**146,514**	**26,530**	**173,044**	**94,886**	**78,158**	59,414
NHA mortgage-backed securities and U.S. agency mortgage-backed securities and collateralized mortgage obligations	**31,966**	**314**	**32,280**	**12,513**	**19,767**	18,719
Corporate and other debt	**23,671**	**10,773**	**34,444**	**6,472**	**27,972**	22,414
Corporate equity	**63,835**	**21,416**	**85,251**	**42,446**	**42,805**	52,616
Total securities and securities borrowed or purchased under resale agreements	**265,986**	**59,033**	**325,019**	**156,317**	**168,702**	153,163
NHA mortgage-backed securities (reported as loans at amortized cost) (4)	**27,865**	**–**	**27,865**	**2,747**	**25,118**	22,940
Total liquid assets	**344,298**	**59,033**	**403,331**	**160,719**	**242,612**	213,757
Other eligible assets at central banks (not included above) (5)	**64,029**	**–**	**64,029**	**660**	**63,369**	64,776
Undrawn credit lines granted by central banks	**–**	**–**	**–**	**–**	**–**	–
Total liquid assets and other sources	**408,327**	**59,033**	**467,360**	**161,379**	**305,981**	278,533

(1) The carrying values outlined in this table are consistent with the carrying values reported in BMO's balance sheet as at October 31, 2018.

(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, National Housing Authority (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 bank's loan portfolio, including incremental securitization, covered bond issuances and Federal Home Loan Bank (FHLB) advances. In July 2018, the Bank of Canada announced that it was increasing the haircuts applied to non-mortgage loans that could be used to access its Standing Liquidity Facility effective August 2018, reducing the amount of funds the bank could access from the Bank of Canada in a period of stress. The impact of this change is reflected as at October 31, 2018. This change does not materially impact the bank.

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

Asset Encumbrance

(Canadian $ in millions) As at October 31, 2018	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	**50,447**	**–**	**1,655**	**–**	**48,792**
Securities (5)	**352,884**	**127,211**	**31,853**	**10,580**	**183,240**
Loans and acceptances	**356,126**	**73,553**	**660**	**218,544**	**63,369**
Other assets					
Derivative instruments	**26,204**	**–**	**–**	**26,204**	**–**
Customers' liability under acceptances	**18,585**	**–**	**–**	**18,585**	**–**
Premises and equipment	**1,986**	**–**	**–**	**1,986**	**–**
Goodwill	**6,373**	**–**	**–**	**6,373**	**–**
Intangible assets	**2,272**	**–**	**–**	**2,272**	**–**
Current tax assets	**1,515**	**–**	**–**	**1,515**	**–**
Deferred tax asset	**2,037**	**–**	**–**	**2,037**	**–**
Other assets	**14,652**	**2,509**	**–**	**12,143**	**–**
Total other assets	**73,624**	**2,509**	**–**	**71,115**	**–**
Total assets	**833,081**	**203,273**	**34,168**	**300,239**	**295,401**

(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	109,835	28,017	9,692	166,411
Loans and acceptances	333,066	63,438	393	204,459	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 asset	2,865	–	–	2,865	–
Other assets	13,570	3,739	–	9,831	–
Total other assets	73,739	3,739	–	70,000	–
Total assets	759,849	177,012	29,845	284,154	268,838

(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 $10.6 billion as at October 31, 2018, 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 bank's loan portfolio, such as 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).

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

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, 2018, was 145%. 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 down from 152% last year. HQLA and net cash outflows both increased; however, the ratio between them changed year-over-year. 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 such a 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 102.

Liquidity Coverage Ratio

(Canadian $ in billions, except as noted)	For the quarter ended October 31, 2018 Total unweighted value (average) (1) (2)	Total weighted value (average) (2) (3)
High-Quality Liquid Assets		
Total high-quality liquid assets (HQLA)	*	**155.0**
Cash Outflows		
Retail deposits and deposits from small business customers, of which:	**167.3**	**10.3**
Stable deposits	**91.3**	**2.7**
Less stable deposits	**76.0**	**7.6**
Unsecured wholesale funding, of which:	**152.2**	**84.1**
Operational deposits (all counterparties) and deposits in networks of cooperative banks	**60.3**	**15.0**
Non-operational deposits (all counterparties)	**60.8**	**38.0**
Unsecured debt	**31.1**	**31.1**
Secured wholesale funding	*	**19.2**
Additional requirements, of which:	**134.8**	**29.6**
Outflows related to derivatives exposures and other collateral requirements	**8.0**	**4.4**
Outflows related to loss of funding on debt products	**2.7**	**2.7**
Credit and liquidity facilities	**124.1**	**22.5**
Other contractual funding obligations	**0.8**	**–**
Other contingent funding obligations	**385.1**	**6.6**
Total cash outflows	*	**149.8**
Cash Inflows		
Secured lending (e.g. reverse repos)	**136.5**	**21.0**
Inflows from fully performing exposures	**8.8**	**5.2**
Other cash inflows	**16.7**	**16.7**
Total cash inflows	**162.0**	**42.9**

	Total adjusted value (4)
Total HQLA	**155.0**
Total net cash outflows	**106.9**
Liquidity Coverage Ratio (%)	**145**

For the quarter ended October 31, 2017	Total adjusted value (4)
Total HQLA	130.3
Total net cash outflows	85.8
Liquidity Coverage Ratio (%)	152

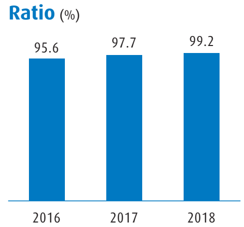
* Disclosure is not required under the LCR disclosure standard.
(1) Unweighted values are calculated at market value (for HQLA) or as outstanding balances maturing or callable within 30 days (for inflows and outflows).
(2) Values are calculated based on the simple average of the daily LCR over 63 business days in the fourth quarter of 2018.
(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 have 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 largely with wholesale term funding.

