

Management's Discussion and Analysis

November 29, 2022

The following Management's Discussion and Analysis (MD&A) presents the financial condition and operating results of National Bank of Canada (the Bank). This analysis was prepared in accordance with the requirements set out in *National Instrument 51-102, Continuous Disclosure Obligations*, released by the Canadian Securities Administrators (CSA). It is based on the audited annual consolidated financial statements for the year ended October 31, 2022 (the consolidated financial statements) and prepared in accordance with International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board (IASB), unless otherwise indicated. IFRS represent Canadian generally accepted accounting principles (GAAP). This MD&A should be read in conjunction with the consolidated financial statements and accompanying notes for the year ended October 31, 2022. All amounts are presented in Canadian dollars. Additional information about the Bank, including the *Annual Information Form*, can be obtained from the Bank's website at nbc.ca and SEDAR's website at sedar.com. The information found in the various documents and reports published by the Bank or the information available on the Bank's website and mentioned herein is not and should not be considered incorporated by reference into the *2022 Annual Report*, the Management's Discussion and Analysis, or the Consolidated Financial Statements, unless expressly stated otherwise.

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Caution Regarding Forward-Looking Statements

Certain statements in this document are forward-looking statements. All such statements are made in accordance with applicable securities legislation in Canada and the United States. Forward-looking statements in this document may include, but are not limited to, statements with respect to the economy—particularly the Canadian and U.S. economies—market changes, the Bank's objectives, outlook and priorities for fiscal year 2023 and beyond, the strategies or actions that will be taken to achieve them, expectations for the Bank's financial condition, the regulatory environment in which it operates, the impacts of—and the Bank's response to—the COVID-19 pandemic, and certain risks it faces. These forward-looking statements are typically identified by verbs or words such as "outlook", "believe", "foresee", "forecast", "anticipate", "estimate", "project", "expect", "intend" and "plan", in their future or conditional forms, notably verbs such as "will", "may", "should", "could" or "would" as well as similar terms and expressions. Such forward-looking statements are made for the purpose of assisting the holders of the Bank's securities in understanding the Bank's financial position and results of operations as at and for the periods ended on the dates presented, as well as the Bank's vision, strategic objectives, and financial performance targets, and may not be appropriate for other purposes. These forward-looking statements are based on current expectations, estimates, assumptions and intentions and are subject to uncertainty and inherent risks, many of which are beyond the Bank's control.

Assumptions about the performance of the Canadian and U.S. economies in 2023 and how that performance will affect the Bank's business are among the main factors considered in setting the Bank's strategic priorities and objectives, including provisions for credit losses. In determining its expectations for economic conditions, both broadly and in the financial services sector in particular, the Bank primarily considers historical economic data provided by the governments of Canada, the United States and certain other countries in which the Bank conducts business, as well as their agencies.

Statements about the economy, market changes, and the Bank's objectives, outlook and priorities for fiscal 2023 and thereafter are based on a number of assumptions and are subject to risk factors, many of which are beyond the Bank's control and the impacts of which are difficult to predict. These risk factors include, among others, the general economic environment and financial market conditions in Canada, the United States, and other countries where the Bank operates; exchange rate and interest rate fluctuations; inflation; disruptions in global supply chains; higher funding costs and greater market volatility; changes made to fiscal, monetary, and other public policies; changes made to regulations that affect the Bank's business; geopolitical and sociopolitical uncertainty; the transition to a low-carbon economy and the Bank's ability to satisfy stakeholder expectations on environmental and social issues; significant changes in consumer behaviour; the housing situation, real estate market, and household indebtedness in Canada; the Bank's ability to achieve its long-term strategies and key short-term priorities; the timely development and launch of new products and services; the Bank's ability to recruit and retain key personnel; technological innovation and heightened competition from established companies and from competitors offering non-traditional services; changes in the performance and creditworthiness of the Bank's clients and counterparties; the Bank's exposure to significant regulatory matters or litigation; changes made to the accounting policies used by the Bank to report financial information, including the uncertainty inherent to assumptions and critical accounting estimates; changes to tax legislation in the countries where the Bank operates, i.e., primarily Canada and the United States; changes made to capital and liquidity guidelines as well as to the presentation and interpretation thereof; changes to the credit ratings assigned to the Bank; potential disruptions to key suppliers of goods and services to the Bank; potential disruptions to the Bank's information technology systems, including evolving cyberattack risk as well as identity theft and theft of personal information; the risk of fraudulent activity; and possible impacts of major events affecting the local and global economies, including international conflicts, natural disasters, and public health crises such as the COVID-19 pandemic, the evolution of which is difficult to predict and could continue to have repercussions on the Bank.

There is a strong possibility that the Bank's express or implied predictions, forecasts, projections, expectations or conclusions will not prove to be accurate, that its assumptions may not be confirmed and that its vision, strategic objectives and financial performance targets will not be achieved. The Bank recommends that readers not place undue reliance on forward-looking statements, as a number of factors could cause actual results to differ significantly from the expectations, estimates or intentions expressed in these forward-looking statements. These risk factors include credit risk, market risk, liquidity and funding risk, operational risk, regulatory compliance risk, reputation risk, strategic risk, environmental and social risk, and certain emerging risks or risks deemed significant, all of which are described in greater detail in the Risk Management section beginning on page 65 of the *2022 Annual Report*.

The foregoing list of risk factors is not exhaustive. Additional information about these risk factors is provided in the Risk Management section of the *2022 Annual Report*. Investors and others who rely on the Bank's forward-looking statements should carefully consider the above factors as well as the uncertainties they represent and the risk they entail. Except as required by law, the Bank does not undertake to update any forward-looking statements, whether written or oral, that may be made from time to time, by it or on its behalf. The Bank cautions investors that these forward-looking statements are not guarantees of future performance and that actual events or results may differ significantly from these statements due to a number of factors.

Financial Reporting Method

The Bank's consolidated financial statements are prepared in accordance with IFRS, as issued by the IASB. The financial statements also comply with section 308(4) of the *Bank Act* (Canada), which states that, except as otherwise specified by the Office of the Superintendent of Financial Institutions (Canada) (OSFI), the consolidated financial statements are to be prepared in accordance with IFRS, which represent Canadian GAAP. None of the OSFI accounting requirements are exceptions to IFRS.

The presentation of segment disclosures is consistent with the presentation adopted by the Bank for the fiscal year beginning November 1, 2021. This presentation reflects the fact that the loan portfolio comprising borrowers in the "Oil and gas" and "Pipelines" sectors as well as related activities, which had previously been reported in the Personal and Commercial segment, are now reported in the Financial Markets segment. The Bank made this change to better align the monitoring of its activities with its management structure.

In addition, a change in accounting policy, as described in the Accounting Policy Changes section of Note 1 to the consolidated financial statements, was applied retrospectively during the year ended October 31, 2022 after the International Financial Reporting Interpretations Committee (IFRIC) issued a final agenda decision on accounting for the costs of configuring or customizing a supplier's software in a cloud computing arrangement. The figures for the year ended October 31, 2021 have been adjusted to reflect this change in accounting policy.

Non-GAAP and Other Financial Measures

The Bank uses a number of financial measures when assessing its results and measuring overall performance. Some of these financial measures are not calculated in accordance with GAAP. *Regulation 52-112 respecting Non-GAAP and Other Financial Measures Disclosure* (Regulation 52-112) prescribes disclosure requirements that apply to the following measures used by the Bank:

- non-GAAP financial measures;
- non-GAAP ratios;
- supplementary financial measures;
- capital management measures.

Non-GAAP Financial Measures

The Bank uses non-GAAP financial measures that do not have standardized meanings under GAAP and that therefore may not be comparable to similar measures used by other companies. Presenting non-GAAP financial measures helps readers to better understand how management analyzes results, shows the impacts of specified items on the results of the reported periods, and allows readers to better assess results without the specified items if they consider such items not to be reflective of the underlying performance of the Bank's operations. In addition, like many other financial institutions, the Bank uses the taxable equivalent basis to calculate net interest income, non-interest income, and income taxes. This calculation method consists of grossing up certain tax-exempt income (particularly dividends) by the income tax that would have been otherwise payable. An equivalent amount is added to income taxes. This adjustment is necessary in order to perform a uniform comparison of the return on different assets regardless of their tax treatment.

The key non-GAAP financial measures used by the Bank to analyze its results are described below, and a quantitative reconciliation of these measures is presented in the tables in the Reconciliation of Non-GAAP Financial Measures section on pages 20 and 21 and in the Consolidated Results table on page 27. It should be noted that, for the year ended October 31, 2022, no specified items have been excluded from results, whereas an amount of \$9 million in intangible asset impairment losses (\$7 million net of income taxes) related to technology developments had been excluded as specified items for the year ended October 31, 2021.

Adjusted Net Interest Income

This item represents net interest income on a taxable equivalent basis and excluding specified items, if any. A taxable equivalent is added to net interest income so that the performance of the various assets can be compared irrespective of their tax treatment, and specified items, if any, are excluded so that net interest income can be better evaluated by excluding items that management believes do not reflect the underlying financial performance of the Bank's operations.

Adjusted Non-Interest Income

This item represents non-interest income on a taxable equivalent basis and excluding specified items, if any. A taxable equivalent is added to non-interest income so that the performance of the various assets can be compared irrespective of their tax treatment, and specified items, if any, are excluded so that non-interest income can be better evaluated by excluding items that management believes do not reflect the underlying financial performance of the Bank's operations.

Adjusted Total Revenues

This item represents total revenues on a taxable equivalent basis and excluding specified items, if any. It consists of adjusted net interest income and adjusted non-interest income. A taxable equivalent is added to total revenues so that the performance of the various assets can be compared irrespective of their tax treatment, and specified items, if any, are excluded so that total revenues can be better evaluated by excluding items that management believes do not reflect the underlying financial performance of the Bank's operations.

Adjusted Non-Interest Expenses

This item represents non-interest expenses excluding specified items, if any. Specified items, if any, are excluded so that non-interest expenses can be better evaluated by excluding items that management believes do not reflect the underlying financial performance of the Bank's operations.

Adjusted Income Before Provisions for Credit Losses and Income Taxes

This item represents income before provisions for credit losses and income taxes on a taxable equivalent basis and excluding specified items, if any. It also represents the difference between adjusted total revenues and adjusted non-interest expenses. A taxable equivalent is added to income before provisions for credit losses and income taxes so that the performance of the various assets can be compared irrespective of their tax treatment, and specified items, if any, are excluded so that income before provisions for credit losses and income taxes can be better evaluated by excluding items that management believes do not reflect the underlying financial performance of the Bank's operations.

Adjusted Income Taxes

This item represents income taxes on a taxable equivalent basis and excluding income taxes on specified items, if any.

Adjusted Net Income

This item represents net income excluding specified items, if any. Specified items, if any, are excluded so that net income can be better evaluated by excluding items that management believes do not reflect the underlying financial performance of the Bank's operations.

Adjusted Net Income Attributable to Common Shareholders

This item represents net income attributable to common shareholders excluding specified items, if any. Specified items, if any, are excluded so that net income attributable to common shareholders can be better evaluated by excluding items that management believes do not reflect the underlying financial performance of the Bank's operations.

Adjusted Basic Earnings Per Share

This item represents basic earnings per share excluding specified items, if any. Specified items, if any, are excluded so that basic earnings per share can be better evaluated by excluding items that management believes do not reflect the underlying financial performance of the Bank's operations.

Adjusted Diluted Earnings Per Share

This item represents diluted earnings per share excluding specified items, if any. Specified items, if any, are excluded so that diluted earnings per share can be better evaluated by excluding items that management believes do not reflect the underlying financial performance of the Bank's operations.

The Bank also uses the below-described measures to assess its results. A quantitative reconciliation of these non-GAAP financial measures is presented in the tables of the Reconciliation of Non-GAAP Financial Measures section on pages 20 and 21 and in Table 5 on page 115.

Adjusted Non-Trading Net Interest Income

This item represents non-trading net interest income on a taxable equivalent basis. It includes revenues related to financial assets and financial liabilities associated with non-trading activities, net of interest expenses and interest income related to the financing of these financial assets and liabilities, and is used to calculate adjusted non-trading net interest margin. A taxable equivalent is added to non-trading net interest income so that the performance of the various assets can be compared irrespective of their tax treatment.

Net Interest Income From Trading Activities on a Taxable Equivalent Basis

This item represents net interest income from trading activities plus a taxable equivalent. It comprises dividends related to financial assets and liabilities associated with trading activities, net of interest expenses and interest income related to the financing of these financial assets and liabilities. A taxable equivalent is added to net interest income from trading activities so that the performance of the various assets can be compared irrespective of their tax treatment.

Non-Interest Income Related to Trading Activities on a Taxable Equivalent Basis

This item represents non-interest income related to trading activities to which a taxable equivalent amount is added. It consists of realized and unrealized gains and losses as well as interest income on securities measured at fair value through profit or loss, income from held-for-trading derivative financial instruments, changes in the fair value of loans at fair value through profit or loss, changes in the fair value of financial instruments designated at fair value through profit or loss, certain commission income, other trading activity revenues, and any applicable transaction costs. A taxable equivalent amount is added to the non-interest income related to trading activities such that the returns of different assets can be compared regardless of their tax treatment.

Trading Activity Revenues on a Taxable Equivalent Basis

This item represents trading activity revenues plus a taxable equivalent. They comprise dividends related to financial assets and liabilities associated with trading activities, net of interest expenses and interest income related to the financing of these financial assets and liabilities, realized and unrealized gains and losses, and interest income on securities measured at fair value through profit or loss, income from held-for-trading derivative financial instruments, changes in the fair value of loans at fair value through profit or loss, changes in the fair value of financial instruments designated at fair value through profit or loss, certain commission income, other trading activity revenues, and any applicable transaction costs. A taxable equivalent is added to trading activity revenues so that the performance of the various assets can be compared irrespective of their tax treatment.

Non-GAAP Ratios

The Bank uses non-GAAP ratios that do not have standardized meanings under GAAP and that may therefore not be comparable to similar measures used by other companies. A non-GAAP ratio is a ratio in which at least one component is a non-GAAP financial measure. The Bank uses non-GAAP ratios to present aspects of its financial performance or financial position.

The key non-GAAP ratios used by the Bank are described below.

Adjusted Return on Common Shareholders' Equity (ROE)

This item represents ROE excluding specified items, if any. It is adjusted net income attributable to common shareholders expressed as a percentage of average equity attributable to common shareholders. It is a general measure of the Bank's efficiency in using equity. Specified items, if any, are excluded so that ROE can be better evaluated by excluding items that management believes do not reflect the underlying financial performance of the Bank's operations.

Adjusted Dividend Payout Ratio

This item represents the dividend payout ratio excluding specified items, if any. It is dividends on common shares (per share amount) expressed as a percentage of adjusted basic earnings per share. This ratio is a measure of the proportion of earnings that is paid out to shareholders in the form of dividends. Specified items, if any, are excluded so that the dividend payout ratio can be better evaluated by excluding items that management believes do not reflect the underlying financial performance of the Bank's operations.

Adjusted Operating Leverage

This item represents operating leverage on a taxable equivalent basis and excluding specified items, if any. It is the difference between the growth rate of adjusted total revenues and the growth rate of adjusted non-interest expenses, and it measures the sensitivity of the Bank's results to changes in its revenues. Adjusted operating leverage is presented on a taxable equivalent basis so that the performance of the various assets can be compared irrespective of their tax treatment, and specified items, if any, are excluded so that the efficiency ratio can be better evaluated by excluding items that management believes do not reflect the underlying financial performance of the Bank's operations.

Adjusted Efficiency Ratio

This item represents the efficiency ratio on a taxable equivalent basis and excluding specified items, if any. The ratio represents adjusted non-interest expenses expressed as a percentage of adjusted total revenues. It measures the efficiency of the Bank's operations. The adjusted efficiency ratio is presented on a taxable equivalent basis so that the performance of the various assets can be compared irrespective of their tax treatment, and specified items, if any, are excluded so that the efficiency ratio can be better evaluated by excluding items that management believes do not reflect the underlying financial performance of the Bank's operations.

Adjusted Net Interest Margin, Non-Trading

This item represents the non-trading net interest margin on a taxable equivalent basis. It is calculated by dividing net interest income related to adjusted non-trading activities by average non-trading interest-bearing assets. This ratio is a measure of the profitability of non-trading activities. The adjusted non-trading net interest margin includes adjusted non-trading net interest income, which includes a taxable equivalent amount so that the performance of the various assets can be compared irrespective of their tax treatment.

Supplementary Financial Measures

A supplementary financial measure is a financial measure that: (a) is not reported in the Bank's consolidated financial statements, and (b) is, or is intended to be, reported periodically to represent historical or expected financial performance, financial position, or cash flows. The composition of these supplementary financial measures is presented in table footnotes or in the Glossary section on pages 122 to 125 of this MD&A.

Capital Management Measures

The financial reporting framework used to prepare the financial statements requires disclosure that helps readers assess the Bank's capital management objectives, policies, and processes, as set out in IFRS in IAS 1 – *Presentation of Financial Statements*. The Bank has its own methods for managing capital and liquidity, and IFRS does not prescribe any particular calculation method. These measures are calculated using various guidelines and advisories issued by OSFI, which are based on the standards, recommendations, and best practices of the Basel Committee on Banking Supervision (BCBS), as presented in the following table.

OSFI guideline or advisory	Measure
Capital Adequacy Requirements	Common Equity Tier 1 (CET1) capital ratio Tier 1 capital ratio Total capital ratio CET1 capital Tier 1 capital Tier 2 capital Total capital Risk-weighted assets Maximum credit risk exposure under the Basel asset classes
Leverage Requirements	Leverage ratio Total exposure
Total Loss Absorbing Capacity (TLAC)	Key indicators – TLAC requirements Available TLAC TLAC ratio TLAC leverage ratio
Liquidity Adequacy Requirements	Liquid asset portfolio Encumbered assets and unencumbered assets Liquidity coverage ratio (LCR) High-quality liquid assets (HQLA) Cash inflows/outflows and net cash outflows Net stable funding ratio (NSFR) Available stable funding items Required stable funding items
Global Systemically Important Banks (G-SIBs) – Public Disclosure Requirements	G-SIB indicators

Reconciliation of Non-GAAP Financial Measures

Presentation of Results – Adjusted

Year ended October 31

(millions of Canadian dollars)

						2022	2021 ⁽¹⁾
	Personal and Commercial	Wealth Management	Financial Markets	USSF&I	Other		
Net interest income	2,865	594	1,029	1,090	(307)	5,271	4,783
Taxable equivalent	–	–	229	–	5	234	181
Net interest income – Adjusted	2,865	594	1,258	1,090	(302)	5,505	4,964
Non-interest income	1,169	1,781	1,162	20	249	4,381	4,144
Taxable equivalent	–	–	48	–	–	48	8
Non-interest income – Adjusted	1,169	1,781	1,210	20	249	4,429	4,152
Total revenues – Adjusted	4,034	2,375	2,468	1,110	(53)	9,934	9,116
Non-interest expenses	2,149	1,391	1,022	344	324	5,230	4,903
Impairment losses on intangible assets ⁽²⁾	–	–	–	–	–	–	(9)
Non-interest expenses – Adjusted	2,149	1,391	1,022	344	324	5,230	4,894
Income before provisions for credit losses and income taxes – Adjusted	1,885	984	1,446	766	(377)	4,704	4,222
Provisions for credit losses	97	3	(23)	66	2	145	2
Income before income taxes – Adjusted	1,788	981	1,469	700	(379)	4,559	4,220
Income taxes	474	260	112	143	(95)	894	882
Taxable equivalent	–	–	277	–	5	282	189
Income taxes related to impairment losses on intangible assets ⁽²⁾	–	–	–	–	–	–	2
Income taxes – Adjusted	474	260	389	143	(90)	1,176	1,073
Net income – Adjusted	1,314	721	1,080	557	(289)	3,383	3,147
Specified items after income taxes	–	–	–	–	–	–	(7)
Net income	1,314	721	1,080	557	(289)	3,383	3,140
Non-controlling interests	–	–	–	–	(1)	(1)	–
Net income attributable to the Bank's shareholders and holders of other equity instruments	1,314	721	1,080	557	(288)	3,384	3,140
Net income attributable to the Bank's shareholders and holders of other equity instruments – Adjusted	1,314	721	1,080	557	(288)	3,384	3,147
Dividends on preferred shares and distributions on limited recourse capital notes						107	123
Net income attributable to common shareholders – Adjusted						3,277	3,024

(1) Certain amounts have been adjusted to reflect an accounting policy change applicable to cloud computing arrangements. For additional information, see Note 1 to the consolidated financial statements.