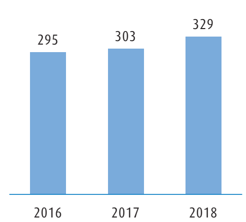
BMO maintains a large and stable base of customer deposits that, in combination with our strong capital base, is a source of strength. It supports the maintenance of a sound liquidity position and reduces our reliance on wholesale funding. Customer deposits totalled $329.2 billion at October 31, 2018, up from $303.1 billion in 2017, due to strong deposit growth and the impact of the stronger U.S. dollar. BMO also receives non-marketable deposits from corporate and institutional customers in support of certain trading activities. These deposits totalled $29.5 billion as at October 31, 2018, unchanged from 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.

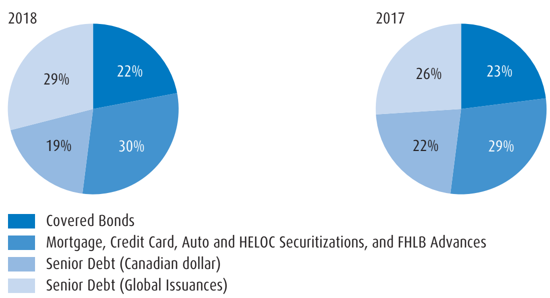
Material presented in a blue-tinted font above is an integral part of the 2018 annual consolidated financial statements (see page 78).

Total wholesale funding outstanding, largely consisting of negotiable marketable securities, was $203.3 billion at October 31, 2018, with $63.2 billion sourced as secured funding and $140.1 billion sourced as unsecured funding. Wholesale funding outstanding increased $22.8 billion, or $20.5 billion excluding the impact of the stronger U.S. dollar. The mix and maturities of BMO's wholesale term funding are outlined in the table below. Additional information on deposit maturities can be found on page 107. BMO maintains a sizeable portfolio of unencumbered liquid assets, totalling $242.6 billion as at October 31, 2018 and $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 101.

In April 2018, the Government of Canada published the final regulations on Canada's Bank Recapitalization (Bail-In) Regime, which became effective on September 23, 2018. Bail-in debt includes senior unsecured debt issued directly by the bank on or after September 23, 2018 that has an original term greater than 400 days and is marketable, subject to certain exceptions. BMO is required to meet minimum TLAC ratio requirements by November 1, 2021. We do not expect a material impact to our funding plan as a result of Canada's Bail-In Regime and TLAC requirements. For more information on Canada's Bail-In Regime and TLAC requirements, please see Regulatory Developments under Capital Management on page 71.

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 our business strategies. The funding plan considers expected maturities, as well as asset and liability growth projected for our businesses in our forecasting and planning processes, 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, 2018								As at October 31, 2017
(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	4,706	185	71	8	4,970	–	7	4,977	3,962
Certificates of deposit and commercial paper	13,727	23,434	17,794	11,059	66,014	2,304	–	68,318	60,640
Bearer deposit notes	227	270	79	–	576	–	–	576	2,815
Asset-backed commercial paper (ABCP)	1,051	1,691	640	204	3,586	–	–	3,586	3,722
Senior unsecured medium-term notes	–	1,317	1,400	4,816	7,533	12,836	35,384	55,753	48,089
Senior unsecured structured notes (2)	–	–	–	–	–	18	3,675	3,693	3,002
Covered bonds and securitizations									
Mortgage and HELOC securitizations	–	1,018	473	1,122	2,613	3,154	12,436	18,203	17,935
Covered bonds	–	2,235	–	1,490	3,725	5,816	15,722	25,263	23,225
Other asset-backed securitizations (3)	1,058	–	–	168	1,226	1,452	4,252	6,930	5,160
Subordinated debt	–	–	–	–	–	–	6,841	6,841	5,028
Other (4)	–	4,971	–	–	4,971	–	4,214	9,185	6,935
Total	20,769	35,121	20,457	18,867	95,214	25,580	82,531	203,325	180,513
Of which:									
Secured	2,109	9,915	1,113	2,984	16,121	10,422	36,624	63,167	56,977
Unsecured	18,660	25,206	19,344	15,883	79,093	15,158	45,907	140,158	123,536
Total (5)	20,769	35,121	20,457	18,867	95,214	25,580	82,531	203,325	180,513

(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 on page 107, and also 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) Refers to FHLB advances.
(5) Total wholesale funding consists of Canadian-dollar-denominated funding of $49.2 billion and U.S.-dollar-denominated and other foreign-currency-denominated funding of $154.1 billion as at October 31, 2018.

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. In February 2018, OSFI announced a revised target NSFR implementation date of January 2020 for Canadian deposit-taking institutions, given the progress made to date on implementation at the international level.

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 starting on page 167 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. Moody's, Standard & Poor's (S&P), Fitch and DBRS have a stable outlook on BMO.

On April 19, 2018, following the finalization of the Bail-In Regime in Canada, DBRS changed the trend to Stable from Negative on the long-term issuer ratings, senior debt ratings and deposit ratings of Bank of Montreal; ratings of legacy subordinated debt were downgraded by one notch for all Canadian domestic systemically important banks.

On July 16, 2018, Moody's took various actions on its ratings of Canadian banks following the introduction of a bank resolution framework. The actions included an upgrade to the ratings for BMO's senior unsecured debt and junior subordinated bank debt (NVCC). The outlook was changed to Stable from Negative.

On August 14, 2018, S&P upgraded its stand-alone credit profile on BMO to 'a' from 'a-', to reflect improvements in its assessment of BMO's risk position. S&P affirmed its 'A+/A-1' long-term and short-term issuer credit ratings on BMO and its operating subsidiaries, and the outlook remains Stable. At the same time, S&P raised its ratings on BMO's subordinated debt and additional Tier 1 instruments by one notch, reflecting improvements in the bank's stand-alone creditworthiness.

All of the rating agencies have also assigned provisional ratings to senior unsecured debt subject to the Bail-In Regime. Moody's, S&P, Fitch and DBRS have assigned provisional ratings of A2, A-, AA- and AA (low) respectively.

As at October 31, 2018

Rating agency	Short-term debt	Senior debt (1)	Long-term deposits / Legacy senior debt (2)	Subordinated debt (NVCC)	Outlook
Moody's	P-1	A2	Aa2	Baa1	Stable
S&P	A-1	A-	A+	BBB+	Stable
Fitch	F1+	AA-	AA-	A+	Stable
DBRS	R-1 (high)	AA (low)	AA	A (low)	Stable

(1) Subject to conversion under the Bank Recapitalization (Bail-In) Regime. Defined as "Junior Senior Unsecured" by Moody's, "Bail-In Eligible Senior Debt" by S&P, "Senior Unsecured" by Fitch, and "Bail-Inable Senior Debt" by DBRS.

(2) Long-term deposits / Legacy senior debt includes senior debt issued prior to September 23, 2018, and senior debt issued on or after September 23, 2018, that is excluded from the Bank Recapitalization (Bail-In) Regime. Defined as "Senior Unsecured" by Moody's and S&P, "Senior Preferred" by Fitch, and "Legacy Senior" by DBRS.

We are required to deliver collateral to certain counterparties in the event of a downgrade to our current credit rating. The incremental collateral required is based on mark-to-market exposure, collateral valuations and collateral threshold arrangements, as applicable. As at October 31, 2018, we would be required to provide additional collateral to counterparties totalling $112 million, $361 million and $502 million under a one-notch, two-notch and three-notch downgrade, respectively.

Contractual Maturities of Assets and Liabilities and Off-Balance Sheet Commitments

The tables below show the remaining contractual maturity of on-balance sheet assets and liabilities and off-balance sheet commitments. The contractual maturity of financial assets and liabilities is an input to, but is not necessarily consistent with, the expected maturity of assets and liabilities that is used in the management of liquidity and funding risk. We forecast asset and liability cash flows, both under normal market conditions and under a number of stress scenarios, to manage liquidity and funding risk. Stress scenarios include assumptions for loan repayments, deposit withdrawals, and credit commitment and liquidity facility drawdowns by counterparty and product type. Stress scenarios also consider the time horizon over which liquid assets can be monetized and the related haircuts and potential collateral requirements that may result from both market volatility and credit rating downgrades, among other assumptions.

(Canadian $ in millions) 2018	0 to 1 month	1 to 3 months	3 to 6 months	6 to 9 months	9 to 12 months	1 to 2 years	2 to 5 years	Over 5 years	No maturity	Total
On-Balance Sheet Financial Instruments										
Assets										
Cash and cash equivalents	41,162	–	–	–	–	–	–	–	980	42,142
Interest bearing deposits with banks	4,964	1,717	1,037	457	112	18	–	–	–	8,305
Securities	4,522	4,283	5,049	7,749	4,943	11,854	32,480	56,004	54,051	180,935
Securities borrowed or purchased under resale agreements	67,804	12,732	2,490	1,781	191	53	–	–	–	85,051
Loans										
Residential mortgages	1,782	1,848	4,343	6,306	4,769	24,522	64,636	11,414	–	119,620
Consumer instalment and other personal	607	440	1,026	1,143	943	5,414	19,910	9,812	23,930	63,225
Credit cards	–	–	–	–	–	–	–	–	8,329	8,329
Business and government	13,088	5,921	7,126	6,779	6,218	19,543	75,099	12,247	48,435	194,456
Allowance for credit losses	–	–	–	–	–	–	–	–	(1,639)	(1,639)
Total loans and acceptances, net of allowance	15,477	8,209	12,495	14,228	11,930	49,479	159,645	33,473	79,055	383,991
Other Assets										
Derivative instruments	2,040	3,385	1,645	1,012	807	3,407	6,074	7,834	–	26,204
Customers' liability under acceptances	16,529	1,988	65	3	–	–	–	–	–	18,585
Other	1,740	506	189	26	6	17	20	4,824	21,507	28,835
Total other assets	20,309	5,879	1,899	1,041	813	3,424	6,094	12,658	21,507	73,624
Total Assets	154,238	32,820	22,970	25,256	17,989	64,828	198,219	102,135	155,593	774,048