(2) During the year ended October 31, 2021, the Bank recorded \$9 million (\$7 million net of income taxes) in intangible asset impairment losses related to technology developments, which were considered a specified item.

Presentation of Basic and Diluted Earnings per Share – Adjusted

Year ended October 31

(Canadian dollars)

	2022	2021 ⁽¹⁾
Basic earnings per share	\$ 9.72	\$ 8.95
Impairment losses on intangible assets ⁽²⁾	–	0.02
Basic earnings per share – Adjusted	\$ 9.72	\$ 8.97
Diluted earnings per share	\$ 9.61	\$ 8.85
Impairment losses on intangible assets ⁽²⁾	–	0.02
Diluted earnings per share – Adjusted	\$ 9.61	\$ 8.87

(1) Certain amounts have been adjusted to reflect an accounting policy change applicable to cloud computing arrangements. For additional information, see Note 1 to the consolidated financial statements.

(2) During the year ended October 31, 2021, the Bank recorded \$9 million (\$7 million net of income taxes) in intangible asset impairment losses related to technology developments, which were considered a specified item.

Presentation of Non-Trading Net Interest Income – Adjusted

Year ended October 31

(millions of Canadian dollars)

	2022	2021
Net interest income – Adjusted	5,505	4,964
Net interest income related to trading activities on a taxable equivalent basis	911	948
Net interest income, non-trading – Adjusted	4,594	4,016

Financial Disclosure

Disclosure Controls and Procedures

The Bank's financial information is prepared with the support of a set of disclosure controls and procedures (DC&P) that are implemented by the President and Chief Executive Officer (CEO) and by the Chief Financial Officer and Executive Vice-President, Finance (CFO). During the year ended October 31, 2022, in accordance with *Regulation 52-109 Respecting Certification of Disclosure in Issuers' Annual and Interim Filings* (Regulation 52-109) released by the CSA, the design and operation of these controls and procedures were evaluated to determine their effectiveness.

As at October 31, 2022, the CEO and the CFO confirmed the effectiveness of the DC&P. These controls are designed to provide reasonable assurance that the information disclosed in annual and interim filings and in other reports filed or submitted under securities legislation is recorded, processed, summarized, and reported within the time periods specified by that legislation. These controls and procedures are also designed to ensure that such information is accumulated and communicated to the Bank's management, including its signing officers, as appropriate, to allow for timely decisions regarding disclosure.

This *Annual Report* was reviewed by the Bank's Disclosure Committee, Audit Committee, and the Board of Directors (the Board), which approved it prior to publication.

Internal Control Over Financial Reporting

The internal control over financial reporting (ICFR) is designed to provide reasonable assurance that the financial information presented is reliable and that the consolidated financial statements were prepared in accordance with GAAP, which are based on IFRS, unless indicated otherwise as explained on pages 16 to 21 of this MD&A. Due to inherent limitations of internal controls, the ICFR may not prevent or detect all misstatements in a timely manner.

The CEO and the CFO oversaw the evaluation work performed on the design and operation of the Bank's ICFR in accordance with Regulation 52-109. The ICFR was evaluated in accordance with the control framework of the Committee of Sponsoring Organizations of the Treadway Commission (COSO — 2013) for financial controls and in accordance with the control framework of the Control Objectives for Information and Related Technologies (COBIT) for general information technology controls.

Based on the evaluation results, the CEO and CFO concluded, as at October 31, 2022, that there are no material weaknesses, that the ICFR is effective and provides reasonable assurance that the financial reporting is reliable, and that the Bank's consolidated financial statements were prepared in accordance with GAAP.

Changes to Internal Control Over Financial Reporting

On February 1, 2022, the Bank deployed a new integrated accounting software package, and certain processes that affect ICFR were modified. The Bank has assessed the impact of this deployment and has made sure that the key controls affected and the newly implemented controls are well designed and effective.

The CEO and CFO also undertook work that enabled them to conclude that, during the year ended October 31, 2022, aside from the above-described change, no changes were made to the ICFR that have materially affected, or are reasonably likely to materially affect, the design or operation of the ICFR.

Disclosure Committee

The Bank's Disclosure Committee assists the CEO and CFO by ensuring the design, implementation, and operation of the DC&P and ICFR. In so doing, the committee ensures that the Bank is meeting its disclosure obligations under current regulations and that the CEO and CFO are producing the requisite certifications.

Overview

Highlights

As at October 31 or for the year ended October 31

(millions of Canadian dollars, except per share amounts)

	2022	2021 ⁽¹⁾	% change
Operating results			
Total revenues	9,652	8,927	8
Income before provisions for credit losses and income taxes	4,422	4,024	10
Net income	3,383	3,140	8
Net income attributable to the Bank's shareholders and holders of other equity instruments	3,384	3,140	8
Return on common shareholders' equity ⁽²⁾	18.8 %	20.7 %	
Dividend payout ratio ⁽²⁾	36.8 %	31.7 %	
Earnings per share			
Basic	\$ 9.72	\$ 8.95	9
Diluted	9.61	8.85	9
Operating results – Adjusted⁽³⁾			
Total revenues – Adjusted ⁽³⁾	9,934	9,116	9
Income before provisions for credit losses and income taxes – Adjusted ⁽³⁾	4,704	4,222	11
Net income – Adjusted ⁽³⁾	3,383	3,147	7
Return on common shareholders' equity – Adjusted ⁽⁴⁾	18.8 %	20.7 %	
Dividend payout ratio – Adjusted ⁽⁴⁾	36.8 %	31.7 %	
Operating leverage – Adjusted ⁽⁴⁾	2.1 %	1.9 %	
Efficiency ratio – Adjusted ⁽⁴⁾	52.6 %	53.7 %	
Earnings per share – Adjusted⁽³⁾			
Basic	\$ 9.72	\$ 8.97	8
Diluted	9.61	8.87	8
Common share information			
Dividends declared	\$ 3.58	\$ 2.84	26
Book value ⁽²⁾	55.24	47.44	
Share price			
High	105.44	104.32	
Low	83.12	65.54	
Close	92.76	102.46	
Number of common shares (<i>thousands</i>)	336,582	337,912	
Market capitalization	31,221	34,622	
Balance sheet and off-balance-sheet			
Total assets	403,740	355,621	14
Loans and acceptances, net of allowances	206,744	182,689	13
Deposits	266,394	240,938	11
Equity attributable to common shareholders	18,594	16,029	16
Assets under administration ⁽²⁾	616,165	651,530	(5)
Assets under management ⁽²⁾	112,346	117,186	(4)
Regulatory ratios under Basel III⁽⁵⁾			
Capital ratios			
Common Equity Tier 1 (CET1) capital ratio	12.7 %	12.4 %	
Tier 1	15.4 %	15.0 %	
Total	16.9 %	15.9 %	
Leverage ratio	4.5 %	4.4 %	
TLAC ratio ⁽⁵⁾	27.7 %	26.3 %	
TLAC leverage ratio ⁽⁵⁾	8.1 %	7.8 %	
Liquidity coverage ratio (LCR) ⁽⁵⁾	140 %	154 %	
Net stable funding ratio (NSFR) ⁽⁵⁾	117 %	117 %	
Other information			
Number of employees – Worldwide	29,509	26,920	10
Number of branches in Canada	378	384	(2)
Number of banking machines in Canada	939	927	1

(1) Certain amounts have been adjusted to reflect an accounting policy change applicable to cloud computing arrangements. For additional information, see Note 1 to the consolidated financial statements.

(2) See the Glossary section on pages 122 to 125 for details on the composition of these measures.

(3) See the Financial Reporting Method section on pages 16 to 21 for additional information on non-GAAP financial measures.

(4) See the Financial Reporting Method section on pages 16 to 21 for additional information on non-GAAP ratios.

(5) See the Financial Reporting Method section on pages 16 to 21 for additional information on capital management measures.

About National Bank

The Bank carries out its activities in four business segments: Personal and Commercial, Wealth Management, Financial Markets as well as U.S. Specialty Finance and International (USSF&I), which comprises the activities of the Credigy Ltd. (Credigy) and Advanced Bank of Asia Limited (ABA Bank) subsidiaries. Other operating activities, certain specified items, Treasury activities, and the operations of the Flinks Technology Inc. (Flinks) subsidiary are grouped in the *Other* heading of segment results. Each reportable segment is distinguished by services offered, type of clientele, and marketing strategy. For additional information, see the Business Segment Analysis section of this MD&A.

Objectives and 2022 Results

When setting its objectives, the Bank aims for a realistic challenge in the prevailing business environment by considering such factors as changes in banking industry financial results as well as the Bank's business development plan. When the Bank sets its medium-term objectives, it does not take into consideration specified items, if any, which are not reflective of the underlying financial performance of the Bank's operations. Management therefore excludes specified items when assessing the Bank's performance against its objectives.

In fiscal 2022, the Bank recorded \$3,383 million in net income compared to \$3,140 million in fiscal 2021, and its diluted earnings per share stood at \$9.61 compared to \$8.85 in fiscal 2021. The Bank's fiscal 2022 return on common shareholders' equity (ROE) was 18.8% versus 20.7% in fiscal 2021. Its diluted earnings per share stood at \$9.61 in fiscal 2022, an 8% increase from adjusted diluted earnings per share of \$8.87 in fiscal 2021. Furthermore, the 18.8% ROE in fiscal 2022 compares to an adjusted ROE of 20.7% in fiscal 2021.

The following table compares the Bank's medium-term objectives with its fiscal 2022 results.

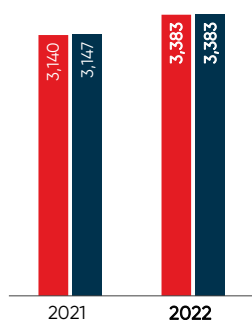
	Medium-Term Objectives (%)	2022 Results
Growth in diluted earnings – Adjusted ⁽¹⁾	5 – 10	8.3%
ROE – Adjusted ⁽²⁾	15 – 20	18.8%
Dividend payout ratio – Adjusted ⁽²⁾	40 – 50	36.8%
CET1 capital ratio ⁽³⁾	Strong level	12.7%
Leverage ratio ⁽³⁾	Strong level	4.5%

The Bank's financial results met all of its medium-term objectives, except for the dividend payout ratio. Year over year, adjusted diluted earnings per share grew 8%, which is within the target range, and was driven by strong revenue growth in every business segment, growth that more than offset increases in non-interest expenses and in provisions for credit losses. For fiscal 2022, adjusted ROE was in the upper range of the target objective. The CET1 capital ratio and the leverage ratio, at 12.7% and 4.5%, respectively, also met the objectives. As for the adjusted dividend payout ratio, it was below the target distribution range given strong growth in net income and the interruptions to dividend increases prescribed by OSFI between March 13, 2020 and November 4, 2021.

The Bank also examines its performance using the efficiency ratio and operating leverage. For fiscal 2022, the Bank's efficiency ratio stood at 54.2% compared to 54.9% in fiscal 2021. Its adjusted efficiency ratio for fiscal 2022 was 52.6%, a 1.1 percentage point improvement from 53.7% in fiscal 2021. These improvements are reflective of disciplined cost management by all the Bank's segments. Also for fiscal 2022, operating leverage and adjusted operating leverage were positive, at 1.4% and 2.1%, respectively.

Net Income

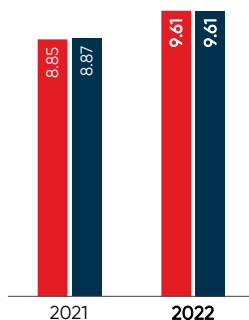
Year ended October 31
(millions of Canadian dollars)



● Published
● Adjusted⁽¹⁾

Diluted Earnings Per Share

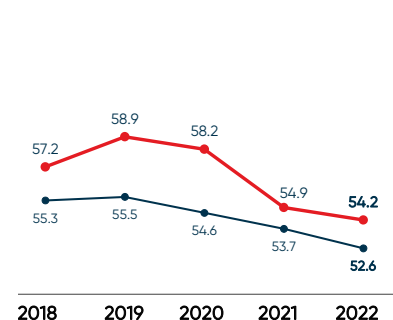
Year ended October 31
(Canadian dollars)



● Published
● Adjusted⁽¹⁾

Efficiency Ratio⁽⁴⁾

Year ended October 31
(%)



● Published
● Adjusted⁽²⁾

- (1) See the Financial Reporting Method section on pages 16 to 21 for additional information on non-GAAP financial measures.
- (2) See the Financial Reporting Method section on pages 16 to 21 for additional information on non-GAAP ratios.
- (3) See the Financial Reporting Method section on pages 16 to 21 for additional information on capital management measures.
- (4) See the Glossary section on pages 122 to 125 for details on the composition of these measures.

Dividends

For fiscal 2022, the Bank declared \$1,206 million in dividends to common shareholders (2021: \$958 million), representing 36.8% of net income attributable to common shareholders (2021: 31.7%).

Solid Capital Levels⁽¹⁾

As at October 31, 2022, the Bank's CET1, Tier 1, and Total capital ratios were, respectively, 12.7%, 15.4% and 16.9%, compared to ratios of, respectively, 12.4%, 15.0% and 15.9% as at October 31, 2021. All of the capital ratios have therefore increased since October 31, 2021, essentially due to net income net of dividends and to common share issuances under the Stock Option Plan. These factors were partly offset by growth in RWA, common share repurchases, and the impact of the transitional measures applicable to ECL provisioning, of which the scaling factor decreased from 50% to 25%. The increase in the Tier 1 capital ratio was also due to the \$500 million issuance of limited recourse capital notes, i.e., Limited Recourse Capital Notes (LRCN) – Series 3, on September 8, 2022. The increase in the Total capital ratio was also due to the \$750 million issuance of medium-term notes on July 25, 2022. As at October 31, 2022, the leverage ratio was 4.5% compared to 4.4% as at October 31, 2021. The growth in Tier 1 capital was partly offset by growth in total exposure, which will continue to benefit, until April 1, 2023, from the temporary measure permitted by OSFI with respect to the exclusion of exposures from central bank reserves.

High-Quality Loan Portfolio

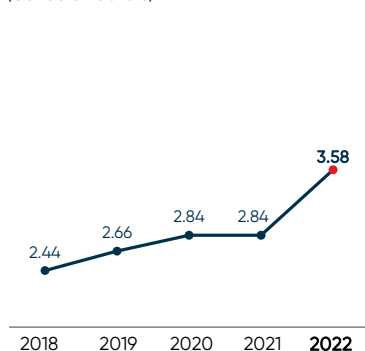
Loans and acceptances, net of allowances for credit losses, accounted for 51% of the Bank's total assets and amounted to \$206.7 billion as at October 31, 2022. For fiscal 2022, the Bank recorded \$145 million in provisions for credit losses compared to \$2 million in fiscal 2021. This increase was due to higher provisions for credit losses on non-impaired loans recorded to reflect a less favourable macroeconomic environment in fiscal 2022 and to a slight deterioration in certain risk parameters, and was also due to an increase in provisions for credit losses on purchased or originated credit-impaired (POCI) loans, as there had been higher reversals on certain portfolios recorded in fiscal 2021. These increases were tempered by lower provisions for credit losses on impaired loans excluding POCI loans, particularly Commercial Banking loans and Financial Markets loans, partly offset by higher provisions for credit losses on the impaired ABA Bank loans recorded to reflect the end of COVID-19 relief measures that had been granted to clients. Gross impaired loans totalled \$1,271 million as at October 31, 2022 compared to \$1,126 million as at October 31, 2021 and represented 0.61% of total loans and acceptances.

Risk Profile

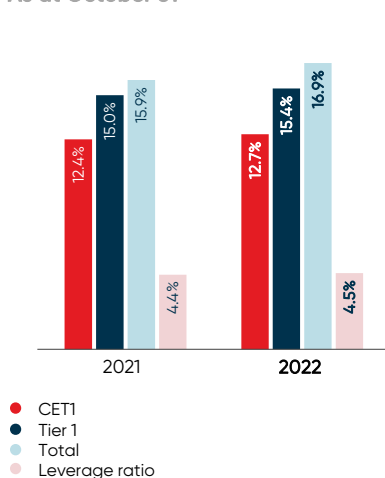
As at October 31 or for the year ended October 31
(millions of Canadian dollars)

	2022	2021
Provisions for credit losses	145	2
Provisions for credit losses as a % of average loans and acceptances ⁽²⁾	0.07 %	– %
Provisions for credit losses on impaired loans excluding POCI loans as a % of average loans and acceptances ⁽²⁾	0.07 %	0.11 %
Net write-offs as a % of average loans and acceptances ⁽²⁾	0.10 %	0.09 %
Gross impaired loans as a % of total loans and acceptances ⁽²⁾	0.61 %	0.61 %
Gross impaired loans	1,271	1,126
Net impaired loans	1,030	836

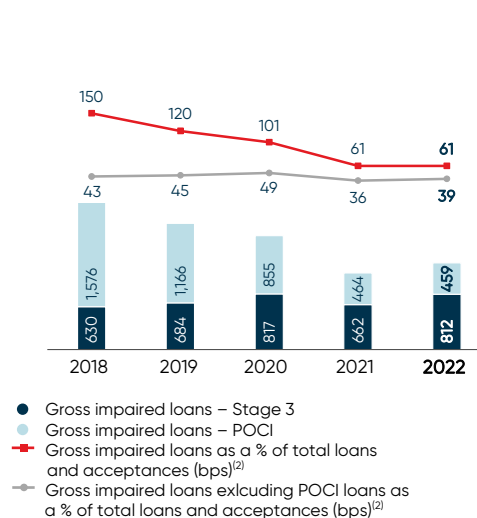
Annual Dividend Per Common Share
Year ended October 31
(Canadian dollars)



Evolution of Regulatory Ratios Under Basel III⁽¹⁾
As at October 31



Gross Impaired Loans
As at October 31
(millions of Canadian dollars)



(1) See the Financial Reporting Method section on pages 16 to 21 for additional information on capital management measures.

(2) See the Glossary section on pages 122 to 125 for details on the composition of these measures.

Economic Review and Outlook

Global Economy

After a somewhat late start, the cycle of tightening global monetary policy seems well under way, with more and more central banks now taking a more restrictive approach to rein in inflation. While this trend reversal offers promise of greater price stability in the future, the economic impacts will still be significant, especially if the reversal comes at a time when growth has already slowed considerably in several regions. In the eurozone, for example, annualized GDP growth was only 0.7% in the third quarter of 2022, since soaring energy costs are being felt and resulting in a decrease in actual compensation. While the energy situation improved slightly in the third quarter of 2022, several signs are pointing to a recession starting in the fourth quarter of 2022. Elsewhere in the world, emerging markets continue to feel the brunt of a strong U.S. dollar, which is putting upward pressure on inflation and making it more difficult to repay loans in U.S. dollars. All the while, China has continued to feel the economic impacts of its zero-COVID policy at a time when weak consumer demand and sluggish real estate markets can no longer be offset by higher exports. Against this backdrop, the global economy is expected to grow by only 2.2%⁽¹⁾ in 2023, on the heels of 3.1%⁽¹⁾ growth in 2022.

The last time that the U.S. Federal Reserve (the Fed) raised interest rates, bringing the target range between 3.75 and 4.00%, Jerome Powell, Chair of the Fed, stated that data published since the last Fed meeting justified having a higher terminal rate than what had previously been presented. And yet, there are increasing signs that an economic slowdown lies ahead. While GDP figures for the third quarter of 2022 showed that growth is rebounding, this is mainly due to international trade since private domestic demand is weakening. More specifically, residential investment decreased for a sixth consecutive quarter—something not seen since the Great Recession of 2008-2009. Inflation continues to hover at abnormally high levels, although there are now many signs pointing to a turnaround, especially given the manufacturing sector slowdown, high inventory levels, a sharp decline in shipping costs, lower selling prices by Chinese producers, and a strong U.S. dollar. Where services are concerned, it may take longer to return inflation to a reasonable level, although there is evidence suggesting far fewer new hires in an environment characterized by anemic growth, which will help to reduce wage pressures. Given this context, the central bank should be able to end its monetary tightening cycle no later than for the first monetary policy meeting in 2023. Otherwise, a recession is practically unavoidable in 2023. Moreover, even if the Fed changes direction, this would not prevent a major slowdown in growth next year. We anticipate a difficult first half next year and growth of only 0.2%⁽¹⁾ for 2023.