(Canadian $ in millions) 2018	0 to 1 month	1 to 3 months	3 to 6 months	6 to 9 months	9 to 12 months	1 to 2 years	2 to 5 years	Over 5 years	No maturity	Total
Liabilities and Equity										
Deposits (1)										
Banks	16,966	6,032	1,200	227	106	–	–	–	3,376	27,907
Business and government	23,524	32,231	22,713	15,893	8,629	22,418	48,684	12,932	126,276	313,300
Individuals	2,582	6,455	7,953	7,619	10,536	11,736	16,327	2,582	115,054	180,844
Total deposits	43,072	44,718	31,866	23,739	19,271	34,154	65,011	15,514	244,706	522,051
Other liabilities										
Derivative instruments	1,499	2,456	1,616	913	639	3,831	6,335	7,122	–	24,411
Acceptances	16,529	1,988	65	3	–	–	–	–	–	18,585
Securities sold but not yet purchased	28,804	–	–	–	–	–	–	–	–	28,804
Securities lent or sold under repurchase agreements	63,496	2,249	8	931	–	–	–	–	–	66,684
Current tax liabilities	–	–	–	–	–	–	–	–	50	50
Deferred tax liabilities	–	–	–	–	–	–	–	–	74	74
Securitization and structured entities' liabilities	1,044	1,084	475	512	588	4,912	13,398	3,038	–	25,051
Other	8,548	5,568	44	34	184	789	4,455	1,905	14,302	35,829
Total other liabilities	119,920	13,345	2,208	2,393	1,411	9,532	24,188	12,065	14,426	199,488
Subordinated debt	–	–	–	–	–	–	–	6,782	–	6,782
Total Equity	–	–	–	–	–	–	–	–	45,727	45,727
Total Liabilities and Equity	162,992	58,063	34,074	26,132	20,682	43,686	89,199	34,361	304,859	774,048

(1) Deposits payable on demand and payable after notice have been included under no maturity.

(Canadian $ in millions) 2018	0 to 1 month	1 to 3 months	3 to 6 months	6 to 9 months	9 to 12 months	1 to 2 years	2 to 5 years	Over 5 years	No maturity	Total
Off-Balance Sheet Commitments										
Commitments to extend credit (1)	1,472	3,610	6,892	9,620	11,345	21,056	84,295	3,144	–	141,434
Backstop liquidity facilities	–	–	–	–	–	–	5,627	–	–	5,627
Operating leases	34	70	99	101	100	358	770	1,210	–	2,742
Securities lending	4,939	–	–	–	–	–	–	–	–	4,939
Purchase obligations	56	388	153	155	158	615	186	82	–	1,793

(1) A large majority of these commitments expire without being drawn upon. As a result, the total contractual amounts may not be representative of the funding likely to be required for these commitments.

Material presented in a blue-tinted font above is an integral part of the 2018 annual consolidated financial statements (see page 78).

(Canadian $ in millions)	0 to 1 month	1 to 3 months	3 to 6 months	6 to 9 months	9 to 12 months	1 to 2 years	2 to 5 years	Over 5 years	No maturity	2017 Total
On-Balance Sheet Financial Instruments										
Assets										
Cash and cash equivalents	31,641	–	–	–	–	–	–	–	958	32,599
Interest bearing deposits with banks	3,784	1,579	626	319	182	–	–	–	–	6,490
Securities	3,620	2,917	5,933	5,845	3,625	7,675	22,842	52,615	58,126	163,198
Securities borrowed or purchased under resale agreements	57,919	13,236	2,353	1,241	249	49	–	–	–	75,047
Loans										
Residential mortgages	1,045	1,551	4,531	7,687	6,201	19,866	65,547	8,830	–	115,258
Consumer instalment and other personal	517	371	1,084	1,374	1,285	4,211	20,845	8,590	23,667	61,944
Credit cards	–	–	–	–	–	–	–	–	8,071	8,071
Business and government	13,379	7,352	6,454	6,169	5,059	17,948	63,614	11,380	43,712	175,067
Allowance for credit losses	–	–	–	–	–	–	–	–	(1,833)	(1,833)
Total loans and acceptances, net of allowance	14,941	9,274	12,069	15,230	12,545	42,025	150,006	28,800	73,617	358,507
Other Assets										
Derivative instruments	1,701	3,748	1,580	1,229	1,306	3,272	7,426	8,689	–	28,951
Customers' liability under acceptances	14,179	2,263	104	–	–	–	–	–	–	16,546
Other	1,340	475	129	17	11	11	131	4,431	21,697	28,242
Total other assets	17,220	6,486	1,813	1,246	1,317	3,283	7,557	13,120	21,697	73,739
Total Assets	129,125	33,492	22,794	23,881	17,918	53,032	180,405	94,535	154,398	709,580