Canadian Economy

In Canada, efforts to soft-land the economy after a period of overheating are continuing. So far, indicators are moving in the right direction for the Bank of Canada, which suggests that we are approaching the terminal rate in this extremely aggressive tightening cycle. In fact, the labour market is showing signs of moderation: private-sector and full-time jobs have been at a standstill for several months, and hiring intentions are declining, suggesting that there will be no rebound in the short term. Inflationary pressures are less acute and widespread than earlier this year. Nevertheless, given the rushed response and the transmission lag for monetary policy, it is normal for observers to be nervous. Unfortunately, we will only know in hindsight if the response was too aggressive. One thing is certain: we are already seeing a notable slowdown in the real estate market, which is leading to extremely rapid real estate deflation. In our view, it will not be necessary to keep interest rates at current levels for long to cool down inflation; consequently, we expect that the central bank will have to lower them in the second half of next year. In light of this monetary tightening, we anticipate an anemic growth rate of 0.7%⁽¹⁾ in 2023, as consumers will be hit simultaneously by a loss of purchasing power, a negative wealth effect, and interest payment shock.

Quebec Economy

Quebec's economy, which had experienced a spectacular post-pandemic recovery compared to the country as a whole, lost its lead in July 2022 after posting the fourth monthly decline in a row. But that is not overly concerning for now, since this decline has not had a significant adverse effect on the labour market, which is still one of the most stable in the country. The unemployment rate reached 4.1% in October 2022, which is the lowest in all of the provinces, while the job vacancy rate is among the highest in the country. We also see some encouraging structural factors for the Quebec economy, such as a highly diversified economy, fiscal support from the Quebec government, and low electricity costs. Moreover, Quebec households are in a better financial situation (lower financial leverage and higher savings rate), mainly because housing accessibility is significantly better than in the rest of the country. They are therefore less vulnerable to the recent interest rate increase. Our forecast for growth in 2023 is 0.7%⁽¹⁾, in line with Canada as a whole, despite less favourable demographic factors.

(1) GDP growth forecasts, National Bank Financial's Economics and Strategy group

Financial Analysis

Consolidated Results

Year ended October 31

(millions of Canadian dollars)

	2022	2021 ⁽¹⁾	% change
Operating results			
Net interest income	5,271	4,783	10
Non-interest income	4,381	4,144	6
Total revenues	9,652	8,927	8
Non-interest expenses	5,230	4,903	7
Income before provisions for credit losses and income taxes	4,422	4,024	10
Provisions for credit losses	145	2	
Income before income taxes	4,277	4,022	6
Income taxes	894	882	1
Net income	3,383	3,140	8
Diluted earnings per share (<i>dollars</i>)	9.61	8.85	9
Taxable equivalent basis⁽²⁾			
Net interest income	234	181	
Non-interest income	48	8	
Income taxes	282	189	
Impact of taxable equivalent basis on net income	–	–	
Specified items⁽²⁾			
Impairment losses on intangible assets	–	(9)	
Specified items before income taxes	–	(9)	
Income taxes on specified items	–	(2)	
Specified items after income taxes	–	(7)	
Operating results – Adjusted⁽²⁾			
Net interest income – Adjusted	5,505	4,964	11
Non-interest income – Adjusted	4,429	4,152	7
Total revenues – Adjusted	9,934	9,116	9
Non-interest expenses – Adjusted	5,230	4,894	7
Income before provisions for credit losses and income taxes – Adjusted	4,704	4,222	11
Provisions for credit losses	145	2	
Income before income taxes – Adjusted	4,559	4,220	8
Income taxes – Adjusted	1,176	1,073	10
Net income – Adjusted	3,383	3,147	7
Diluted earnings per share – Adjusted (<i>dollars</i>)	9.61	8.87	8
Average assets ⁽³⁾	393,847	363,506	8
Average loans and acceptances ⁽³⁾	194,340	172,323	13
Average deposits ⁽³⁾	258,929	236,229	10
Operating leverage ⁽⁴⁾	1.4 %	6.4 %	
Operating leverage – Adjusted ⁽⁵⁾	2.1 %	1.9 %	
Efficiency ratio ⁽⁴⁾	54.2 %	54.9 %	
Efficiency ratio – Adjusted ⁽⁵⁾	52.6 %	53.7 %	
Net interest margin, non-trading - Adjusted ⁽⁵⁾	1.96 %	1.90 %	

(1) Certain amounts have been adjusted to reflect an accounting policy change applicable to cloud computing arrangements. For additional information, see Note 1 to the consolidated financial statements.

(2) See the Financial Reporting Method section on pages 16 to 21 for additional information on non-GAAP financial measures.

(3) Represents an average of the daily balances for the period.

(4) See the Glossary section on pages 122 to 125 for details on the composition of these measures.

(5) See the Financial Reporting Method section on pages 16 to 21 for additional information on non-GAAP ratios.

Analysis of Consolidated Results

Financial Results

For fiscal 2022, the Bank's net income totalled \$3,383 million, an 8% increase from \$3,140 million in fiscal 2021. Excellent performance in all of the business segments, driven by revenue growth, contributed to this increase in net income, which was partly offset by higher provisions for credit losses recorded in part to reflect a deterioration in the macroeconomic outlook in fiscal 2022. Income before provisions for credit losses and income taxes totalled \$4,422 million for fiscal 2022, a 10% year-over-year increase that was due to the revenue growth in all of the business segments.

Total Revenues

For fiscal 2022, the Bank's total revenues amounted to \$9,652 million versus \$8,927 million in fiscal 2021, a \$725 million or 8% increase that was driven by the revenue growth across all of the Bank's business segments. For additional information on total revenues, see Table 2 on page 114. The fiscal 2022 adjusted total revenues grew \$818 million or 9% year over year.

Net Interest Income

For fiscal 2022, net interest income totalled \$5,271 million, up \$488 million or 10% from \$4,783 million in fiscal 2021 (see Table 3, page 114). As for the adjusted net interest income in fiscal 2022, it amounted to \$5,505 million, up 11% from \$4,964 million in fiscal 2021.

In the Personal and Commercial segment, net interest income totalled \$2,865 million in fiscal 2022, a \$318 million or 12% year-over-year increase owing mainly to growth in loans and deposits, which rose 11% and 7%, respectively, year over year. The loan growth came mainly from mortgage credit and business lending. The increase in net interest income was also due to a higher net interest margin, which rose to 2.14% in 2022 from 2.11% in 2021 as a result of interest rate hikes, and that was primarily attributable to the deposit margin. In the Wealth Management segment, net interest income totalled \$594 million in fiscal 2022, a 33% year-over-year increase owing to higher interest rates, growth in loan and deposit volumes, and the deposit margin.

In the Financial Markets segment, net interest income on a taxable equivalent basis was down \$4 million in fiscal 2022 compared to fiscal 2021, mainly due to trading activities, and should be examined together with the other items of trading activity revenues. In the USSF&I segment, net interest income rose \$183 million or 20% year over year owing to loan and deposit growth at the ABA Bank subsidiary in fiscal 2022 as well as to an increase in the Credigy subsidiary's net interest income given growth in loan portfolios and solid performance in certain portfolios.

Non-Interest Income

The Bank's non-interest income amounted to \$4,381 million in fiscal 2022, up \$237 million or 6% from \$4,144 million in fiscal 2021. For additional information on non-interest income, see Table 4 on page 115.

For fiscal 2022, revenues from underwriting and advisory fees were down 22% year over year, notably due to capital markets activities in the Financial Markets segment. Revenues from securities brokerage commissions were down 14% year over year, essentially due to a decrease in commission-generating transactions in the Wealth Management segment. Combined, mutual fund revenues and revenues from investment management and trust service fees totalled \$1,584 million, a \$121 million year-over-year increase owing to growth in average assets under administration and under management as a result of net inflows into various solutions and of stock market performance in the first half of 2022.

Credit fee revenues and revenues from acceptances and letters of credit and guarantee were down \$16 million year over year, as greater business activity at Commercial Banking was more than offset by a decrease in the activities of Financial Markets. Conversely, card revenues and revenues from deposits and payment service charges rose 26% and 9%, respectively, as an upswing in economic activity led to greater transaction volume during fiscal 2022.

Non-interest income related to trading activity on a taxable equivalent basis totalled \$596 million, up from \$290 million in fiscal 2021 (Table 5, page 115). Including the portion recorded in net interest income, trading activity revenues on a taxable equivalent basis amounted to \$1,507 million in fiscal 2022, a \$269 million year-over-year increase that was essentially driven by equity securities revenues from the Financial Markets segment. Conversely, trading activity revenues on a taxable equivalent basis from the Bank's other business segments decreased year over year.

For fiscal 2022, gains on non-trading securities were down \$38 million year over year, in part due to Treasury activities, while insurance revenues were up \$27 million year over year, reflecting a revision to actuarial reserves. Also up year over year were foreign exchange revenues and the share in the net income of associates and joint ventures, which rose \$9 million and \$5 million, respectively. Other revenues amounted to \$242 million in fiscal 2022, an \$83 million decrease that was notably due to a gain realized on the disposal of certain loan portfolios and to a more favourable impact of the fair value remeasurements of certain Credigy loan portfolios in fiscal 2021. In addition, in fiscal 2021, the Other revenues item had included a \$33 million gain on the remeasurement of the previously held equity interest in Flinks and a \$30 million loss related to the fair value measurement of the Bank's equity interest in AfrAsia Bank Limited (AfrAsia).

Non-Interest Expenses

For fiscal 2022, non-interest expenses stood at \$5,230 million, up \$327 million or 7% from fiscal 2021 (Table 6, page 116). In fiscal 2021, non-interest expenses had included \$9 million in intangible asset impairment losses. The fiscal 2022 non-interest expenses, compared to \$4,894 million in adjusted non-interest expenses, were up \$336 million or 7%.

Compensation and employee benefits totalled \$3,284 million in fiscal 2022, an 8% year-over-year increase that was notably due to wage growth and a greater number of employees as well as to the variable compensation associated with revenue growth. An increase in technology expenses, including amortization, was attributable to significant investments made to support the Bank's technological evolution and the business development plan. In addition, fiscal 2022 travel and business development expenses increased year over year as activities with clients resumed. These higher expenses were tempered by decreases in certain expenses; in particular, there was a \$20 million reversal of the provision for the compensatory tax on salaries paid in Quebec during the first quarter of 2022 as well as a decrease in COVID-19 response expenses, which had been higher during fiscal 2021. Furthermore, a portion of the overall increase in non-interest expenses was attributable to the Flinks acquisition at the end of fiscal 2021.

Provisions for Credit Losses

For fiscal 2022, the Bank recorded \$145 million in provisions for credit losses compared to \$2 million in fiscal 2021 (Table 7, page 117). This increase was mainly attributable to \$1 million in provisions for credit losses on non-impaired loans during fiscal 2022 compared to the \$155 million in reversals of allowances for credit losses recorded during fiscal 2021. The macroeconomic outlook deteriorated in the second half of fiscal 2022, notably due to high inflationary pressure, geopolitical instability, and global supply chain disruptions, whereas in fiscal 2021, the macroeconomic outlook had been more favourable. Provisions for credit losses on impaired loans excluding POCI⁽¹⁾ loans were down \$45 million in fiscal 2022, mainly those in Commercial Banking and Financial Markets, which decreased \$13 million and \$77 million, respectively. These decreases were partly offset by a \$10 million increase in Personal Banking's provisions for credit losses (including credit card receivables) and a \$35 million increase in USSF&I's provisions for credit losses (excluding POCI loans), essentially attributable to the ABA Bank subsidiary, where COVID-19 relief measures that had been granted to customers ended. The provisions for credit losses on Credigy's POCI loans also increased, rising \$32 million given the favourable remeasurements of certain portfolios during fiscal 2021. At \$138 million for fiscal 2022, the provisions for credit losses on impaired loans excluding POCI loans⁽¹⁾ decreased and represented 0.07% of average loans and acceptances, down from 0.11% in fiscal 2021.

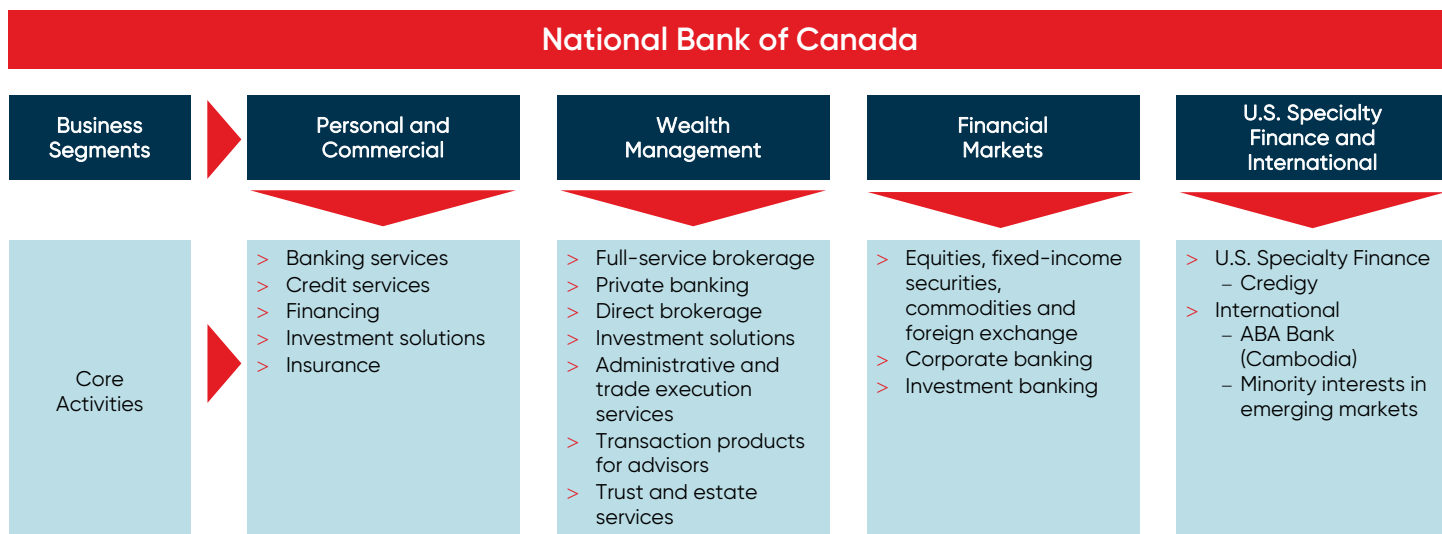
Income Taxes

Detailed information about the Bank's income taxes is provided in Note 24 to the consolidated financial statements. For fiscal 2022, income taxes stood at \$894 million, representing an effective tax rate of 21%, which compares to income taxes of \$882 million and a 22% effective tax rate in fiscal 2021. The change in effective tax rates stems mainly from a higher level of tax-exempt dividend income during fiscal 2022.

(1) See the Glossary section on pages 122 to 125 for details on the composition of these measures.

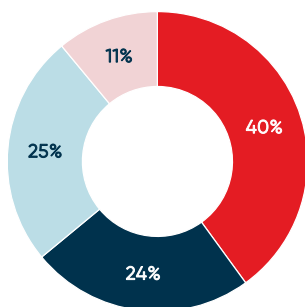
Business Segment Analysis

The Bank carries out its activities in four business segments, which are defined below. For presentation purposes, other activities are grouped in the *Other* heading. Each reportable segment is distinguished by services offered, type of clientele, and marketing strategy.



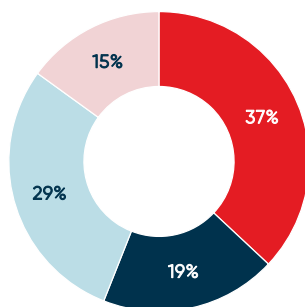
Other: Treasury activities, liquidity management, Bank funding, asset/liability management, Flinks subsidiary activities (a fintech specialized in financial data aggregation and distribution), and corporate units.

Total Revenues by Business Segment⁽¹⁾
Year ended October 31, 2022



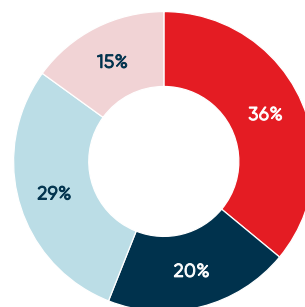
- Personal and Commercial (2021: 40%)
- Wealth Management (2021: 24%)
- Financial Markets (2021: 25%)
- USSF&I (2021: 11%)

Income Before Provisions for Credit Losses and Income Taxes by Business Segment⁽¹⁾
Year ended October 31, 2022



- Personal and Commercial (2021: 36%)
- Wealth Management (2021: 20%)
- Financial Markets (2021: 29%)
- USSF&I (2021: 15%)

Net Income by Business Segment⁽¹⁾
Year ended October 31, 2022



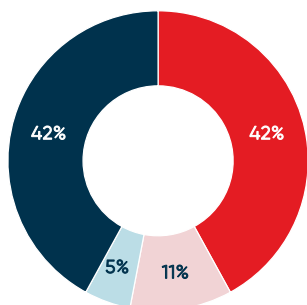
- Personal and Commercial (2021: 35%)
- Wealth Management (2021: 19%)
- Financial Markets (2021: 29%)
- USSF&I (2021: 17%)

(1) Excluding the *Other* heading.

Personal and Commercial

The Personal and Commercial segment meets the financial needs of close to 2.6 million individuals and over 145,000 businesses across Canada. These clients entrust the Bank to manage, invest, and safeguard their assets and to finance their projects. Clients turn to the Bank's experienced advisors who take the time to understand their specific needs and help them reach their financial goals. Thanks to the Bank's convenient self-banking channels, 378 branches, and 939 banking machines across Canada, clients can do their daily banking whenever and wherever they wish.

Total Revenues by Category Year ended October 31, 2022



- Retail (2021: 46%)
- Payment Solutions (2021: 11%)
- Insurance (2021: 5%)
- Commercial Banking (2021: 38%)

\$4,034 million

Total revenues

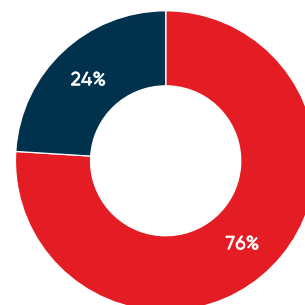
\$1,885 million

Income before provisions
for credit losses and
income taxes

\$1,314 million

Net income

Total Revenues by Geographic Distribution Year ended October 31, 2022



- Province of Quebec (2021: 75%)
- Other provinces (2021: 25%)

Personal Banking

Personal Banking provides a complete range of financing and investment products and services to help clients reach their financial goals throughout every stage in their lives. It offers everyday transaction solutions, mortgage loans and home equity lines of credit, consumer loans, payment solutions, savings and investment solutions as well as a range of insurance products.

Commercial Banking

Commercial Banking serves the financial needs of small- and medium-sized enterprises (SMEs) and large corporations, helping them to achieve growth. It offers a full line of financial products and services, including credit, deposit, and investment solutions as well as international trade, foreign exchange transaction, payroll, cash management, insurance, electronic transaction, and complementary services. With deep roots in the business community for over 160 years, Commercial Banking is the leading bank in the Quebec market.

Economic and Market Review

In Canada, efforts continue to soft-land the economy after a period of overheating. Interest rate hikes brought real estate activity to an abrupt halt, after it had reached record levels since the start of the pandemic and was characterized by soaring house prices. With house hunters now having less buying power, prices across Canada are undergoing a correction, generating more of an impact on household wealth already falling as a result of weak financial market performance. However, many people seized opportunities that arose during the pandemic to get their financial house in order. In fact, some consumers have amassed excess savings that can be used to cushion the blow of the rising cost of living and higher interest rates. Personal and corporate bankruptcies are on the rise, even though they remain below pre-pandemic levels. The labour market is showing signs of moderation, with full-time private-sector employment stagnating in recent months and hiring intentions slowing down—which does not point to a turnaround in the short-term. Corporate investment remains strong for now, but activity may slow down due to higher funding costs and the uncertain economic outlook.

The economic environment in 2022 and the outlook for 2023 are discussed in more detail in the Economic Review and Outlook section on page 26.

Key Success Factors

- > Strong penetration in our core Quebec market thanks to a full range of personal and commercial banking services.
- > Well-established and enduring client relationships grounded in an ability to provide both advice and a full range of solutions tailored to specific client needs.
- > Vast sales force in Quebec, consisting of both generalists and specialists, positioning the Bank to offer the best advice to clients.
- > Unmatched closeness to Quebec entrepreneurs, with leading expertise in business lending and risk management solutions.
- > Ability to meet all the needs facing businesses and entrepreneurs in collaboration with other Bank segments.

Objectives and Strategic Priorities

The Personal and Commercial segment is targeting growth by becoming a more simple, efficient bank focused on constantly improving the client experience.