(Canadian $ in millions)	0 to 1 month	1 to 3 months	3 to 6 months	6 to 9 months	9 to 12 months	1 to 2 years	2 to 5 years	Over 5 years	No maturity	2017 Total
Liabilities and Equity										
Deposits (1)										
Banks	12,462	9,321	2,633	496	25	–	–	–	3,268	28,205
Business and government	23,917	25,224	19,112	12,897	10,806	16,522	42,707	15,712	116,379	283,276
Individuals	3,835	5,081	5,569	5,662	7,999	9,098	15,811	2,075	113,181	168,311
Total deposits	40,214	39,626	27,314	19,055	18,830	25,620	58,518	17,787	232,828	479,792
Other liabilities										
Derivative instruments	1,876	3,227	1,512	1,510	1,206	3,477	6,885	8,111	–	27,804
Acceptances	14,179	2,263	104	–	–	–	–	–	–	16,546
Securities sold but not yet purchased	25,163	–	–	–	–	–	–	–	–	25,163
Securities lent or sold under repurchase agreements	53,165	1,644	290	20	–	–	–	–	–	55,119
Current tax liabilities	–	–	–	–	–	–	–	–	125	125
Deferred tax liabilities	–	–	–	–	–	–	–	–	233	233
Securitization and structured entities' liabilities	10	709	1,523	556	845	3,931	11,812	3,668	–	23,054
Other	12,616	2,536	517	43	239	752	154	2,361	13,143	32,361
Total other liabilities	107,009	10,379	3,946	2,129	2,290	8,160	18,851	14,140	13,501	180,405
Subordinated debt	–	–	–	–	–	–	–	5,029	–	5,029
Total Equity	–	–	–	–	–	–	–	–	44,354	44,354
Total Liabilities and Equity	147,223	50,005	31,260	21,184	21,120	33,780	77,369	36,956	290,683	709,580

(1) Deposits payable on demand and payable after notice have been included under no maturity.
Certain comparative figures have been reclassified to conform with the current year's presentation.

(Canadian $ in millions)	0 to 1 month	1 to 3 months	3 to 6 months	6 to 9 months	9 to 12 months	1 to 2 years	2 to 5 years	Over 5 years	No maturity	2017 Total
Off-Balance Sheet Commitments										
Commitments to extend credit (1)	1,377	2,302	4,755	8,312	14,560	21,985	71,481	2,283	–	127,055
Backstop liquidity facilities	–	–	–	–	–	–	5,044	–	–	5,044
Operating leases	31	62	91	89	87	329	712	1,032	–	2,433
Securities lending	5,336	–	–	–	–	–	–	–	–	5,336
Purchase obligations	42	83	128	124	129	519	577	157	–	1,759

(1) A large majority of these commitments expire without being drawn upon. As a result, the total contractual amounts may not be representative of the funding likely to be required for these commitments.

Material presented in a blue-tinted font above is an integral part of the 2018 annual consolidated financial statements (see page 78).

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, liquidity and funding risk, market risk, strategic and reputation risk.

Operational risk is inherent in all of our business and banking activities and can lead to significant impacts on our business and financial results, including financial loss, restatements and damage to our reputation. Like other financial services organizations that operate in multiple jurisdictions, BMO is exposed to a variety of operational risks arising 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 to risks related to outsourcing and 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 also inherent in the processes and controls we use to manage our risks. There is the possibility that errors will occur, as well as the possibility of a 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 the accuracy and completeness of any information provided by, and any other representations made by customers and counterparties. While we conduct appropriate due diligence on such customer information and, where practicable and economically feasible, engage valuation experts and other experts or sources of information to assist with assessing the value of collateral and other customer risks, our financial results may be adversely impacted if the information provided by customers or counterparties is materially misleading and this 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 a three-lines-of-defence approach in managing operational risk. Operational risk is managed by the operating groups and corporate functions as the first line of defence. This is overseen by ERPM Operational Risk Management (ORM), along with Corporate Support areas for specialized risks, 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 internal controls and limits, and identifies opportunities to strengthen our processes.

Operational Risk Governance

The Operational Risk Committee (ORC), a sub-committee of the RMC, is the primary governance committee exercising oversight of 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. The documentation that gives effect to these governing principles is reviewed on a regular basis to ensure it incorporates sound practices and is 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 and support timely and comprehensive reporting capabilities in order 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 business units, and Corporate Support areas providing additional governance and oversight in certain 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 to be 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. In addition, the ORMF defines the processes by which ORM, as the second line of defence, develops, supports, monitors, assesses and communicates with 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 across 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 set out 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 provides 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 Assessments (PRAs) and ORM reviews take a deeper view by identifying key risks and controls in our critical business processes, which may span multiple business and functional units. PRAs and ORM reviews 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 specific metrics related to their material operational risks. 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. In these assessments, internal loss data is analyzed and benchmarked against available external data. Material trends are regularly reported to the ORC, RMC and RRC so that preventative or corrective action can 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 prepares us 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 when required by law, regulation or contractual agreement, and when 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 reliance on the internet and our pervasive use of advanced digital technologies to process data, we face common banking information security risks, including the threat of potential data loss, hacking, loss or exposure of customer or employee information, 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. We have increased our investments in defensive technology, talent and processes in order to prevent or detect and manage cyber security threats within BMO operations and at our service providers. These measures include benchmarking and review of best practices across peer companies and other industries, third party assessments of our controls, evaluation of the effectiveness of our key controls and development of new controls, as needed, with ongoing investments in both technology and human resources. We also work with information security and software suppliers to bolster our internal resources and technology capabilities in order to improve our ability to remain resilient in a rapidly evolving threat landscape.

Anti-Money Laundering

Compliance with all Anti-Money Laundering, Anti-Terrorist Financing (AML/ATF) and Sanctions Measures is an essential part of safeguarding BMO, our customers and the communities in which we operate. BMO is committed to managing AML/ATF and sanctions risks prudently, and complying with all legal and regulatory requirements. Risks related to non-compliance with these requirements can include enforcement actions, legal actions and damage to our reputation. Our AML/ATF and sanctions program promotes effective governance and oversight across all BMO businesses, so that we are able to take appropriate 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 and sanctions risks, and is carried out by employees who use analytics, technology and their professional expertise in order 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, in conjunction with the Standardized Approach in certain areas, regulatory capital requirements for managing operational risk. The AMA Capital Model employs 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 that include operating group, business activity and event type. Minimum enterprise operational risk capital is determined at a specific upper confidence limit of the enterprise total loss distribution. 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. Scenario analyses are also conducted 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. We are monitoring regulatory capital developments on the replacement of AMA with a new Standardized Measurement Approach.

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.

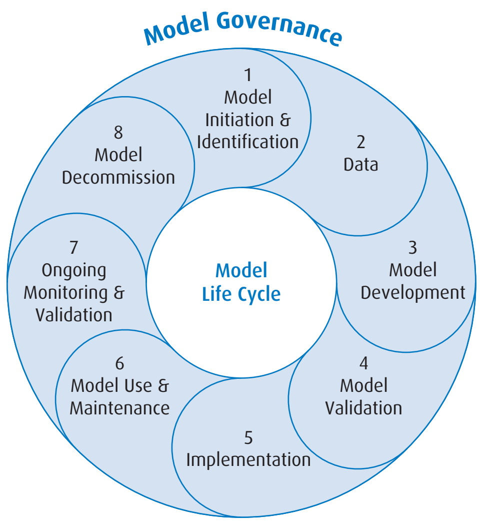
Models are quantitative tools that apply statistical, economic and other quantitative techniques and assumptions to process input data and generate quantitative estimates. BMO uses models ranging from very simple models that produce straightforward estimates to highly sophisticated models that value complex transactions or generate 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 assess 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 and limitations, while controlling and mitigating 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 in order to provide reasonable results.

Model Risk Management

Risk is inherent in models because model results are estimates that rely on data and statistical techniques to simulate reality or provide forecasts of future outcomes. Model risk also arises from the potential for 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 the limits of 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 group and the Model Governance group 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, our model inventory, and the overall aggregation and assessment of model risk. The Model Risk Management Committee (MRMC), a sub-committee of the RMC, is a cross-functional group representing all key stakeholders across the enterprise. 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, in addition to 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 purpose and desired functionality of the models, and have overall responsibility for ensuring that each model complies with BMO's framework and approved terms of use. Model developers act as agents of 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 a model's 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 purpose without giving rise to material model risk. They provide observations as guidance for model owners, users and developers that may lead to remediation or mitigation of model issues. Approval from the Model Valuation group is required before a model can be used, unless an exception is obtained in accordance with the framework. 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 tool will not be subject to the framework, but nevertheless, the developers and users of such methodology or tool are expected to provide appropriate documentation and arrange for effective independent review and challenge by knowledgeable BMO employees and managers.

Model Use and Monitoring

Model owners and users are accountable for the appropriate use of models in business decision-making, which includes having an understanding of the assumptions and limitations of the models, 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, periodic reviews and revaluation as appropriate. 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.

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 observed outcomes are measured against defined risk materiality thresholds. To ensure that variances remain within the defined 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, which helps to ensure that appropriate controls are in place in order to address identified issues and enhances a model's overall performance.

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

Credit Risk – The Model Risk Guidelines include clear 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 PD credit risk models are subject to quarterly performance monitoring. This comprehensive monitoring involves prescribed tests and analyses that assess discriminatory power, calibration and population stability. Overall model performance assessment is based on all individual testing results, as well as other qualitative considerations, such as user feedback, performance trends and mitigants that are in place. 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. This ongoing validation is conducted annually to confirm that the models are performing as intended and continue to be fit for use, and the conclusions are reported to senior management.

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.

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 results of the bank's internal VaR model are 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 and 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 is used to monitor the quality and accuracy of the internal VaR model results and assist 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 or 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 resulting from a failure to comply with laws or satisfy contractual obligations or regulatory requirements. This includes the risks of failure 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 manage our exposure to legal and regulatory risk prudently. The financial services industry is highly regulated, and we anticipate intense ongoing scrutiny from our supervisors and strict enforcement of legal and 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 BMO's General Counsel, our Legal and Compliance Group maintains enterprise-wide frameworks that identify, measure, manage, monitor and report on legal and regulatory issues. We identify applicable laws and regulations and potential risks, recommend mitigation strategies and actions, conduct internal investigations and oversee litigation and enforcement actions. We are 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. We are required to disclose material litigation to which we are party. Our disclosure controls and procedures are designed to provide reasonable assurance that all relevant information is gathered and reported to senior management on a timely basis so that appropriate decisions can be made regarding public disclosure. In assessing the materiality of litigation, factors considered include a case-by-case assessment of specific facts and circumstances, our past experience and the opinions of legal experts. We are currently party to litigation involving certain of our insurance products, which has been the subject of recent media attention. The court will be asked to consider new regulations recently published by the Saskatchewan government confirming that such insurance products may not be used for the purpose sought by the plaintiff. We have concluded that this litigation is not material. Another area of focus is the oversight of fiduciary risk related to any of BMO's businesses that provide products or services giving rise to fiduciary duties, as well as policies and practices that address the responsibilities of a business to a customer (including service requirements and expectations, customer suitability determinations, and disclosure obligations and communications).