	2022 Achievements and Highlights	2023 Priorities
Accelerate net client acquisition	<ul style="list-style-type: none"> > Delivered unparalleled performance in terms of total client acquisition. > Enhanced our visibility and proximity through targeted campaigns. > Continued our client acquisition strategy by intensifying coverage in promising markets and among high-growth target clients such as newcomers, professionals, Gen Z, millennials, and SMEs. > Strengthened the synergies between our business units to achieve even greater acquisition success. > Strengthened ties between Private Banking (PB1859) and Commercial Banking using a mixed approach and a market presence that is delivering impressive results in terms of the engagement of our commercial and high net worth clients. > Enhanced our preferential offering to our strategic client sectors, such as professionals. > Continued to expand financial literacy content in response to common concerns arising in the current economic environment. > Improved our digital approval processes for our signature products (bank accounts and credit cards). 	<ul style="list-style-type: none"> > Achieve greater coverage in promising markets and high-growth client segments. > Further develop a distinctive offering for clients who are in both our PB1859 and Commercial Banking sectors by adding differentiating revenue-generating components such that they can go to market together. > Continue our acquisition efforts by further developing our digital acquisition capabilities and client eligibility and by focusing branch efforts on advisory service. > Simplify and modernize our product offering such that it is better tailored to client needs. > Grow the Bank's brand across Canada and demonstrate our ESG impact.
Improve client engagement	<ul style="list-style-type: none"> > Implemented a new, more client-centric and advisory-driven distribution approach. > Enhanced the capabilities of the transactional platform and the mobile app to deliver a simpler, safer, and more intuitive digital experience for all our clients. > Personalized client interaction with the use of client data, which helps us to proactively contact clients, through both assisted and unassisted channels, during key life moments. > Deployed an advisory and support strategy to clients most affected by market fluctuations in the volatile economic environment, particularly to help them manage their liquidity. > Improved our digital investment platform, notably through the Enhanced Investing Experience, by adding several self-serve capabilities that promote client autonomy. 	<ul style="list-style-type: none"> > Develop account and market strategies designed to raise the penetration rate of both Commercial Banking and PB1859 clients. > Increase the quality of our advice and our value among clients by continuing to develop our distribution network and personalize our contacts. > Achieve greater synergy by improving the penetration rate of banking services among our investor clients. > Enhance our payment facilities offering. > Optimize client experience by modernizing the most frequently used cash management capabilities. > Further develop our key technological capacities in the areas of account management and client profile services.

2022 Achievements and Highlights

2023 Priorities

Improve efficiency

- > Simplified the transactional banking capabilities most frequently used by personal and commercial clients on our priority approaches by ensuring an integrated experience among the channels.
 - > Finalized the automation of the financing process for all Commercial Banking segments, thereby providing a simple and quick experience.
 - > Simplified the customer journey, both for retail clients (account opening and payments) and commercial clients (account opening, financing, and cash management).
 - > Aligned our product offering to evolving market needs (transactional, card, payment, and cash management solutions).
- > Continue simplifying the customer journey for priority clients as well as our business processes.
 - > Bolster our digital capabilities such that it promotes client autonomy and simplifies our processes.
 - > Maximize the support structure provided to our sales force by optimizing the operational support offered to our client-facing employees.
 - > Continue modernizing our range of cash management offerings, adapting them to client needs and helping business clients manage their cash cycle.

Segment Results – Personal and Commercial

Year ended October 31

(millions of Canadian dollars)

	2022	2021 ⁽¹⁾	% change
Net interest income	2,865	2,547	12
Non-interest income	1,169	1,068	9
Total revenues	4,034	3,615	12
Non-interest expenses	2,149	2,008	7
Income before provisions for credit losses and income taxes	1,885	1,607	17
Provisions for credit losses	97	40	
Income before income taxes	1,788	1,567	14
Income taxes	474	416	14
Net income	1,314	1,151	14
Net interest margin ⁽²⁾	2.14 %	2.11 %	
Average interest-bearing assets ⁽²⁾	133,754	120,956	11
Average assets ⁽³⁾	140,514	126,637	11
Average loans and acceptances ⁽³⁾	139,749	125,917	11
Net impaired loans ⁽²⁾	193	213	(9)
Net impaired loans as a % of total loans and acceptances ⁽²⁾	0.1 %	0.2 %	
Average deposits ⁽³⁾	82,005	76,442	7
Efficiency ratio ⁽²⁾	53.3 %	55.5 %	

(1) For the year ended October 31, 2021, certain amounts have been reclassified, in particular amounts of the loan portfolio of borrowers in the "Oil and gas" and "Pipelines" sectors as well as related activities, which were transferred from the Personal and Commercial segment to the Financial Markets segment. Moreover, certain amounts have been adjusted to reflect an accounting policy change applicable to cloud computing arrangements (for additional information, see Note 1 to the consolidated financial statements).

(2) See the Glossary section on pages 122 to 125 for details on the composition of these measures.

(3) Represents an average of the daily balances for the period.

Financial Results

In the Personal and Commercial segment, net income totalled \$1,314 million in fiscal 2022 compared to \$1,151 million in fiscal 2021, a 14% increase that was due to \$419 million in total revenue growth, partly offset by higher provisions for credit losses. The segment's income before provisions for credit losses and income taxes totalled \$1,885 million in fiscal 2022, up 17% year over year. The growth in total revenues was driven by a \$318 million increase in net interest income and a \$101 million increase in non-interest income. The increase in net interest income came mainly from growth in personal and commercial loans and deposits. In addition, the successive interest rate increases that occurred in fiscal 2022 had a favourable impact on net interest margin, which rose to 2.14% from 2.11% in fiscal 2021, an increase attributable mainly to the deposit margin.

For fiscal 2022, the Personal and Commercial segment's non-interest expenses stood at \$2,149 million, a 7% year-over-year increase that was mainly due to higher compensation and employee benefits (given wage growth and a greater number of employees), to greater investments made as part of the segment's technological evolution, and to higher operations support charges. Furthermore, travel and business development costs increased as activities with clients resumed. At 53.3%, the segment's 2022 efficiency ratio improved by 2.2 percentage points from 55.5% in 2021.

The segment recorded \$97 million in provisions for credit losses in fiscal 2022, which is \$57 million more than the \$40 million recorded in fiscal 2021. This increase came mainly from higher provisions for credit losses on non-impaired Personal Banking loans (including credit card receivables) recorded to reflect less favourable macroeconomic conditions, whereas, in fiscal 2021, a more favourable macroeconomic environment had led to significant reversals of allowances for credit losses on non-impaired loans. These increases were tempered by lower provisions for credit losses on impaired Commercial Banking loans as well as by a decrease in provisions for credit losses on non-impaired Commercial Banking loans resulting from more favourable risk parameters in fiscal 2022.

Personal Banking

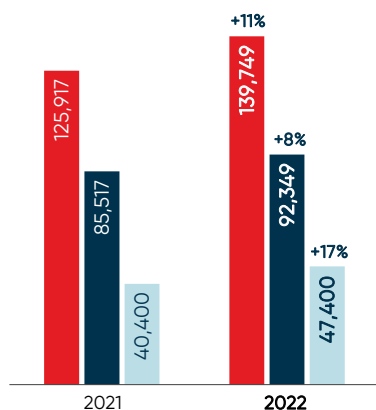
Personal Banking's total revenues amounted to \$2,359 million in fiscal 2022, a 6% increase from \$2,234 million in fiscal 2021. Its net interest income increased, as there was 8% growth in loan volumes, 4% growth in deposit volumes and a higher deposit margin, partly offset by a lower net interest margin on loans. Non-interest income was also up, rising \$53 million year over year, essentially due to higher credit card revenues given a notable increase in purchasing volume, higher insurance revenues (reflecting a revision to actuarial reserves), and higher internal commission revenues related to the distribution of Wealth Management products. For fiscal 2022, Personal Banking's non-interest expenses rose \$105 million year over year, mainly due to higher compensation and employee benefits (given wage growth and a greater number of employees), to greater investments made as part of the segment's technological evolution, and to higher operations support charges.

Commercial Banking

Commercial Banking's total revenues amounted to \$1,675 million in fiscal 2022, rising 21% from \$1,381 million in fiscal 2021. Net interest income was up, essentially due to 17% growth in loans and 11% growth in deposits as well as to a higher net interest margin as interest rates were raised successively during fiscal 2022. Non-interest income was also up, rising \$48 million compared to fiscal 2021, mainly due to increases in revenues from bankers' acceptances, in revenues from derivative financial instruments, and in revenues from foreign exchange activities. For fiscal 2022, Commercial Banking's non-interest expenses rose \$36 million year over year, mainly due to higher compensation and employee benefits (given wage growth and a greater number of employees), to higher operations support charges, and to higher travel and business development costs as activities with clients resumed.

Average Loans and Acceptances

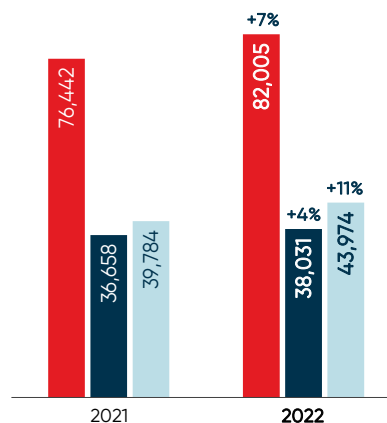
Year ended October 31
(millions of Canadian dollars)



- Total – Personal and Commercial Banking
- Personal Banking
- Commercial Banking

Average Deposits

Year ended October 31
(millions of Canadian Dollars)



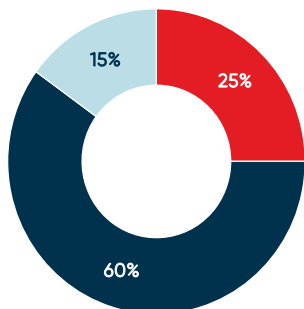
- Total – Personal and Commercial Banking
- Personal Banking
- Commercial Banking

Wealth Management

As a leader in Quebec and firmly established across Canada, the Wealth Management segment serves all market segments by emphasizing advisory-based service and close client relationships. It delivers a full range of wealth management products and solutions through a multi-channel distribution network and a differentiated business model. Wealth Management also provides services to independent advisors and institutional clients.

Total Revenues by Category

Year ended October 31, 2022



- Net interest income (2021: 21%)
- Fee-based services (2021: 61%)
- Transaction-based and other revenues (2021: 18%)

\$2,375 million

Total revenues

\$984 million

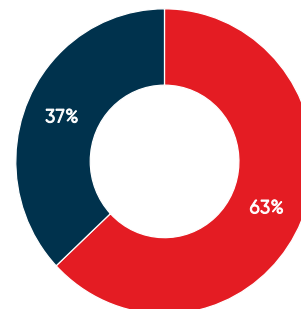
Income before provisions
for credit losses and
income taxes

\$721 million

Net income

Total Revenues by Geographic Distribution

Year ended October 31, 2022



- Province of Quebec (2021: 63%)
- Other provinces (2021: 37%)

Full-Service Brokerage

Drawing on the largest network of investment advisors in Quebec, National Bank Financial Wealth Management (NBFWM) provides wealth management advisory services through 800-plus advisors at close to 100 service points across Canada. Its advisors serve approximately 400,000 retail clients, proposing portfolio management services, financial and succession planning services, and insurance services while working in close collaboration with other segments of the Bank.

Private Banking

Private Banking 1859 (PB1859) offers highly personalized wealth management services and advice across Canada, helping affluent clients benefit from comprehensive management of their personal and family fortunes. As a true market leader in Quebec, PB1859 is continuing to expand its operations throughout Canada with its extensive range of financial solutions and strategies for the protection, growth, and transition of wealth.

Direct Brokerage

National Bank Direct Brokerage (NBDB) offers a multitude of financial products and investment tools to self-directed investors across Canada through its online investment solution. NBDB helps customers who want to manage their own investments to do so through an online trading platform or by speaking directly to a representative on the phone.

Investment Solutions

National Bank Investments Inc. (NBI) manufactures and offers mutual funds, exchange-traded funds (ETF), investment solutions, and services to consumers and institutional investors through the Bank's extended network. With its open architecture model, NBI is Canada's largest investment fund manager to entrust the management of its investments exclusively to external portfolio managers.

Administrative and Trade Execution Services

National Bank Independent Network (NBIN) is a Canadian leader in providing administrative services such as trade execution, custodial services, and brokerage solutions to many independent financial services firms across Canada, in particular to introducing brokers, portfolio managers, and investment fund managers.

Transaction Products

The Wealth Management segment provides independent advisors across Canada with a vast array of investment products, including guaranteed investment certificates (GICs), mutual funds, notes, structured products, and monetization, helping to support their own business needs and client relationships.

Key Success Factors

- > Leader in Quebec and firmly established across Canada in full-service brokerage services with seasoned wealth management professionals. Our team of advisors makes the difference by forging lasting relationships and providing personalized solutions to clients at every life stage.
- > NBI is the largest manager of managers in Canada (open architecture). Given this positioning, our clients can access the industry's best advisors.
- > Leadership position in Canada in securities custody and brokerage services for independent wealth management firms.
- > Strong synergies with the Personal and Commercial and Financial Markets segments, allowing a holistic service offering.

Trust and Estate Services

Through National Bank Trust (NBT), Wealth Management provides retail and institutional clients with turnkey services and solutions. Its team of experts offers a full range of high value-added services designed to consolidate, protect, and transfer its customers' wealth and give them peace of mind. NBT also provides integrated trustee and depository services as well as securities custody services.

Economic and Market Review

Soaring inflation resulting from the war in Ukraine has led to the fastest tightening of monetary policies since the mid-1990s. The financial market corrections were brutal, and rising interest rates caused bond and stock portfolios to post losses. A number of stock markets, including the S&P 500, entered bear market territory (market decline of over 20%). Canada's stock market also declined, although it was more resilient, primarily owing to the country's raw materials sectors, which are doing quite well in the current geopolitical context. While the market impacts of rising interest rates were felt very quickly, it will take some time to assess the full economic impacts, which could create volatility in the months to come. Although the North American economy is holding up well, the outlook for 2023 is less rosy. The real estate sector has been hit very hard—both in the U.S. and Canada—and house prices have already begun to slide despite a resilient labour market. Business leaders' confidence has been shaken by the growing risk of recession, and anemic economic growth is expected in 2023.

The economic environment in 2022 and the outlook for 2023 are discussed in more detail in the Economic Review and Outlook section on page 26.

Objectives and Strategic Priorities

The Wealth Management segment will capitalize on the strength of the Bank's brand by generating sustained earnings growth, further improving client satisfaction, and maintaining high employee engagement.

	2022 Achievements and Highlights	2023 Priorities
Create highly engaged clients thanks to an exceptional advisory-based experience	<ul style="list-style-type: none"> > Focused on our growth strategies by leveraging intersegment synergies and by looking beyond Quebec and also towards sectors with strong potential. > Reconciled the activities of PB1859 and Commercial Banking to better meet client needs. > Raised client satisfaction across all channels despite an uncertain economic environment. 	<ul style="list-style-type: none"> > Further develop the quality of our advice and our closeness to clients by leveraging client relationship tools and accelerating synergies, both in terms of our expertise as well as geographically. > Continue developing a fully-integrated solution that helps advisors become independent. > Further develop a distinctive offering for clients who are in both PB1859 and the Commercial Banking sectors by adding differentiating revenue-generating components such that they can go to market together.
Have best-in-class investment and digital solutions	<ul style="list-style-type: none"> > Continually simplified and improved our digital ecosystem to improve client and employee experience. > Enhanced our responsible investment and non-traditional investment product offerings through teams of experts. 	<ul style="list-style-type: none"> > Continue developing new investment solutions that are constantly aligning with client needs (responsible investing, ETFs, private investments, life goals, etc.). > Further simplify and improve digital solutions according to client needs and on a continual basis.
Target fast, expert and flawless execution	<ul style="list-style-type: none"> > Continued developing our analytic foundations and the 360-degree holistic view of clients. > Made ongoing investments to automate and digitalize key processes to improve both client and employee experience. 	<ul style="list-style-type: none"> > Maintain the pace of progress on transformation projects and continue executing our automation and digitalization plan. > Continue developing analytic foundations in order to put data (360-degree holistic view) at the service of clients.
Encourage entrepreneurial culture and talent development	<ul style="list-style-type: none"> > Deployed multiple tools and programs to further improve diversity and inclusion and to support the ongoing development of our employees. > Created conditions that encourage employees to return to work, notably a flexible hybrid work model. 	<ul style="list-style-type: none"> > Continue delivering an engaging employee experience by: <ul style="list-style-type: none"> • providing experiences tailored to employee needs and that support flexibility and quality of life; • having an inclusive culture that is conducive to synergy, agility, and a client focus.

Segment Results – Wealth Management

Year ended October 31

(millions of Canadian dollars)

	2022	2021 ⁽¹⁾	% change
Net interest income	594	446	33
Fee-based revenues	1,429	1,322	8
Transaction and other revenues	352	398	(12)
Total revenues	2,375	2,166	10
Non-interest expenses	1,391	1,293	8
Income before provisions for credit losses and income taxes	984	873	13
Provisions for credit losses	3	1	
Income before income taxes	981	872	13
Income taxes	260	231	13
Net income	721	641	12
Average assets ⁽²⁾	8,226	7,146	15
Average loans and acceptances ⁽²⁾	7,132	5,998	19
Net impaired loans ⁽³⁾	15	16	(6)
Average deposits ⁽²⁾	35,325	33,934	4
Efficiency ratio ⁽³⁾	58.6 %	59.7 %	
Assets under administration⁽³⁾	616,165	651,530	(5)
Assets under management⁽³⁾			
Individual	65,214	64,941	-
Mutual funds	47,132	52,245	(10)
	112,346	117,186	(4)

(1) For the year ended October 31, 2021, certain amounts have been reclassified, notably certain amounts that have been adjusted to reflect an accounting policy change applicable to cloud computing arrangements (for additional information, see Note 1 to the consolidated financial statements).

(2) Represents an average of the daily balances for the period.

(3) See the Glossary section on pages 122 to 125 for details on the composition of these measures.

Financial Results

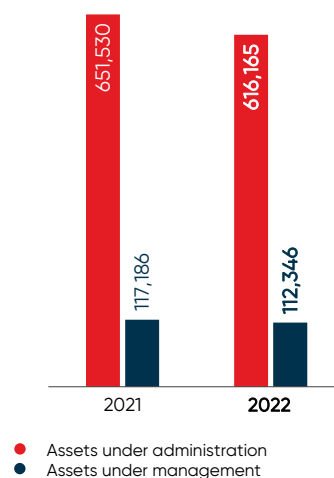
In the Wealth Management segment, net income totalled \$721 million in fiscal 2022, up 12% from \$641 million in fiscal 2021. The segment's total revenues amounted to \$2,375 million in fiscal 2022, up 10% from \$2,166 million in fiscal 2021. Its fiscal 2022 net interest income grew \$148 million or 33% year over year owing to higher interest rates, to growth in loan and deposit volumes, and to the deposit margin. Fee-based revenues rose 8% year over year due to growth in average assets under administration and assets under management as a result of net inflows into various solutions and to stock market performance in the first half of fiscal 2022. As for transaction and other revenues, they decreased 12% year over year as a result of lower commission-generating trading volume during fiscal 2022.

For fiscal 2022, Wealth Management's non-interest expenses stood at \$1,391 million compared to \$1,293 million in fiscal 2021, an increase attributable to higher compensation and employee benefits, notably the variable compensation associated with revenue growth, as well as to higher operations support charges related to the segment's business growth and initiatives. At 58.6%, the segment's 2022 efficiency ratio improved by 1.1 percentage points from 59.7% in 2021.

Wealth Management recorded \$3 million in provisions for credit losses in fiscal 2022 to reflect a less favourable macroeconomic environment, whereas \$1 million had been recorded in fiscal 2021.

Assets Under Administration and Assets Under Management

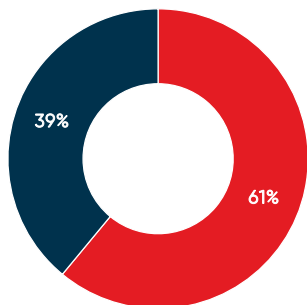
Year ended October 31
(millions of Canadian dollars)



Financial Markets

The Financial Markets segment offers a complete suite of products and services to corporations, institutional clients, and public-sector entities. Whether providing comprehensive advisory services and research or capital markets products and services, the segment focuses on relationships with clients and their growth. Over 900 professionals serve clients through its offices in North America, Europe, the UK, and Asia.