Safeguarding our customers, employees, information and assets from exposure to criminal risk is an important priority. Criminal risk is the potential for loss or harm resulting from a failure 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 a robust Criminal Risk Framework designed to prevent, detect, respond to and report on exposure to criminal risk using a three-lines-of-defence approach, as well as through enhanced centralized management and oversight. BMO has conducted a review of a previously announced cyber incident where fraudsters claimed to be in possession of personal and financial information of a limited number of customers. We are committed to protecting customer information and privacy, and we have worked directly with impacted customers to protect their accounts. Three related class actions have been filed against BMO on behalf of customers who allege their personal information was disclosed as a result of the cyber incident. At this time, only one of the three lawsuits is proceeding, with a certification motion scheduled for 2019. For additional information regarding BMO's operational risk management practices, including with respect to cyber security, please see Operational Risk in the Enterprise-Wide Risk Management section on page 109.

As governments globally seek to curb corruption and counter its negative effects on political stability, sustainable economic development, international trade and investment and 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. These include guidance on both identifying and avoiding corrupt practices and rigorously investigating allegations of corrupt activity.

Governments and regulators around the world continue to focus on anti-money laundering and related concerns, raising their expectations concerning the quality and efficacy of anti-money laundering programs and penalizing institutions that fail to meet these expectations. Under the direction of the Chief Anti-Money Laundering Officer, BMO's Anti-Money Laundering Office is responsible for the governance, oversight and assessment of principles and procedures designed to help ensure compliance with legal and regulatory requirements and internal risk parameters related to anti-money laundering, anti-terrorist financing and sanctions measures. For additional discussion regarding BMO's operational risk management practices with respect to anti-money laundering, please see the Anti-Money Laundering section on page 110.

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 Legal and Compliance units 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, Legal and Compliance assesses and analyzes the implications of regulatory changes. We devote substantial resources to the implementation of systems and processes required to comply with new regulations while also helping us meet the needs and demands of our customers. 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 damage to our reputation.

Our ethical culture influences how we conduct ourselves, enabling us to deliver positive outcomes for our customers and contribute to the orderly operation of financial markets. Misconduct is behaviour that falls short of legal, professional, internal conduct and ethical standards. Our management approach to culture and conduct is centred on the key themes of our people, customers and markets. We manage and mitigate the potential for misconduct through various risk management processes and procedures using their information and insights to develop an enterprise perspective.

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), which are discussed in further detail below. 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 100. For additional discussion of the impact of certain potential changes in fiscal policy and tax legislation on our results, please see Critical Accounting Estimates – Income Taxes and Deferred Tax Assets on page 119, Tax Legislation and Interpretations on page 80 and General Economic Conditions and Fiscal and Monetary Policies in the Countries in Which We Conduct Business on page 80.

Bank Resolution and Bail-In – In June 2016, legislation required to implement a Bank Recapitalization (Bail-In) Regime was passed by the Canadian government in order to enhance Canada's bank resolution capabilities, in line with international efforts in this area. Final regulations implementing the Bail-In Regime took effect in September 2018. The related total loss-absorbing capacity (TLAC) requirements take effect in November 2021. For additional discussion of the Bail-In Regime and TLAC requirements, please refer to the Enterprise-Wide Capital Management section starting on page 69 and the Liquidity and Funding Risk section starting on page 100.

Housing Market Reforms – In October 2017, OSFI published the final version of Guideline B-20 – Residential Mortgage Underwriting Practices and Procedures. The revised Guideline came 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 a focus on the minimum qualifying rate for uninsured mortgages, expectations related to loan-to-value (LTV) frameworks and limits, and restrictions on transactions designed to circumvent those LTV limits.

Federal Financial Sector Legislation – In October 2018, in connection with its previously tabled budget, the government of Canada introduced legislation: amending the *Bank Act* to strengthen the financial consumer protection framework, with enhancements in the areas of corporate governance, responsible business conduct, disclosure and customer redress; amending the *Financial Consumer Agency of Canada Act* to strengthen the mandate and powers of the Financial Consumer Agency of Canada; and enacting the *Pay Equity Act* to redress systemic gender-based discrimination by requiring federal public and private sector employers to establish and maintain a pay equity plan within set time frames. Implementing regulations are still required, regarding earlier amendments to the *Bank Act*, which would allow banks to undertake broader financial technology activities.

U.S. Regulatory Reform – In May 2018, the U.S. Congress passed the *Economic Growth, Regulatory Relief, and Consumer Protection Act* (EGRRCP), which made reforms to Dodd-Frank, including raising the threshold for heightened prudential standards, and changes to certain exemptions to restrictions on proprietary trading and the ownership and sponsorship of private investment funds by banks and their affiliates. The bank continues to monitor EGRRCP rulemaking activities by applicable agencies.

Other Regulatory Initiatives Impacting Financial Services in Canada – Federal and provincial regulators continue to focus on issues relating to consumer protection, including with respect to seniors and retail investors, OTC derivatives and advisor conduct. Recent amendments to federal privacy legislation set out privacy breach reporting requirements. For additional discussion regarding privacy, please see the Risks That May Affect Future Results – Top and Emerging Risks That May Affect Future Results – Cyber Security, Information Security and Privacy Risk section in the Enterprise-Wide Risk Management section on page 79.

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, the European Union, Hong Kong, Singapore 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 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.

United Kingdom and European Union Regulatory Reform – The political and legislative processes continue with respect to the United Kingdom's (U.K.'s) withdrawal from the European Union (EU). The General Data Protection Regulation came into effect in the EU in May 2018, establishing guidelines for the collection, processing and management of personal information of individuals within the EU. Effective December 2019, the U.K.'s Prudential Regulation Authority and Financial Conduct Authority will extend the senior managers and certification regime to all regulated firms. The London Interbank Offered Rate (LIBOR), Euro Interbank Offered Rate and other rates and indices are the subject of national, international and other regulatory guidance and proposals for reform. For additional discussion regarding the impact of the United Kingdom's withdrawal from the EU and benchmark reform, please see Risks That May Affect Future Results – Other Factors That May Affect Future Results – Regulatory Requirements and Benchmark Interest Rate Reform, respectively, in the Enterprise-Wide Risk Management section on pages 80 and 81.

The General Counsel and the Chief Compliance Officer regularly report to the Audit and Conduct Review Committee (ACRC) of the Board and senior management on the effectiveness of our Enterprise Compliance Program. The Program uses a risk-based approach to identify, assess and manage compliance with applicable legal and regulatory requirements. The Program directs operating groups and Corporate Support areas to maintain compliance policies, procedures and controls that meet these requirements. Under the direction of the Chief Compliance Officer, we identify and report on gaps and deficiencies, and track 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 policies, standards and procedures. This is done in conjunction with our Code of Conduct training, which tests employees' knowledge and understanding of the behaviour required of 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 respond appropriately 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 from 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 limited 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 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 involves 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 contribute to a deeper sense of responsibility that informs all aspects of our business strategy.

BMO's Sustainability Council, chaired by BMO's General Counsel, is comprised of senior leaders from business and Corporate Support areas across our organization, and provides oversight and leadership for our sustainability strategy.

The Sustainability Office is responsible for coordinating the development and maintenance of an enterprise-wide strategy that meets BMO's overarching environmental and social responsibilities. The Sustainability Office works in partnership with the lines of business and Corporate Support areas to manage environmental and social risk within our business, and works with external stakeholders to better understand the consequences and impacts of our operations and financing decisions.

BMO's Procurement and Corporate Real Estate groups are responsible for establishing environmental management processes. Within Corporate Real Estate, the Environmental Sustainability group is responsible for establishing and maintaining an operational environmental management system that is aligned with the framework set out in ISO 14001, and for setting objectives and targets that are related to aligning the bank's operations with its Environmental Policy.

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 risks for specific lines of business. To limit our potential 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. BMO has been a signatory to the Equator Principles since 2005 and applies its credit risk management framework to identify, assess and manage the environmental and social risk of transactions within its scope. We also apply environmental and social screening procedures 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-standing signatory to and participant in the Carbon Disclosure Project – a global initiative that gathers and publishes corporate disclosure on greenhouse gas emissions and climate change. We also support the recommendations of the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD), and we continue to investigate and assess climate-related risks and improve our climate-related disclosures.

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

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 publicly report under the United Kingdom *Modern Slavery Act 2015*, and our Supplier Code of Conduct reflects this legislation.

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 monitor and evaluate policy and legislative changes in the jurisdictions in which we operate. We publicly report on our environmental and social performance and targets in our annual Environmental, Social and Governance (ESG) Report and Public Accountability Statement (PAS), and on our website at https://www.bmo.com/home/about/banking/corporate-responsibility/our-approach/reporting#esg_pas. 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 can 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 and trust.

We manage risks to our reputation by considering the potential reputational impact of all business activities, including strategy development and implementation, transactions and initiatives, events or incidents impacting BMO, as well as day-to-day decision-making and conduct. We consider our reputation in everything that we do.

BMO's Code of Conduct is the foundation of our ethical culture and it provides employees with guidance on the behaviour that is expected of them, so that they can make the right choice in decisions that affect our customers and stakeholders. Continual reinforcement of the principles set out in the Code of Conduct minimizes risks to our reputation that may result from poor decisions or behaviour.

Our corporate governance practices and enterprise risk management framework have various controls in place that support the management of risks to our reputation. We seek to identify activities or events that could impact our reputation, including events with large-scale impact through the media or otherwise. Where we identify a potential risk to our reputation, we take steps to assess and manage that risk. Instances of significant or heightened exposure to reputation risk are escalated to BMO's Reputation Risk Management Committee for review. As misconduct can impact our reputation, the Chief Ethics and Conduct Officer is responsible for enterprise-wide reporting on our corporate culture and our employees' conduct, and reports on cases of misconduct to BMO's Reputation Risk Management Committee, as appropriate.