Total Revenues by Category
Year ended October 31, 2022



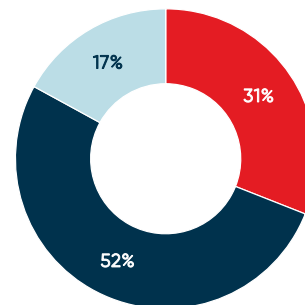
● Global Markets (2021: 53%)
● Corporate and Investment Banking (2021: 47%)

\$2,468 million
Total revenues

\$1,446 million
Income before provisions
for credit losses and
income taxes

\$1,080 million
Net income

Total Revenues by Geographic Distribution
Year ended October 31, 2022



● Province of Quebec (2021: 30%)
● Other provinces (2021: 57%)
● Outside of Canada (2021: 13%)

Global Markets

Financial Markets is a Canadian leader in risk management solutions, structured products, and market-making in exchange-traded funds (ETFs) by volume. The segment offers solutions in the areas of fixed-income securities, currencies, equities, and commodities in order to mitigate the financial and business risks of clients. It also provides new product development expertise to asset managers and fund companies and supports their success by providing liquidity, research, and counterparty services. Financial Markets also provides tailored investment products across all asset classes to institutional and retail distribution channels.

Corporate and Investment Banking

Financial Markets provides corporate banking, advisory, and capital markets services. It offers loan origination and syndication to large corporations for project financing, merger and acquisition transactions, and corporate financing solutions. The segment is also an investment banking leader in Quebec and across Canada. Its comprehensive services include strategic advisory for financing and merger and acquisition initiatives as well as for debt and equity underwriting. It is the Canadian leader in government debt and corporate high-yield debt underwriting. Dominant in Quebec, the segment is the leader in debt underwriting for provincial and municipal governments across Canada while growing its national position in infrastructure and project financing. Financial Markets is active in securitization financing, mainly mortgages insured by the Government of Canada and mortgage-backed securities.

Key Success Factors

- > Pan-Canadian franchise with established leadership in government debt underwriting and ETF market-making in addition to securities lending and recognized capabilities in risk management solutions, structured products, and equity derivatives.
- > Client-centric business with a differentiated and diversified revenue mix.
- > Sound risk management.
- > Flexible approach to capital allocation and proven ability to adapt to evolving capital market conditions and to deliver consistent financial performance.
- > Entrepreneurial culture: Integrated approach, teamwork, and alignment among all groups, including other segments of the Bank.

Economic and Market Review

The impacts of tighter monetary policy announced several months ago by a number of central banks are clearly being felt the world over. In Europe, rising interest rates (and soaring prices) have again stymied growth and shone a light on certain financial weaknesses, notably in the UK, where poor fiscal management nearly derailed the bond market. U.S. growth remained stronger, even though cracks have begun to appear in sectors that are more sensitive to interest rate fluctuations. The Bank of Canada followed the global trend, quickly raising its benchmark rate, which is weighing heavily on the housing market. After skyrocketing increases during the pandemic, house prices have begun to cool, putting downward pressure on household wealth at a time when consumer spending power has already been eroded by steep prices.

The economic environment in 2022 and the outlook for 2023 are discussed in more detail in the Economic Review and Outlook section on page 26.

Objectives and Strategic Priorities

	2022 Achievements and Highlights	2023 Priorities
Ensure continued growth by recruiting, coaching, and retaining a diversified workforce	<ul style="list-style-type: none"> > Advanced our Inclusion and Diversity strategy through scholarship and sponsorship programs. > Coached and retained our talent at all levels through mentorship and executive development programs. 	<ul style="list-style-type: none"> > Implement innovative practices for employee recruitment, coaching, and retention while fostering inclusion.
Carry on international expansion supported by an innovative offering	<ul style="list-style-type: none"> > Enhanced U.S. coverage in key sectors and distribution of selected products. 	<ul style="list-style-type: none"> > Assist our clients in their growth ambitions and funding needs.
Maintain our leadership in established businesses and leverage our strengths onto other businesses	<ul style="list-style-type: none"> > Ranked number one in Canadian government debt underwriting for an eighth consecutive year. > Maintained our ETF leadership position. > Ranked number one in International Securities Finance's (ISF) survey in the G2 Borrowers category for the Americas. 	<ul style="list-style-type: none"> > Maintain our leadership through quality and innovation. > Grow market shares in corporate debt issuance.
Strengthen our leadership role in sustainable financing solutions	<ul style="list-style-type: none"> > Guided and advised our clients in their energy transition. > Exclusive financial advisor to Tidewater Renewables Ltd. on its \$60 million renewable natural gas (RNG) and feedstock partnership with Rimrock RNG Inc., allowing each party to focus on their core competencies to build and advance RNG projects; lead lender to a wholly owned subsidiary of Tidewater Renewables Ltd. on a \$26 million credit facility used to fund investment into the partnership. > Exclusive financial advisor to Whitecap Resources Inc., a leader in driving forward best ESG practices, on its \$1.9 billion acquisition of XTO Energy Canada; joint bookrunner and co-lead arranger on a \$1.4 billion four-year committed term loan. > Supported several cleantech companies through increased capacity. 	<ul style="list-style-type: none"> > Continue discussions with clients, employees, and other stakeholders to achieve net-zero greenhouse gas (GHG) emissions by 2050. > Ensure depth and quality of our coverage regarding the global energy transition. > Make ESG principles a growth lever and impact multiplier for Financial Markets.

2022 Achievements and Highlights

2023 Priorities

Further strengthen information technology to enhance and accelerate our execution

- > Invested in technology and talent to deploy technology enhancements.
- > Leveraged and exported our technology expertise to other segments of the Bank.
- > Used the latest advances in deep learning to automate and scale our platform.

- > Continue to create differentiated technology across all Financial Markets' business lines.

Strengthen our ability to deliver integrated advice and solutions to clients

- > Exclusive financial advisor to Stantec Inc. on its acquisition of select assets of Australian-listed Cardno Limited for US\$500 million.
- > Financial advisor to Cominar Real Estate Investment Trust on its sale to a consortium led by Canderel Management Inc. for \$5.7 billion.
- > Sole bookrunner and lead underwriter on an \$86 million bought deal equity offering for Artemis Gold Inc., following the Bank's inaugural project loan facility; co-lead arranger and underwriter of a committed credit facility of up to \$385 million, plus an additional \$40 million standby cost overrun facility.
- > Exclusive financial advisor to Nomad Royalty Company Ltd. (Nomad) on its sale to Sandstorm Gold Ltd. (Sandstorm) for US\$590 million, including a fairness opinion provided to the Special Committee of Nomad; co-manager on bought deal equity offerings for Nomad (\$42.5 million) and Sandstorm (US\$90 million).
- > Exclusive financial advisor to the Credit Union Central of Saskatchewan on the sale of its 84% ownership stake in Concentra Bank to Equitable Group Inc. (Equitable); co-manager on a \$230 million bought deal offering of subscription receipts for Equitable.
- > Exclusive financial advisor to Vegpro International Inc. on the sale of the majority of its operations to Vision Ridge Partners, LLC; sole bookrunner, administrative agent and arranger on the acquisition financing.
- > Exclusive financial advisor to IBI Group Inc. on its \$873 million sale to Dutch-listed Arcadis N.V.
- > Received Consensus Economics' Forecast Accuracy Award (FAA) for Canada.
- > Sponsored the tenth annual Bloomberg Canadian Finance Conference.

- > Deepen our relationships with corporations, institutional clients, and public-sector entities and help support their growth.

Segment Results – Financial Markets

Year ended October 31
(taxable equivalent basis)⁽¹⁾
(millions of Canadian dollars)

	2022	2021 ⁽²⁾	% change
Global markets			
Equities	979	685	43
Fixed-income	367	357	3
Commodities and foreign exchange	156	128	22
	1,502	1,170	28
Corporate and investment banking	966	1,048	(8)
Total revenues ⁽¹⁾	2,468	2,218	11
Non-interest expenses	1,022	906	13
Income before provisions for credit losses and income taxes	1,446	1,312	10
Provisions for credit losses	(23)	(24)	4
Income before income taxes	1,469	1,336	10
Income taxes ⁽¹⁾	389	353	10
Net income	1,080	983	10
Average assets ⁽³⁾	154,349	151,240	2
Average loans and acceptances ⁽³⁾ (Corporate Banking only)	22,311	19,630	14
Net impaired loans ⁽⁴⁾	91	14	
Net impaired loans as a % of total loans and acceptances ⁽⁴⁾	0.4 %	0.1 %	
Average deposits ⁽³⁾	47,242	44,006	7
Efficiency ratio ⁽⁴⁾	41.4 %	40.8 %	

- (1) The *Total revenues* and *Income taxes* items of the Financial Markets segment are presented on a taxable equivalent basis. Taxable equivalent basis is a calculation method that consists in grossing up certain tax-exempt income by the amount of income tax that would have been otherwise payable. For the year ended October 31, 2022, *Total revenues* were grossed up by \$277 million (\$183 million in 2021) and an equivalent amount was recognized in *Income taxes*. The effect of these adjustments is reversed under the *Other* heading in the segment results.
- (2) For the year ended October 31, 2021, certain amounts have been reclassified, in particular amounts of the loan portfolio of borrowers in the "Oil and gas" and "Pipelines" sectors as well as related activities, which were transferred from the Personal and Commercial segment to the Financial Markets segment. Moreover, certain amounts have been adjusted to reflect an accounting policy change applicable to cloud computing arrangements (for additional information, see Note 1 to the consolidated financial statements).
- (3) Represents an average of the daily balances for the period.
- (4) See the Glossary section on pages 122 to 125 for details on the composition of these measures.

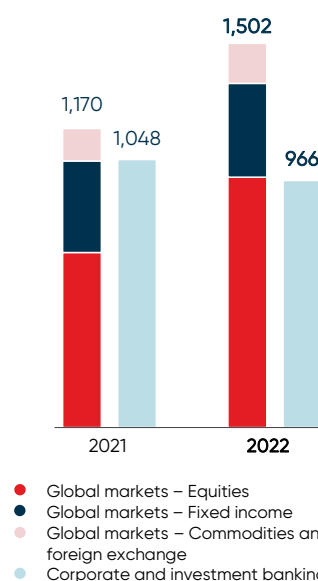
Financial Results

In the Financial Markets segment, net income totalled \$1,080 million in fiscal 2022, a 10% year-over-year increase driven by growth in total revenues. The segment's income before provisions for credit losses and income taxes totalled \$1,446 million in fiscal 2022, up \$134 million or 10% from fiscal 2021. Its fiscal 2022 total revenues amounted to \$2,468 million, up \$250 million or 11% year over year. Global markets revenues rose 28% year over year owing to growth across every revenue category, notably revenues from equities as market conditions favoured greater client activity. As for the fiscal 2022 corporate and investment banking revenues, they were down 8% year over year, mainly due to a decrease in revenues related to capital markets activity, tempered by revenues generated by favourable merger and acquisition activity and by growth in loan volumes.

For fiscal 2022, the segment's non-interest expenses rose 13% year over year, essentially attributable to higher compensation and employee benefits, notably the variable compensation associated with revenue growth, and to higher technology investment expenses and operations support charges. The segment's 2022 efficiency ratio was 41.4% versus 40.8% in 2021.

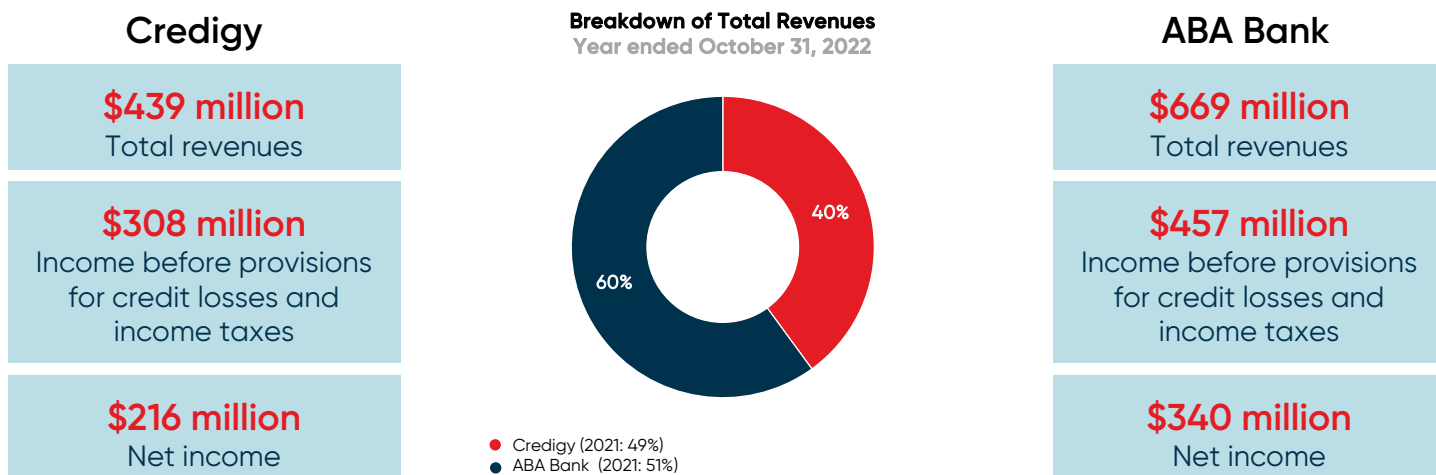
Financial Markets recorded \$23 million in recoveries of credit losses during fiscal 2022 compared to \$24 million in recoveries of credit losses in fiscal 2021. A \$78 million increase in provisions for credit losses on non-impaired loans, resulting from a less favourable macroeconomic outlook than in fiscal 2021, was offset by a \$77 million decrease in provisions for credit losses on impaired loans.

Total Revenues by Category
Year ended October 31
(millions of Canadian dollars)



U.S. Specialty Finance and International

The Bank complements its Canadian growth with a targeted, disciplined international strategy that aims for superior returns. The Bank is currently focused on specialty finance in the U.S. through its Credigy subsidiary and on personal and commercial banking in Cambodia through its ABA Bank subsidiary. The Bank also holds minority positions in financial groups operating in French-speaking Africa and Africa-Asia. The Bank currently has a moratorium on any new significant investments in emerging markets. During fiscal 2022, the U.S. Specialty Finance and International (USSF&I) segment generated 12% of the Bank's consolidated total revenue and 16% of its net income.



U.S. Specialty Finance – Credigy

Founded in 2001 and based in Atlanta, Georgia, Credigy is a specialty finance company primarily active in financing and acquiring a diverse range of performing assets. Its portfolio is mostly comprised of diversified secured consumer receivables in the U.S. market. Through its landmark modelling expertise, flexibility, and client-centric approach, Credigy is a partner of choice for financial services institutions.

Economic and Market Review

The U.S. Federal Reserve (Fed) has already raised its policy rate by 375 basis points since March 2022, and its most recent announcements show that it believes that more work is needed to rein in inflation. Yet, the U.S. economy has begun to grow again after a difficult first six months. While the labour market remains solid, consumers are managing to cope with their reduced buying power by digging into their savings amassed during the pandemic. Americans are also maintaining their spending levels using credit. In fact, credit card debt rose 15%, year over year in the third quarter of 2022, the highest increase seen in 20 years. However, there are growing signs of an economic slowdown on the horizon. Residential investment declined for a sixth consecutive quarter—something not seen since the Great Recession of 2008-09. Moreover, the manufacturing sector growth outlook is less rosy. While inflation is showing some encouraging signs that should soon enable the Fed to press the pause button, there has been so much monetary tightening that growth is expected to slow substantially in 2023.

The economic environment in 2022 and the outlook for 2023 are discussed in more detail in the Economic Review and Outlook section on page 26.

Key Success Factors

- > Proven investment strategy that is adaptable to rapidly changing market conditions.
- > Diversification across several classes of performing assets.
- > Market credibility achieved through 350-plus transactions and over US\$23 billion in total investments life-to-date.
- > Rigorous underwriting approach with continuous refinement of modelling and analytics capabilities.
- > Resilience to unfavourable economic conditions owing to credit quality and structural enhancements that provide downside protection.
- > Emphasis on recruiting and retaining exceptional talent.

Objectives and Strategic Priorities – Credigy

Credigy aims to provide customized solutions for the acquisition or financing of customer receivable assets in pursuit of the best risk-adjusted returns and a pre-tax return on assets (ROA) of at least 2.5%.

	2022 Achievements and Highlights	2023 Priorities
Sustain deal flow by being a partner of choice for institutions facing complex challenges and strategic changes	<ul style="list-style-type: none"> > Conducted active monitoring of the economy and opportunities. > Achieved a balance in transactions among new and existing partners. > Maintained average assets of approximately \$8.2 billion. 	<ul style="list-style-type: none"> > Leverage relationships with current and prospective partners. > Remain prepared to seize opportunities in rapidly evolving markets.
Maintain a diversified mix of performing assets	<ul style="list-style-type: none"> > Performing assets accounted for 99% of assets. > Continued asset class diversification focused on secured high-quality consumer assets. > Leveraged flexibility to invest via financing and direct acquisitions. 	<ul style="list-style-type: none"> > Favour asset diversification and a prudent investment profile. > Maintain a stable risk-reward balance while optimizing for capital efficiency.
Achieve best risk-adjusted returns	<ul style="list-style-type: none"> > Refined and monitored credit models to target the best risk-return investments. > Maintained a disciplined approach to ensure a risk-return balance and a pre-tax return on assets (ROA) of at least 2.5%. 	<ul style="list-style-type: none"> > Actively monitor macroeconomic conditions to implement risk mitigation strategies. > Deliver asset growth through a balanced mix of financing and direct acquisitions.

International – ABA Bank

Established in 1996, ABA Bank provides financial services to individuals and businesses in Cambodia. It is now the largest by assets and the fastest growing commercial bank in Cambodia. ABA Bank offers a full spectrum of financial services to micro, small and medium enterprises (MSMEs) as well as to individuals through 81 branches, 30 self-banking units, 1,024 automated teller machines (ATMs) and other self-service machines, and advanced online banking and mobile banking platforms. It has been selected as the Best Bank in Cambodia by financial magazines *The Banker*, *Global Finance* (eighth consecutive year), *Euromoney* (ninth consecutive year) and *Asiamoney*.

Economic and Market Review

The persistent impact of the pandemic, most notably in China, continues to affect Cambodia's tourism industry. The export sectors on the other hand are growing with textile and agriculture benefitting from the economic recovery in developed countries and the new Regional Comprehensive Trade Partnership between the Association of Southeast Asian Nations (ASEAN), Australia, New Zealand, Brunei Darussalam, China and Japan. The highly dollarized nature of the Cambodian economy (more than 80%) helps to keep inflation under control. After peaking at 8% in mid-2022, it is expected to level off at year end and return to historical averages of 3% by 2024.

The economy grew by 3% in 2021 and is expected to grow by close to 5% in 2022. In 2023, growth rates should remain close to 5%, as tourism returns to more normalized levels. Cambodia will also continue to benefit from increased regional economic integration under the ASEAN trade association. The Cambodian market is underbanked; there is a high adoption and use of mobile technology and social media in the country, and over 65% of the population of 17 million is under 35 years of age.

Key Success Factors

- > Loan strategy targeting MSMEs with simple products.
- > Disciplined risk management that drives high credit quality.
- > Ability to fund loan growth through the deposit strategy.
- > Deposit strategy based on state-of-the art technology, leading to a self-sufficient and expanding transactional banking ecosystem.
- > Experienced leadership team and skilled workforce supported by robust training programs.
- > Governance structure based on rigorous international standards while providing local management with the autonomy to pursue strategic priorities and business objectives.
- > Leveraging National Bank's reputation as a world-class financial institution.
- > International recognition of ABA Bank.

Objectives and Strategic Priorities – ABA Bank

ABA Bank is pursuing an omnichannel banking strategy with the goal of becoming the lending partner of choice to MSMEs while increasing market penetration in deposits and transactional services for retail and business clients.

	2022 Achievements and Highlights	2023 Priorities
Grow market share in MSME lending	<ul style="list-style-type: none"> > Achieved 39% growth in loan volumes. > Went from the third-largest bank in the market to the largest by increasing market share. > Continued to adapt the MSME lending strategy to support the growing needs of customers as their businesses become more mature. > Opened two new branches, bringing the total to 81 throughout the country. 	<ul style="list-style-type: none"> > Open four branches and ten self-banking units in 2023 to extend its reach in Cambodia, continue modernizing its branch network, and gain direct access to a larger pool of MSME customers and retail deposits. > Focus on MSME clients in industries that have been minimally affected by the current economic slowdown. > Continue to adapt the lending strategy in line with the growing needs of MSME customers as their businesses become more mature.
Maintain credit quality	<ul style="list-style-type: none"> > Maintained a well-diversified portfolio (99% of loans are secured). > At 2.8% of the loan portfolio as at October 31, 2022, non-performing loans were below market average. > Closely monitored clients as they exited the payment deferral program established in 2020 to offer relief to clients affected by the slowdown caused by the COVID-19 pandemic. > Standard & Poor's maintained ABA Bank's long-term credit rating at B+ with a "Stable" outlook, based on its strengthening business franchise underpinned by a growing market share and above-average profitability. 	<ul style="list-style-type: none"> > Maintain strong governance, disciplined risk management, and sound business processes. > Ensure strong credit quality across the loan portfolio to keep non-performing loan levels below market averages. > Continue to focus on secured lending.
Sustain growth in deposits and transactional services	<ul style="list-style-type: none"> > Grew deposit volume by 28% from fiscal 2021. > Continued to enhance self-banking capabilities, including the market-leading full-scale mobile banking application in Cambodia. > Self-banking transactions made up 98% of total transactions. > Further expanded ABA 24/7, a network of standalone self-banking locations that provide customers with round-the-clock access to their accounts and now has 30 locations throughout the country. 	<ul style="list-style-type: none"> > Further develop the transactional banking model to accelerate the migration of cash transactions, payments, and money transfers to self-service and digital banking channels. > Adapt the product offering to support the growth and evolving needs of clients. > Increase the deposit base by providing convenience to retail customers through an advanced digital and self-banking infrastructure and by expanding the network of self-service locations.

Segment Results – USSF&I

Year ended October 31

(millions of Canadian dollars)

	2022	2021	% change
Total revenues			
Credigy	439	486	(10)
ABA Bank	669	510	31
International	2	5	
	1,110	1,001	11
Non-interest expenses			
Credigy	131	139	(6)
ABA Bank	212	173	23
International	1	3	
	344	315	9
Income before provisions for credit losses and income taxes	766	686	12
Provisions for credit losses			
Credigy	35	(41)	
ABA Bank	31	26	19
	66	(15)	
Income before income taxes	700	701	-
Income taxes			
Credigy	57	86	(34)
ABA Bank	86	60	43
	143	146	(2)
Net income			
Credigy	216	302	(28)
ABA Bank	340	251	35
International	1	2	
	557	555	-
Average assets ⁽¹⁾	18,890	16,150	17
Average loans and receivables ⁽¹⁾	15,283	12,558	22
Purchased or originated credit-impaired (POCI) loans	459	464	(1)
Net impaired loans excluding POCI loans ⁽²⁾	180	40	
Average deposits ⁽¹⁾	8,577	6,699	28
Efficiency ratio ⁽²⁾	31.0 %	31.5 %	

(1) Represents an average of the daily balances for the period.

(2) See the Glossary section on pages 122 to 125 for details on the composition of these measures.

Financial Results

In the USSF&I segment, net income totalled \$557 million in fiscal 2022 compared to \$555 million in fiscal 2021 as total revenue growth was offset by higher provisions for credit losses. The segment's total revenues amounted to \$1,110 million in fiscal 2022 versus \$1,001 million in fiscal 2021, an 11% increase resulting from a \$159 million or 31% increase in the ABA Bank subsidiary's revenues driven by loan and deposit growth, partly offset by a \$47 million decrease in the Credigy subsidiary's revenues.

For fiscal 2022, the segment's non-interest expenses stood at \$344 million compared to \$315 million in fiscal 2021, a \$29 million increase attributable to higher non-interest expenses at ABA Bank resulting from its business growth.

The segment's provisions for credit losses increased by \$81 million compared to fiscal 2021, resulting in part from the more favourable macroeconomic outlook in fiscal 2021 as well as from more favourable remeasurements of Credigy's POCI loan portfolios in fiscal 2021.

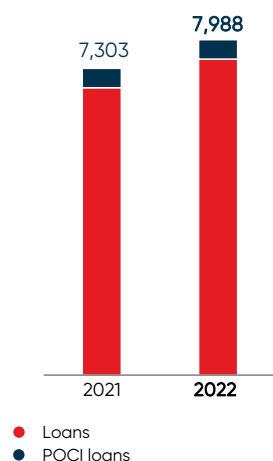
Credigy

For fiscal 2022, the Credigy subsidiary's net income totalled \$216 million, a 28% year-over-year decrease that was notably due to lower revenue and a significant increase in provisions for credit losses. Its income before provisions for credit losses and income taxes totalled \$308 million in fiscal 2022, down 11% year over year. Credigy's fiscal 2022 total revenues amounted to \$439 million, down from \$486 million in fiscal 2021. While there was growth in net interest income, it was more than offset by a decrease in non-interest income, that was due to a \$26 million gain that had been realized in the first quarter of 2021 upon a disposal of loan portfolios, to a favourable impact of fair value remeasurements of certain portfolios during fiscal 2021, and to an unfavourable impact upon remeasurements of certain portfolios in fiscal 2022. Credigy's non-interest expenses were down \$8 million year over year, mainly due to a decrease in variable compensation. Provisions for credit losses rose \$76 million year over year, whereas in fiscal 2021, reversals of allowances for credit losses on non-impaired loans had been recorded to reflect more favourable macroeconomic conditions at that time and more favourable remeasurements of POCI loan portfolios had also been carried out.

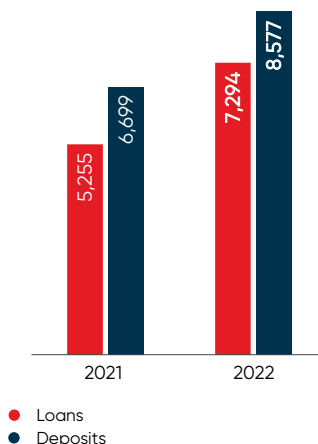
ABA Bank

For fiscal 2022, ABA Bank's net income totalled \$340 million, up 35% from fiscal 2021. Growth in the subsidiary's business activities, mainly in the form of sustained loan and deposit growth, drove total revenues up 31% year over year. This increase was, however, partly offset by lower interest rates on loans given a competitive environment in Cambodia. The subsidiary's fiscal 2022 non-interest expenses stood at \$212 million, a 23% year-over-year increase resulting from higher compensation and employee benefits (notably due to higher salaries given a greater number of employees and higher variable compensation associated with revenue growth) and from higher occupancy expenses attributable to business growth. ABA Bank recorded \$31 million in provisions for credit losses in fiscal 2022, which is \$5 million more than last year, as provisions for credit losses on impaired loans increased to reflect the end of COVID-19 relief measures that had been granted to the subsidiary's clients.

Average Loans and Receivables - Credigy
Year ended October 31
(millions of Canadian dollars)



Average Loans and Average Deposits - ABA Bank
Year ended October 31
(millions of Canadian dollars)



Other

The *Other* heading reports on Treasury operations; liquidity management; Bank funding; asset and liability management; the activities of the Flinks subsidiary, a fintech company specialized in financial data aggregation and distribution; certain specified items; and the unallocated portion of corporate units. Corporate units include Technology and Operations, Risk Management, Employee Experience, and Finance. These units provide advice and guidance throughout the Bank and to its business segments in addition to expertise and support in their respective fields.

Segment Results – Other

Year ended October 31 (millions of Canadian dollars)	2022	2021 ⁽¹⁾
Net interest income ⁽²⁾	(536)	(379)
Non-interest income ⁽²⁾	201	306
Total revenues	(335)	(73)
Non-interest expenses	324	381
Income before provisions for credit losses and income taxes	(659)	(454)
Provisions for credit losses	2	–
Income before income taxes	(661)	(454)
Income taxes (recovery) ⁽²⁾	(372)	(264)
Net loss	(289)	(190)
Non-controlling interests	(1)	–
Net loss attributable to the Bank's shareholders and holders of other equity instruments	(288)	(190)
Specified items after income taxes ⁽³⁾	–	(7)
Net loss – Adjusted⁽³⁾	(289)	(183)
Average assets ⁽⁴⁾	71,868	62,333

(1) For the year ended October 31, 2021, certain amounts have been reclassified.

(2) For the year ended October 31, 2022, *Net interest income* was reduced by \$234 million (\$181 million in 2021), *Non-interest income* was reduced by \$48 million (\$8 million in 2021), and an equivalent amount was recorded in *Income taxes*. These adjustments include a reversal of the taxable equivalent of the Financial Markets segment and the *Other* heading. Taxable equivalent basis is a calculation method that consists in grossing up certain tax-exempt income by the amount of income tax that would have otherwise been payable.

(3) See the Financial Reporting Method section on pages 16 to 21 for additional information on non-GAAP financial measures.

(4) Represents an average of the daily balances for the period.

Financial Results

For the *Other* heading of segment results, there was a net loss of \$289 million in fiscal 2022 compared to a net loss of \$190 million in fiscal 2021. This change in net loss was due to a decrease in total revenues arising mainly from a lower contribution from Treasury activities and from lower gains on investments in fiscal 2022. This decrease in revenues was tempered by a reduction in non-interest expenses, notably variable compensation, and in pension plan expense as well as by a \$20 million reversal of the provision for the compensatory tax on salaries paid in Quebec. In fiscal 2021, the net loss had included a \$33 million gain on a remeasurement of the previously held equity interest in Flinks and a \$30 million loss (\$26 million net of income taxes) related to the fair value measurement of the Bank's equity interest in AfrAsia.

The specified items, net of income taxes, recorded in fiscal 2021 had consisted of \$7 million in intangible asset impairment losses. For fiscal 2022, net loss stood at \$289 million compared to a \$183 million adjusted net loss in fiscal 2021.

Quarterly Financial Information

Several trends and factors have an impact on the Bank's quarterly net income, revenues, non-interest expenses and provisions for credit losses. The following table presents a summary of results for the past eight quarters.

Quarterly Results Summary⁽¹⁾

(millions of Canadian dollars)	2022 ⁽²⁾				2021 ⁽²⁾			
	Q4	Q3	Q2	Q1	Q4	Q3	Q2	Q1
Statement of income data								
Net interest income	1,207	1,419	1,313	1,332	1,190	1,230	1,156	1,207
Non-interest income	1,127	994	1,126	1,134	1,021	1,024	1,082	1,017
Total revenues	2,334	2,413	2,439	2,466	2,211	2,254	2,238	2,224
Non-interest expenses	1,346	1,305	1,299	1,280	1,268	1,224	1,217	1,194
Income before provisions for credit losses and income taxes	988	1,108	1,140	1,186	943	1,030	1,021	1,030
Provisions for credit losses	87	57	3	(2)	(41)	(43)	5	81
Income taxes	163	225	248	258	215	240	228	199
Net income	738	826	889	930	769	833	788	750

(1) For additional information about the 2022 fourth-quarter results, visit the Bank's website at nbc.ca or the SEDAR website at sedar.com to consult the Bank's *Press Release for the Fourth Quarter of 2022*, published on November 30, 2022. Also, a summary of results for the past 12 quarters is provided in Table 1 on pages 112 and 113 of this MD&A.

(2) Certain amounts have been adjusted to reflect an accounting policy change applicable to cloud computing arrangements. For additional information, see Note 1 to the consolidated financial statements.

The analysis of the past eight quarters reflects the sustained performance of all the business segments and helps readers identify the items that have favourably or unfavourably affected results. In the third and fourth quarters of fiscal 2022, the Bank's net income results decreased year over year; this was due to higher provisions for credit losses, as more favourable macroeconomic conditions in these quarters of 2021 had led to reversals of allowances for credit losses. Conversely, for the first two quarters of fiscal 2022, the net income results increased year over year. These increases came from the net income growth generated in each business segment, notably due to higher revenues, and from lower provisions for credit losses recorded in these quarters of fiscal 2022.

Net interest income posted year-over-year increases in every quarter of fiscal 2022. These increases were driven by loan and deposit growth in both the Personal and Commercial segment and the Wealth Management segment, by trading activity revenues in the Financial Markets segment (except for the fourth quarter), by loan portfolio growth and the good performance of certain Credigy portfolios, and by an increase in ABA Bank's net interest income owing to sustained business growth. In addition, interest rates were increased successively during fiscal 2022, which had a favourable impact on net interest income in the third and fourth quarters of fiscal 2022.

Non-interest income posted year-over-year increases in every quarter of fiscal 2022 except for the third quarter; the increases were driven partly by sustained business growth in the Personal and Commercial segment, particularly in the area of card revenues, where there was a notable increase in purchasing volume. In the Wealth Management segment, non-interest income grew substantially in the first and second quarters of fiscal 2022 given growth in average assets under administration and under management as a result of net inflows into various solutions and also due to stock market performance. Conversely, in the third quarter of fiscal 2022, non-interest income was down year over year, notably because higher gains on non-trading securities had been realized during the third quarter of 2021. In the fourth quarter of fiscal 2022, non-interest income was favourably affected by trading activity revenues in the Financial Markets segment. Some factors, however, had an unfavourable impact on non-interest income, including the more favourable fair value remeasurements of Credigy loan portfolios during the quarters of 2021 and a gain realized in the first quarter of 2021 upon a disposal of certain Credigy loan portfolios.

In fiscal 2022, non-interest expenses posted year-over-year increases in every quarter. These increases came from compensation and employee benefits, notably due to wage growth and a greater number of employees, as well as from investments made as part of the Bank's technological evolution. Travel and business development expenses were also up in every quarter of fiscal 2022, as activities with clients resumed during the year. However, certain expenses decreased, in particular the compensatory tax on salaries for which a downward adjustment was recorded in the first quarter of 2022 as well as the expenses incurred to implement client and employee health and safety measures in response to COVID-19, which had been higher during fiscal 2021.

For the first two quarters of fiscal 2022, provisions for credit losses decreased year over year; these decreases were due to reversals of allowances for credit losses on non-impaired loans recorded in the first half of fiscal 2022 given improvements in both the macroeconomic outlook and credit conditions, as well as to lower provisions for credit losses on impaired Commercial Banking and Financial Markets loans. Conversely, in the last two quarters of fiscal 2022, the provisions for credit losses increased year over year given less favourable macroeconomic conditions and a slight deterioration in credit conditions during the third and fourth quarters of fiscal 2022. For the third quarter of fiscal 2022, the year-over-year increase in the provisions for credit losses was also due to the favourable remeasurements of Credigy's POCI loan portfolios that had been recorded in the third quarter of 2021.

The change in the effective tax rates between the quarters of fiscal 2022 and fiscal 2021 came essentially from a higher level and proportion of tax-exempt dividend income in every quarter of fiscal 2022, except for the first quarter of fiscal 2022.

Analysis of the Consolidated Balance Sheet

Consolidated Balance Sheet Summary

As at October 31

(millions of Canadian dollars)

	2022	2021 ⁽¹⁾	% change
Assets			
Cash and deposits with financial institutions	31,870	33,879	(6)
Securities	109,719	106,304	3
Securities purchased under reverse repurchase agreements and securities borrowed	26,486	7,516	252
Loans and acceptances, net of allowances	206,744	182,689	13
Other	28,921	25,233	15
	403,740	355,621	14
Liabilities and equity			
Deposits	266,394	240,938	11
Other	114,101	95,233	20
Subordinated debt	1,499	768	95
Equity attributable to the Bank's shareholders and holders of other equity instruments	21,744	18,679	16
Non-controlling interests	2	3	(33)
	403,740	355,621	14

(1) Certain amounts have been adjusted to reflect an accounting policy change applicable to cloud computing arrangements. For additional information, see Note 1 to the consolidated financial statements.

As at October 31, 2022, the Bank had total assets of \$403.7 billion, which rose \$48.1 billion or 14% from \$355.6 billion since the end of fiscal 2021.

Cash and Deposits With Financial Institutions

At \$31.9 billion as at October 31, 2022, cash and deposits with financial institutions were down \$2.0 billion since October 31, 2021, mainly due to a decrease in deposits with the Bank of Canada, partly offset by an increase in deposits with the U.S. Federal Reserve. The high level of cash and deposits with financial institutions is explained in part by the excess liquidity related to the accommodative monetary policies that have been applied by central banks since 2020. The Bank's liquidity and funding risk management practices are described on pages 91 to 100 of this MD&A.

Securities

Securities, totalling \$109.7 billion as at October 31, 2022, rose \$3.4 billion since October 31, 2021, due to a \$2.6 billion or 3% increase in securities at fair value through profit or loss, notably securities issued or guaranteed by the Canadian government and by U.S. Treasury, other U.S. agencies, and other foreign governments, partly offset by a decrease in equity securities. Securities other than those measured at fair value through profit or loss were also up, rising \$0.8 billion. Securities purchased under reverse repurchase agreements and securities borrowed rose \$19.0 billion, an increase that is mainly related to the activities of the Financial Markets segment and of Treasury. The Bank's market risk management policies are described on pages 84 to 90 of this MD&A.

Loans and Acceptances

As at October 31, 2022, loans and acceptances, net of allowances for credit losses, accounted for 51% of total assets and totalled \$206.7 billion, rising \$24.0 billion or 13% since October 31, 2021.

Residential mortgage loans outstanding amounted to \$80.1 billion as at October 31, 2022, rising \$7.6 billion or 10% since October 31, 2021. This growth was mainly driven by sustained demand for mortgage credit in the Personal and Commercial segment as well as by the activities of the Financial Markets segment and the ABA Bank and Credigy subsidiaries. Personal loans totalled \$45.3 billion at year-end 2022, rising \$4.2 billion from \$41.1 billion since October 31, 2021. This increase came mainly from business growth in Personal Banking and at ABA Bank. At \$2.4 billion, credit card receivables rose \$0.2 billion since October 31, 2021, as the consumer spending habits of clients gradually resumed and resulted in a notable increase in purchasing volume.

As at October 31, 2022, loans and acceptances to business and government totalled \$79.9 billion, a \$12.0 billion or 18% increase since October 31, 2021 that was mainly due to business growth in Commercial Banking, in the corporate financial services, and at ABA Bank.

Table 9 (page 119) shows, among other information, gross loans and acceptances by borrower category as at October 31, 2022. At \$95.6 billion as at October 31, 2022, residential mortgages (including home equity lines of credit) have posted strong growth since 2018 and accounted for 46% of total loans and acceptances. The growth in residential mortgages was driven by sustained demand for mortgage credit in the Personal and Commercial segment and by the business activity at Financial Markets, ABA Bank, and Credigy. As for personal loans (including credit card receivables), they totalled \$18.7 billion as at October 31, 2022, rising \$2.2 billion since October 31, 2021. With respect to commercial loans, the key increases were recorded in the agriculture, utilities, manufacturing, financial services, real estate and real-estate-construction, and other services categories. As at October 31, 2022, certain categories were down compared to a year ago, notably the oil and gas category as well as the education and health care category. Furthermore, the Credigy subsidiary's POCI loans remained relatively stable since October 31, 2021.

Impaired Loans

Impaired loans include all loans classified in Stage 3 of the expected credit loss model and the Credigy subsidiary's POCI loans.

As at October 31, 2022, gross impaired loans stood at \$1,271 million compared to \$1,126 million as at October 31, 2021 (Table 10, page 120). As for net impaired loans, they totalled \$1,030 million as at October 31, 2022 compared to \$836 million as at October 31, 2021. Net impaired loans excluding POCI loans amounted to \$479 million, rising \$196 million from \$283 million as at October 31, 2021. This increase was essentially due to the loan portfolio of the Financial Markets segment and to the loan portfolio of ABA Bank, as the COVID-19 relief measures that had been granted to this subsidiary's clients ceased. The increase was partly offset by decreases in the net impaired loans of the Commercial Banking loan portfolio and of the Credigy loan portfolio (excluding POCI loans). Net POCI loans stood at \$551 million as at October 31, 2022 compared to \$553 million as at October 31, 2021.

A detailed description of the Bank's credit risk management practices is provided on pages 75 to 83 of this MD&A as well as in Note 7 to the consolidated financial statements.

Other Assets

As at October 31, 2022, other assets totalled \$28.9 billion versus \$25.2 billion as at October 31, 2021, a \$3.7 billion increase that came mainly from a \$2.0 billion increase in derivative financial instruments, related to the activities of the Financial Markets segment, and from a \$1.4 billion increase in receivables, prepaid expenses and other items.

Deposits

As at October 31, 2022, deposits stood at \$266.4 billion, rising \$25.5 billion or 11% since the end of fiscal 2021. At \$78.8 billion, personal deposits, as presented in Table 12 (page 121), accounted for 30% of all deposits, and had increased \$8.7 billion since October 31, 2021. This increase was driven by business growth in Personal Banking, in both the Wealth Management and Financial Markets segments, and at ABA Bank.

As shown in Table 12, business and government deposits totalled \$184.2 billion as at October 31, 2022, rising \$16.3 billion from \$167.9 billion as at October 31, 2021. This increase came from the funding activities of the Financial Markets segment and of Treasury, including \$2.0 billion in deposits subject to bank recapitalization (bail-in) conversion regulations, as well as from business and government deposits from the business activities of Commercial Banking and Wealth Management. Deposits from deposit-taking institutions totalled \$3.4 billion as at October 31, 2022, rising \$0.4 billion since the end of fiscal 2021.

Other Liabilities

Other liabilities stood at \$114.1 billion as at October 31, 2022, rising \$18.9 billion since October 31, 2021, essentially due to a \$16.2 billion increase in obligations related to securities sold under repurchase agreements and securities loaned. Obligations related to securities sold short and liabilities related to transferred receivables were also up, rising \$1.5 billion and \$1.1 billion, respectively.

Subordinated Debt and Other Contractual Obligations

Subordinated debt increased since October 31, 2021 as a result of the issuance, on July 25, 2022, of \$750 million medium-term notes, partly offset by the US\$7 million redemption, on August 31, 2022, of debentures denominated in foreign currency. The contractual obligations are presented in detail in Note 29 to the consolidated financial statements.

Equity

As at October 31, 2022, equity attributable to the Bank's shareholders and holders of other equity instruments totalled \$21.7 billion, rising \$3.0 billion from \$18.7 billion since October 31, 2021. This increase was due to net income net of dividends, to the \$500 million issuance of LRCN – Series 3, to the issuances of common shares under the Stock Option Plan, to the net fair value change attributable to the credit risk on financial liabilities designated at fair value through profit or loss, and to accumulated other comprehensive income, notably net unrealized foreign currency translation gains on investments in foreign operations. These increases were partly offset by the repurchases of common shares for cancellation and by remeasurements of pension plans and other post-employment benefit plans.

The Consolidated Statements of Changes in Equity on page 136 of this *Annual Report* present the items that make up equity. In addition, an analysis of the Bank's regulatory capital is presented in the Capital Management section of this MD&A.

Exposures to Certain Activities

The Financial Stability Board (FSB) formed a working group, the Enhanced Disclosure Task Force (EDTF), that was mandated to develop principles for enhancing the risk disclosures of major banks. The EDTF published a report containing 32 recommendations. The risk disclosures required by the EDTF are provided in this *Annual Report* and in the documents entitled *Supplementary Regulatory Capital and Pillar 3 Disclosure* and *Supplementary Financial Information*, which are available on the Bank's website at nbc.ca. In addition, on page 13 of this *Annual Report* is a table of contents that readers can use to locate information relative to the 32 recommendations.

The FSB recommendations seek to enhance the transparency and measurement of certain exposures, in particular structured entities, subprime and Alt-A exposures, collateralized debt obligations, residential and commercial mortgage-backed securities, and leveraged financing structures. The Bank does not market any specific mortgage financing program to subprime or Alt-A clients. The Bank does not have any significant direct position in residential and commercial mortgage-backed securities that are not insured by the CMHC. Credit derivative positions are presented in the *Supplementary Regulatory Capital and Pillar 3 Disclosure* report, which is available on the Bank's website at nbc.ca.

Leveraged finance is commonly employed to achieve a specific objective, for example, to make an acquisition, complete a buy-out, or repurchase shares. Leveraged finance risk exposure takes the form of both funded and unfunded commitments. As at October 31, 2022, total commitments for this type of loan stood at \$5,285 million (\$4,048 million as at October 31, 2021). Details about other exposures are provided in the table concerning structured entities in Note 27 to the consolidated financial statements.

Related Party Transactions

In the normal course of business, the Bank provides various banking services and enters into contractual agreements and other transactions with associates, joint ventures, directors, key officers and other related parties. These agreements and transactions are entered into under conditions similar to those offered to non-related third parties.

In accordance with the *Bank Act* (Canada), the aggregate of loans granted to key officers of the Bank, excluding mortgage loans granted on their principal residence, cannot exceed twice the officer's annual salary.

Loans to eligible key officers are granted under the same conditions as those granted to any other employee of the Bank. The main conditions are as follows:

- the employee must meet the same credit requirements as a client;
- mortgage loans are offered at the preferential employee rate;
- home equity lines of credit bear interest at Canadian prime less 0.5%, but never lower than Canadian prime divided by two;
- personal loans bear interest at a risk-based regular client rate;
- credit card advances bear interest at a prescribed fixed rate in accordance with Bank policy;
- personal lines of credit bear interest at Canadian prime less 0.5%, but never lower than Canadian prime divided by two.

The Bank also offers a deferred stock unit plan to directors who are not Bank employees. For additional information, see Note 22 to the consolidated financial statements. Additional information about related parties is presented in Notes 9, 27 and 28 to the consolidated financial statements.

Income Taxes

Notice of Assessment

In September 2022, the Bank was reassessed by the Canada Revenue Agency (CRA) for additional income tax and interest of approximately \$150 million (including estimated provincial tax and interest) in respect of certain Canadian dividends received by the Bank during the 2017 taxation year.

In prior fiscal years, the Bank had been reassessed for additional income tax and interest of approximately \$725 million (including provincial tax and interest) in respect of certain Canadian dividends received by the Bank during the 2012-2016 taxation years.

In the reassessments, the CRA alleges that the dividends were received as part of a "dividend rental arrangement".

The CRA may issue reassessments to the Bank for taxation years subsequent to 2017 in regard to activities similar to those that were the subject of the above-mentioned reassessments. The Bank remains confident that its tax position was appropriate and intends to vigorously defend its position. As a result, no amount has been recognized in the consolidated financial statements as at October 31, 2022.

Proposed Legislation

On November 4, 2022, the Government of Canada introduced Bill C-32 – *An Act to implement certain provisions of the fall economic statement table in Parliament on November 3, 2022 and certain provisions of the budget tabled in Parliament on April 7, 2022* to implement tax measures applicable to certain entities of banking and life insurer groups, as presented in its budget of April 7, 2022. These tax measures include the Canada Recovery Dividend (CRD), which is a one-time 15% tax on the fiscal 2021 and 2020 average taxable income above \$1 billion, and also include a 1.5% increase in the statutory tax rate. The amount of CRD for the Bank is estimated at \$32 million. Since these tax measures were not substantively enacted at the reporting date, no amount has been recognized in the Bank's consolidated financial statements as at October 31, 2022.

Event After the Consolidated Balance Sheet

Repurchase of Common Shares

On November 29, 2022, the Bank's Board of Directors approved a normal course issuer bid, beginning December 12, 2022, to repurchase for cancellation up to 7,000,000 common shares (representing approximately 2.08% of its outstanding common shares) over the 12-month period ending December 11, 2023. Any repurchase through the Toronto Stock Exchange will be done at market prices. The common shares may also be repurchased through other means authorized by the Toronto Stock Exchange and applicable regulations, including private agreements or share repurchase programs under issuer bid exemption orders issued by the securities regulators. A private purchase made under an exemption order issued by a securities regulator will be done at a discount to the prevailing market price. The amounts that are paid above the average book value of the common shares are charged to *Retained earnings*. This normal course issuer bid is subject to the approval of OSFI and the Toronto Stock Exchange (TSX).

Securitization and Off-Balance-Sheet Arrangements

In the normal course of business, the Bank is party to various financial arrangements that, under IFRS, are not required to be recorded on the Consolidated Balance Sheet or are recorded under amounts other than their notional or contractual values. These arrangements include, among others, transactions with structured entities, derivative financial instruments, the issuance of guarantees, credit instruments, and financial assets received as collateral.

Structured Entities

The Bank uses structured entities, among other means, to diversify its funding sources and to offer services to clients, in particular to help them securitize their financial assets or provide them with investment opportunities. Under IFRS, a structured entity must be consolidated if the Bank controls the entity. Note 1 to the consolidated financial statements describes the accounting policy and criteria used for consolidating structured entities. Additional information on consolidated and non-consolidated structured entities is provided in Note 27 to the consolidated financial statements.

Securitization of the Bank's Financial Assets

Mortgage Loans

The Bank participates in two Canada Mortgage and Housing Corporation (CMHC) securitization programs: the Mortgage-Backed Securities (MBS) Program under the *National Housing Act* (Canada) (NHA) and the Canada Mortgage Bond (CMB) Program. Under the first program, the Bank issues NHA securities backed by insured residential mortgage loans and, under the second, the Bank sells NHA securities to Canada Housing Trust (CHT), which finances the purchase through the issuance of mortgage bonds insured by CMHC. Moreover, these mortgage bonds feature an interest rate swap agreement under which a CMHC-certified counterparty pays CHT the interest due to investors and receives the interest on the NHA securities. As at October 31, 2022, the outstanding amount of NHA securities issued by the Bank and sold to CHT was \$24.1 billion. The mortgage loans sold consist of fixed- or variable-rate residential loans that are insured against potential losses by a loan insurer. In accordance with the NHA-MBS Program, the Bank advances the funds required to cover late payments and, if necessary, obtains reimbursement from the insurer that insured the loan. The NHA-MBS and CMB programs do not use liquidity guarantee arrangements. The Bank uses these securitization programs mainly to diversify its funding sources. In accordance with IFRS, because the Bank retains substantially all of the risks and rewards of ownership of the mortgage loans transferred to CHT, the derecognition criteria are not met. Therefore, the insured mortgage loans securitized under the CMB Program continue to be recognized in *Loans* on the Bank's Consolidated Balance Sheet, and the liabilities for the considerations received from the transfer are recognized in *Liabilities related to transferred receivables* on the Consolidated Balance Sheet. For additional information, see Note 8 to the consolidated financial statements.

Credit Card Receivables

In April 2015, the Bank set up Canadian Credit Card Trust II (CCCT II) to continue its program of securitizing credit card receivables on a revolving basis. The Bank uses this entity for capital management and funding purposes. The Bank acts as the servicer of the receivables sold and maintains the client relationship. Furthermore, it administers the securitization program and ensures that all related procedures are stringently followed and that investors are paid according to the provisions of the program.

As at October 31, 2022, the credit card receivables portfolio held by CCCT II represented an amount outstanding of \$2.1 billion. CCCT II issued notes to investors, \$0.1 billion of which is held by third parties and \$1.3 billion is held by the Bank. CCCT II also issued a bank certificate held by the Bank that stood at \$0.7 billion as at October 31, 2022. New receivables are periodically sold to the structure on a revolving basis to replace the receivables reimbursed by clients.

The different series of notes are rated by the Fitch and DBRS Morningstar (DBRS) rating agencies. From this portfolio of sold receivables, the Bank retains the excess spread, i.e., the residual net interest income after all the expenses related to this structure have been paid, and thus provides first-loss protection. Furthermore, second-loss protection for issued series is provided by notes subordinated to the senior notes, representing 5.8% of the total amount of the series issued. The Bank controls CCCT II and thus consolidates it.

Securitization of Third-Party Financial Assets

The Bank administers multi-seller conduits that purchase financial assets from clients and finance those purchases by issuing commercial paper backed by the acquired assets. Clients use these multi-seller conduits to diversify their funding sources and reduce borrowing costs while continuing to service the financial assets and providing some amount of first-loss protection. Notes issued by the conduits and held by third parties provide additional credit loss protection. The Bank acts as a financial agent and provides administrative and transaction structuring services to these conduits. The Bank provides backstop liquidity and credit enhancement facilities under the commercial paper program. These facilities are presented and described in Notes 26 and 27 to the consolidated financial statements. The Bank has concluded derivative financial instrument contracts with these conduits, the fair value of which is presented on the Bank's Consolidated Balance Sheet. The Bank is not required to consolidate these conduits, as it does not control them.

Derivative Financial Instruments

The Bank uses various types of derivative financial instruments to meet its clients' needs, generate trading activity revenues, and manage its exposure to interest rate, foreign exchange and credit risk as well as other market risks. All derivative financial instruments are accounted for at fair value on the Consolidated Balance Sheet. Transactions in derivative financial instruments are expressed as notional amounts. These amounts are not presented as assets or liabilities on the Consolidated Balance Sheet. They represent the face amount of the contract to which a rate or price is applied to determine the amount of cash flows to be exchanged. Notes 1 and 16 to the consolidated financial statements provide additional information on the types of derivative financial instruments used by the Bank and their accounting basis.

Guarantees

In the normal course of business, the Bank enters into various guarantee contracts. The principal types of guarantees are letters of guarantee, backstop liquidity and credit enhancement facilities, certain securities lending activities, and certain indemnification agreements. Note 26 to the consolidated financial statements provides detailed information on these guarantees.

Credit Instruments

In the normal course of business, the Bank enters into various off-balance-sheet credit commitments. The credit instruments used to meet the financing needs of its clients represent the maximum amount of additional credit that the Bank could be required to extend if the commitments were fully drawn. For additional information on these off-balance-sheet credit instruments and other items, see Note 26 to the consolidated financial statements.

Financial Assets Received as Collateral

In the normal course of business, the Bank receives financial assets as collateral as a result of transactions involving securities purchased under reverse repurchase agreements, securities borrowing and lending agreements, and derivative financial instrument transactions. For additional information on financial assets received as collateral, see Note 26 to the consolidated financial statements.

Capital Management

Capital management has a dual role of ensuring a competitive return to the Bank's shareholders while maintaining a solid capital foundation that covers the risks inherent to the Bank's business activities, supports its business segments, and protects its clients.

Capital Management Framework

The Bank's capital management policy defines the guiding principles as well as the roles and responsibilities of its internal capital adequacy assessment process. This process aims to determine the capital level that the Bank needs to maintain to pursue its business activities and accommodate unexpected losses arising from extremely adverse economic and operational conditions. The Bank has implemented a rigorous internal capital adequacy assessment process that comprises the following procedures:

- conducting an overall risk assessment;
- measuring significant risks and the capital requirements related to the Bank's financial budget for the next fiscal year and current and prospective risk profiles;
- integrating stress tests across the organization and executing sensitivity analyses to determine the capital buffer above minimum regulatory levels (for additional information on enterprise-wide stress testing, see the Risk Management section of this MD&A);
- aggregating capital and monitoring the reasonableness of internal capital compared with regulatory capital;
- comparing projected internal capital against regulatory capital levels, internal operating targets, and competing banks;
- attesting to the adequacy of the Bank's capital levels.

Assessing capital adequacy is an integral part of capital planning and strategy. The Bank sets internal operating targets that include a discretionary cushion in excess of the minimum regulatory requirements, which provides a solid financial structure and sufficient capital to meet management's business needs in accordance with its risk appetite, along with competitive returns to shareholders, under both normal market conditions and a range of severe but plausible stress testing scenarios. The internal capital adequacy assessment process is a key tool in establishing the Bank's capital strategy and is subject to quarterly reviews and periodic amendments.

Risk-adjusted return on capital and shareholder value added (SVA), which are obtained from an assessment of required economic capital, are calculated quarterly for each of the Bank's business segments. The results are then used to guide management in allocating capital among the various business segments.

Structure and Governance

Along with its partners from Risk Management, the Global Funding and Treasury Group, and Finance, the Capital Management team is responsible for maintaining integrated control methods and processes so that an overall assessment of capital adequacy may be performed.

The Board oversees the structure and development of the Bank's capital management policy and ensures that the Bank maintains sufficient capital in accordance with regulatory requirements and in consideration of market conditions. The Board delegates certain responsibilities to the Risk Management Committee (RMC), which in turn recommends capital management policies and oversees application thereof. The Board, on the recommendation of the RMC, assumes the following responsibilities:

- reviewing and approving the capital management policy;
- reviewing and approving the Bank's risk appetite, including the main capital and risk targets and the corresponding limits;
- reviewing and approving the capital plan and strategy on an annual basis, including the Bank's internal capital adequacy assessment process;
- reviewing and approving the implementation of significant measures respecting capital, including contingency measures;
- reviewing significant capital disclosures, including Basel capital adequacy ratios;
- ensuring the appropriateness of the regulatory capital adequacy assessment.

The Senior Leadership Team is responsible for defining the Bank's strategy and plays a key role in guiding measures and decisions regarding capital. The Enterprise-Wide Risk Management Committee oversees capital management, which consists of reviewing the capital plan and strategy and implementing significant measures respecting capital, including contingency measures, and making recommendations with respect to these measures.

Basel Accord and Regulatory Environment

Basel Accord

The Basel Accord proposes a range of approaches of varying complexity, the choice of which determines the sensitivity of capital to risks. A less complex approach, such as the Standardized Approach, uses regulatory weightings, while a more complex approach uses the Bank's internal estimates of risk components to establish risk-weighted assets and calculate regulatory capital.

As required under Basel, risk-weighted assets (RWA) are calculated for each credit risk, market risk, and operational risk. The Bank uses the Advanced Internal Ratings-Based (AIRB) Approach for credit risk to determine minimum regulatory capital requirements for a majority of its portfolios. The credit risk of certain portfolios considered to be less significant is weighted according to the Basel Standardized Approach. The simple risk-weighted method is used to calculate the charge related to banking book equity securities. This method requires proactive management of the capital allocated to portfolios with banking book equity securities, since, beyond a certain investment threshold, the cost of regulatory capital becomes prohibitive. As for operational risk, the Bank uses the Standardized Approach. Market risk-weighted assets are primarily determined using the Internal Model-Based Approach, while the Standardized Approach is used to assess interest-rate specific risk.

With respect to the risk related to securitization operations, the capital treatment depends on the type of underlying exposures and on the information available about the exposures. The Bank must use the Securitization: Internal Ratings-Based Approach (SEC-IRBA) if it is able to apply an approved internal ratings-based model and has sufficient information to calculate the capital requirements for all underlying exposures in the securitization pool. Under this approach, RWA is derived from a combination of supervisory inputs and inputs specific to the securitization exposure, such as the implicit capital charge related to the underlying exposures, the credit enhancement level, the effective maturity, the number of exposures, and the weighted average loss given default (LGD).

If the Bank cannot use the SEC-IRBA, it must use the Securitization: External Ratings-Based Approach (SEC-ERBA) for the securitization exposures that are externally rated. This approach assigns risk weights to exposures using external ratings. The Bank uses the ratings assigned by Moody's, Standard & Poor's (S&P), Fitch, Kroll Bond Rating Agency, or DBRS or a combination of these ratings. The Bank uses the Securitization: Internal Assessment Approach (SEC-IAA) for unrated securitization exposures relating to the asset-backed commercial paper conduits it sponsors. The SEC-IAA rating methodologies used are mainly based on criteria published by the above-mentioned credit rating agencies and consider risk factors that the Bank deems relevant to assessing the credit quality of the exposures. The Bank's SEC-IAA includes an assessment of the extent by which the credit enhancement available for loss protection provides coverage of expected losses. The levels of stressed coverage the Bank requires for each internal risk rating are consistent with the requirements published by the rating agencies for equivalent external ratings by asset class. If the Bank cannot apply the SEC-ERBA or the SEC-IAA, it must use the supervisory formula under the Securitization Standardized Approach (SEC-SA). Under this approach, RWA is derived from inputs specific to the securitization exposure, such as the implicit capital charge related to the underlying exposures calculated under the standardized credit risk approach as well as credit enhancement and delinquency levels.

If none of the above approaches can be used, the securitization exposure must be assigned a risk weight of 1,250%. The Bank can apply a reduced capital charge for securitization exposures that meet the criteria of the Simple, Transparent and Comparable (STC) framework.

Capital ratios are calculated by dividing capital by risk-weighted assets. Credit, market, and operational risks are factored into the risk-weighted assets calculation for regulatory purposes. Basel rules apply at the consolidated level of the Bank. Assets of non-consolidated entities for regulatory purposes are therefore excluded from the risk-weighted assets calculation.

The definition adopted by the Basel Committee on Banking Supervision (BCBS) distinguishes between three types of capital. Common Equity Tier 1 (CET1) capital consists of common shareholders' equity less goodwill, intangible assets, and other CET1 capital deductions. Additional Tier 1 (AT1) capital consists of eligible non-cumulative preferred shares, limited recourse capital notes (LRCN), and other AT1 capital adjustments. The sum of CET1 and AT1 capital forms what is known as Tier 1 capital. Tier 2 capital consists of eligible subordinated debts and certain allowances for credit losses. Total regulatory capital is the sum of Tier 1 and Tier 2 capital.

OSFI is responsible for applying the Basel Accord in Canada. As required under the Basel Accord, OSFI requires that recognized regulatory capital instruments other than common equity must have a non-viability contingent capital (NVCC) clause to ensure that investors bear losses before taxpayers should the government determine that it is in the public interest to rescue a non-viable financial institution. As at October 31, 2022, all of the Bank's regulatory capital instruments, other than common shares, have an NVCC clause. Furthermore, in the regulations of the *Canada Deposit Insurance Corporation (CDIC) Act* and the *Bank Act* (Canada), the Government of Canada has provided detailed information on conversion, issuance, and compensation regimes for bail-in instruments issued by Domestic Systemically Important Banks (D-SIBs) (collectively the Bail-In Regulations). Pursuant to the *CDIC Act*, in circumstances where OSFI has determined that the Bank has ceased, or is about to cease, to be viable, the Governor in Council may, upon a Minister of Finance recommendation indicating that he or she believes that it is in the public interest to do so, grant an order directing CDIC to convert all or a portion of certain shares and liabilities of the Bank into common shares (a "Bail-In Conversion").

The Bail-In Regulations governing the conversion and issuance of bail-in instruments came into force on September 23, 2018, and those governing compensation for holders of converted instruments came into force on March 27, 2018. Any shares and liabilities issued before the date that the Bail-In Regulations came into force are not subject to a Bail-In Conversion, unless, in the case of a liability, the terms of said liability are, on or after that day, amended to increase its principal amount or to extend its term to maturity, and the liability, as amended, meets the requirements to be subject to a Bail-In Conversion.

The Bail-In Regulations prescribe the types of shares and liabilities that are subject to a Bail-In Conversion. In general, any senior debt securities with an initial or amended term-to-maturity greater than 400 days that are unsecured or partially secured and have been assigned a Committee on Uniform Securities Identification Procedures (CUSIP), an International Securities Identification Number (ISIN), or similar identification number are subject to a Bail-In Conversion. However, certain other debt obligations of the Bank, such as structured notes (as defined in the Bail-In Regulations), covered bonds, deposits and certain derivative financial instruments, are not subject to a bail-in conversion.

The Bank and all other major Canadian banks have to maintain the following minimum capital ratios established by OSFI: a CET1 capital ratio of at least 10.5%, a Tier 1 capital ratio of at least 12.0%, and a Total capital ratio of at least 14.0%. All of these ratios are to include a capital conservation buffer of 2.5% established by the BCBS and OSFI, a 1.0% surcharge applicable solely to D-SIBs, and a 2.5% domestic stability buffer established by OSFI. The domestic stability buffer, which varies from 0% to 2.5% of risk-weighted assets, consists exclusively of CET1 capital. A D-SIB that fails to meet this buffer requirement is not subject to automatic constraints to reduce capital distributions but must provide a remediation plan to OSFI. The banks also have to meet the capital floor that sets the regulatory capital level according to the Basel II Standardized Approach. If the capital requirement under Basel III is less than 70% of the capital requirement as calculated under Basel II, the difference is added to risk-weighted assets. OSFI requires Canadian banks to meet a Basel III leverage ratio of at least 3.0%. The leverage ratio is a measure independent of risk that is calculated by dividing the amount of Tier 1 capital by total exposure. Total exposure is defined as the sum of on-balance-sheet assets (including derivative financial instruments exposures and securities financing transaction exposures) and off-balance-sheet items. The assets deducted from Tier 1 capital are also deducted from total exposure.

OSFI's *Total Loss Absorbing Capacity* (TLAC) Guideline, which applies to all D-SIBs under the federal government's bail-in regulations, is to ensure that a D-SIB has sufficient loss-absorbing capacity to support its recapitalization in the unlikely event it becomes non-viable. Available TLAC includes total capital as well as certain senior unsecured debts that satisfy all of the eligibility criteria of OSFI's TLAC guideline. Since November 1, 2021, OSFI has been requiring D-SIBs to maintain a risk-based TLAC ratio of at least 24.0% (including the domestic stability buffer) of risk-weighted assets and a TLAC leverage ratio of at least 6.75%. The TLAC ratio is calculated by dividing available TLAC by risk-weighted assets, and the TLAC leverage ratio is calculated by dividing available TLAC by total exposure. As at October 31, 2022, outstanding liabilities of \$13.9 billion (\$11.9 billion as at October 31, 2021) were subject to conversion under the Bail-In Regulations.

Requirements – Regulatory Capital, Leverage, and TLAC Ratios

As at October 31, 2022							
	Minimum	Capital conservation buffer	Minimum set by BCBS	D-SIB surcharge	Minimum set by OSFI ⁽¹⁾	Domestic stability buffer ⁽²⁾	Minimum set by OSFI ⁽¹⁾ , including the domestic stability buffer
Capital ratios							
CET1	4.5 %	2.5 %	7.0 %	1.0 %	8.0 %	2.5 %	10.5 %
Tier 1	6.0 %	2.5 %	8.5 %	1.0 %	9.5 %	2.5 %	12.0 %
Total	8.0 %	2.5 %	10.5 %	1.0 %	11.5 %	2.5 %	14.0 %
Leverage ratio	3.0 %	n.a.	3.0 %	n.a.	3.0 %	n.a.	3.0 %
TLAC ratio	21.5 %	n.a.	21.5 %	n.a.	21.5 %	2.5 %	24.0 %
TLAC leverage ratio	6.75 %	n.a.	6.75 %	n.a.	6.75 %	n.a.	6.75 %

n.a. Not applicable

(1) The capital ratios and the TLAC ratio include the capital conservation buffer and the D-SIB surcharge.

(2) On June 22, 2022, OSFI confirmed that the domestic stability buffer was being maintained at 2.5%.

The Bank ensures that its capital levels are always above the minimum capital requirements set by OSFI, including the domestic stability buffer. By maintaining a strong capital structure, the Bank can cover the risks inherent to its business activities, support its business segments, and protect its clients.

Other disclosure requirements pursuant to Pillar 3 of the Basel Accord and a set of recommendations defined by the EDTF are presented in the *Supplementary Regulatory Capital and Pillar 3 Disclosure* report published quarterly and available on the Bank's website at nbc.ca. Furthermore, a complete list of capital instruments and their main features is also available on the Bank's website.

Regulatory Context

The Bank closely monitors regulatory developments and participates actively in various consultative processes. In response to the impact of the COVID-19 pandemic, on March 27, 2020 OSFI had announced a series of regulatory adjustments to support the financial and operational resilience of banks. The measures announced by OSFI that have continued to have an impact on the Bank for the year ended October 31, 2022 are described below. Also presented below are brief descriptions of ongoing regulatory projects.

COVID-19 relief measures still in effect as at October 31, 2022:

- Treatment of regulatory capital for expected credit loss accounting purposes: OSFI introduced transitional arrangements applicable to the ECL provisioning method set out in the Basel framework. Under the arrangements, a portion of allowances that would otherwise have been included in Tier 2 capital is included in CET1 capital. The increased amount is adjusted for tax effects and multiplied by a scaling factor that decreases over time. The scaling factor was set at 70% for fiscal 2020, at 50% for fiscal 2021, and at 25% for fiscal 2022. These arrangements ceased to apply on November 1, 2022.
- Capital floor: OSFI lowered the floor factor from 75% to 70%, which will stay in place until the domestic implementation of the Basel III capital floor comes into effect in the second quarter of 2023.
- Leverage ratio: OSFI is continuing to allow banks to temporarily exclude exposures from central bank reserves for leverage ratio purposes. On September 13, 2022, OSFI announced that this temporary exclusion will cease to apply on April 1, 2023.

Basel III Reform

In December 2017, the Group of Central Bank Governors and Heads of Supervision (GHOS), which oversees the BCBS, endorsed the outstanding Basel III post-crisis regulatory reforms. The purpose of the approved reforms, set out in *Basel III: Finalising Post-Crisis Reforms*, is to reduce excessive variability in risk-weighted assets and improve comparability and transparency among bank capital ratios.

On March 27, 2020, in response to the impact of the COVID-19 pandemic, GHOS announced a postponement to the implementation of the Basel III international capital standard reform. OSFI therefore postponed, until the first quarter of 2023, the implementation of the Standardized Approach and Advanced IRB Approach to credit risk, the revision of the operational risk framework and of the leverage ratio framework, and the introduction of a more risk-sensitive capital floor. Implementation of the Pillar 3 financial disclosure requirements finalized by the BCBS in December 2018 was also postponed until at least the first quarter of 2023. On November 29, 2021, OSFI postponed the implementation of the above-mentioned Basel III reform items to the second quarter of 2023. Lastly, implementation of the final set of revisions to the new market risk framework, entitled *Fundamental Review of the Trading Book* and published in January 2019, and implementation of the revised credit valuation adjustment (CVA) risk framework are being postponed to the first quarter of 2024.

On January 31, 2022, OSFI released its final capital and liquidity rules that incorporate the final Basel III reforms, and on February 7, 2022, OSFI published corresponding changes to the regulatory returns, i.e., the *Basel Capital Adequacy Return* (BCAR) and the *Leverage Requirements Return* (LRR).

Other Projects

On March 31, 2022, OSFI released, for consultation purposes, a draft guideline entitled *Assurance on Capital, Leverage and Liquidity Returns*. OSFI relies largely on the regulatory returns produced by financial institutions when assessing their safety and soundness. The purpose of this draft guideline is to better inform auditors and institutions on the work to be performed on regulatory returns in order to clarify and align OSFI's assurance expectations across all financial institutions. On November 7, 2022, OSFI released the final version of this guideline, which notably addresses the assurance that must be provided by external auditors, senior management attestation, the assurance that must be provided by internal auditors, and the effective dates, which will range from fiscal 2023 to fiscal 2025.

On June 30, 2022, the BCBS published its second public consultation on the prudential treatment of cryptoasset risk exposures faced by banks. This consultation builds on preliminary proposals from the first consultation published in June 2021 and the responses received. The BCBS plans to finalize the standards by the end of 2022. The Bank is actively participating in this consultation. On August 18, 2022, OSFI released an advisory on interim arrangements for dealing with cryptoassets held by federally regulated financial institutions, which outlines its prudential expectations on cryptoasset holdings and sets exposure limits. OSFI also provided guidance on the regulatory capital and liquidity treatment of cryptoasset exposures. These interim arrangements will take effect in the second quarter of 2023.

Capital Management in 2022

Management Activities

On November 4, 2021, OSFI amended its capital distribution expectations, namely, by permitting financial institutions to increase regular dividends and, subject to OSFI approval, to buy back shares.

On November 30, 2021, the Bank's Board of Directors approved a normal course issuer bid, which began on December 10, 2021, to repurchase for cancellation up to 7,000,000 common shares (representing approximately 2% of its common shares outstanding) over a 12-month period ending no later than December 9, 2022. This normal course issuer bid was approved by OSFI and the Toronto Stock Exchange (TSX) on December 8, 2021. During the year ended October 31, 2022, the Bank repurchased 2,500,000 common shares under this program for \$245 million, which reduced *Common share* capital by \$24 million and *Retained earnings* by \$221 million.

On July 25, 2022, the Bank issued medium-term notes for an amount of \$750 million, bearing interest at 5.426% and maturing on August 16, 2032. As these medium-term notes satisfy the NVCC requirements, they qualify for the purposes of calculating regulatory capital under Basel III.

On August 31, 2022, the Bank redeemed the US\$7 million non-NVCC debentures denominated in foreign currency and maturing on February 28, 2087 at a price equal to their nominal value plus accrued interest.

On September 8, 2022, the Bank issued \$500 million of LRCN – Series 3 for which noteholder recourse is limited to the assets held by an independent trustee in a consolidated limited recourse trust. The trust's assets consist of \$500 million of Series 46 First Preferred Shares issued by the Bank in conjunction with the LRCN – Series 3. The LRCN – Series 3 sell for \$1,000 each and bear interest at a fixed rate of 7.50% per annum until November 16, 2027 exclusively and, thereafter, at an annual rate equal to the yield on five-year Government of Canada bonds plus 4.281% until November 16, 2077. Since the LRCN – Series 3 satisfy the NVCC requirements, they qualify for the purposes of calculating regulatory capital under Basel III.

As at October 31, 2022, the Bank had 336,582,124 issued and outstanding common shares compared to 337,912,283 a year earlier. It also had 66,000,000 issued and outstanding preferred shares, unchanged from October 31, 2021. In addition, as at October 31, 2022, the Bank had 1,500,000 LRCN compared to 1,000,000 a year earlier. For additional information on capital instruments, see Notes 15 and 18 to the consolidated financial statements.

Dividends

The Bank's strategy for common share dividends is to aim for a dividend payout ratio of between 40% and 50% of net income attributable to common shareholders, taking into account such factors as financial position, cash needs, regulatory requirements, and any other factor deemed relevant by the Board.

For fiscal 2022, the Bank declared \$1,206 million in dividends to common shareholders, which represents 36.8% of net income attributable to common shareholders (2021: 31.7%). The declared dividends are below the target payout range given the interruption to dividend increases prescribed by OSFI at the onset of the COVID-19 pandemic. OSFI has only been allowing Canadian banks to make capital distribution decisions, i.e., dividend increases and share buybacks, since November 4, 2021. Given the economic conditions during fiscal 2022, the Bank has taken a prudent approach to managing regulatory capital and remains confident in its ability to increase earnings going forward.

Shares, Other Equity Instruments, and Stock Options

	As at October 31, 2022	
	Number of shares or LRCN	\$ million
First preferred shares		
Series 30	14,000,000	350
Series 32	12,000,000	300
Series 38	16,000,000	400
Series 40	12,000,000	300
Series 42	12,000,000	300
	66,000,000	1,650
Other equity instruments		
LRCN – Series 1	500,000	500
LRCN – Series 2	500,000	500
LRCN – Series 3	500,000	500
	1,500,000	1,500
	67,500,000	3,150
Common shares	336,582,124	3,196
Stock options	11,861,749	

As at November 25, 2022, there were 336,734,809 common shares and 11,714,314 stock options outstanding. NVCC provisions require the conversion of capital instruments into a variable number of common shares should OSFI deem a bank to be non-viable or should the government publicly announce that a bank has accepted or agreed to accept an injection of capital. If an NVCC trigger event were to occur, all of the Bank's preferred shares, LRCNs, and medium-term notes maturing on February 1, 2028 and August 16, 2032, which are NVCC capital instruments, would be converted into common shares of the Bank according to an automatic conversion formula at a conversion price corresponding to the greater of the following amounts: (i) a \$5.00 contractual floor price; or (ii) the market price of the Bank's common shares on the date of the trigger event (10-day weighted average price). Based on a \$5.00 floor price and including an estimate for accrued dividends and interest, these NVCC capital instruments would be converted into a maximum of 1,093 million Bank common shares, which would have a 76.5% dilutive effect based on the number of Bank common shares outstanding as at October 31, 2022.

Regulatory Capital Ratios, Leverage Ratio and TLAC Ratios

As at October 31, 2022, the Bank's CET1, Tier 1, and Total capital ratios were, respectively, 12.7%, 15.4% and 16.9%, compared to ratios of, respectively, 12.4%, 15.0% and 15.9% as at October 31, 2021. All of the capital ratios have therefore increased since October 31, 2021, essentially due to net income net of dividends and to common share issuances under the Stock Option Plan. These factors were partly offset by growth in RWA, common share repurchases, and the impact of the transitional measures applicable to ECL provisioning, of which the scaling factor decreased from 50% to 25%. The increase in the Tier 1 capital ratio was also due to the \$500 million issuance of limited recourse capital notes, i.e., Limited Recourse Capital Notes (LRCN) – Series 3, on September 8, 2022. The increase in the Total capital ratio was also due to the \$750 million issuance of medium-term notes on July 25, 2022. As at October 31, 2022, the leverage ratio was 4.5% compared to 4.4% as at October 31, 2021. The growth in Tier 1 capital was partly offset by growth in total exposure, which will continue to benefit, until April 1, 2023, from the temporary measure permitted by OSFI with respect to the exclusion of exposures from central bank reserves.

As at October 31, 2022, the Bank's TLAC ratio and TLAC leverage ratio were, respectively, 27.7% and 8.1%, compared with 26.3% and 7.8%, respectively, as at October 31, 2021. The increase in the TLAC ratio was due to the same factors as those provided for the Total capital ratio and to the net TLAC instrument issuances during the period. The increase in the TLAC leverage ratio was due to the same factors as those provided for the leverage ratio and to the net TLAC instrument issuances.

During the year ended October 31, 2022, the Bank was in compliance with all of OSFI's regulatory capital, leverage, and TLAC requirements.

Regulatory Capital⁽¹⁾, Leverage Ratio⁽¹⁾ and TLAC⁽²⁾

As at October 31

(millions of Canadian dollars)

	2022		2021	
	Adjusted ⁽³⁾		Adjusted ⁽³⁾	
Capital				
CET1	14,763	14,818	12,866	12,973
Tier 1	17,906	17,961	15,515	15,622
Total	19,727	19,727	16,643	16,643
Risk-weighted assets	116,840	116,840	104,358	104,358
Total exposure	401,780	401,780	351,160	351,160
Capital ratios				
CET1	12.6 %	12.7 %	12.3 %	12.4 %
Tier 1	15.3 %	15.4 %	14.9 %	15.0 %
Total	16.9 %	16.9 %	15.9 %	15.9 %
Leverage ratio	4.5 %	4.5 %	4.4 %	4.4 %
Available TLAC⁽²⁾	32,351	32,351	27,492	27,492
TLAC ratio⁽²⁾	27.7 %	27.7 %	26.3 %	26.3 %
TLAC leverage ratio⁽²⁾	8.1 %	8.1 %	7.8 %	7.8 %

(1) Capital, risk-weighted assets, total exposure, the capital ratios, and the leverage ratio are calculated in accordance with the Basel III rules, as set out in OSFI's *Capital Adequacy Requirements Guideline* and *Leverage Requirements Guideline*.

(2) Available TLAC, the TLAC ratio, and the TLAC leverage ratio are calculated in accordance with OSFI's *Total Loss Absorbing Capacity Guideline*.

(3) Adjusted amounts are calculated in accordance with the Basel III rules, as set out in OSFI's *Capital Adequacy Requirements Guideline*, and exclude the transitional measure for provisioning expected credit losses.

Movement in Regulatory Capital⁽¹⁾

Year ended October 31

(millions of Canadian dollars)

	2022	2021
Common Equity Tier 1 (CET1) capital		
Balance at beginning	12,973	11,167
Issuance of common shares (including Stock Option Plan)	54	93
Impact of shares purchased or sold for trading	(1)	(1)
Repurchase of common shares	(245)	–
Other contributed surplus	16	11
Dividends on preferred and common shares and distributions on other equity instruments	(1,325)	(1,089)
Net income attributable to the Bank's shareholders and holders of other equity instruments	3,384	3,140
Common share capital issued by subsidiaries and held by third parties	–	–
Removal of own credit spread net of income taxes	(733)	(20)
Other	448	496
Movements in accumulated other comprehensive income		
Translation adjustments	333	(190)
Debt securities at fair value through other comprehensive income	(105)	(30)
Other	(2)	–
Change in goodwill and intangible assets (net of related tax liability)	(67)	(73)
Other, including regulatory adjustments and transitional arrangements		
Change in defined benefit pension plan asset (net of related tax liability)	145	(402)
Change in amount exceeding 15% threshold		
Deferred tax assets	–	–
Significant investment in common shares of financial institutions	–	–
Deferred tax assets, unless they result from temporary differences (net of related tax liability)	(5)	7
Other deductions of regulatory adjustments to CET1 implemented by OSFI ⁽²⁾	(52)	(136)
Change in other regulatory adjustments	–	–
Balance at end	14,818	12,973
Additional Tier 1 capital		
Balance at beginning	2,649	2,945
New Tier 1 eligible capital issuances	500	500
Redeemed capital	–	(800)
Change in non-qualifying Additional Tier 1 capital subject to phase-out	–	–
Other, including regulatory adjustments and transitional arrangements	(6)	4
Balance at end	3,143	2,649
Total Tier 1 capital	17,961	15,622
Tier 2 capital		
Balance at beginning	1,021	1,055
New Tier 2 eligible capital issuances	750	–
Redeemed capital	–	–
Change in non-qualifying Tier 2 subject to phase-out	–	–
Tier 2 instruments issued by subsidiaries and held by third parties	–	–
Change in certain allowances for credit losses	21	20
Other, including regulatory adjustments and transitional arrangements	(26)	(54)
Balance at end	1,766	1,021
Total regulatory capital	19,727	16,643

(1) See the Financial Reporting Method section on pages 16 to 21 for additional information on capital management measures.

(2) This item includes the transitional measure applicable to expected credit loss provisioning implemented during the second quarter of 2020.

RWA by Key Risk Drivers

Risk-weighted assets (RWA) amounted to \$116.8 billion as at October 31, 2022 compared to \$104.4 billion as at October 31, 2021, a \$12.4 billion increase resulting mainly from organic growth in RWA and from foreign exchange movements, partly offset by improvement in the credit quality of the loan portfolio and of exposures to derivative financial instruments, and by model updates and methodology and policy changes. Changes in the Bank's RWA by risk type are presented in the following table.

Risk-Weighted Assets Movement by Key Drivers⁽¹⁾

Quarter ended (millions of Canadian dollars)	October 31, 2022	July 31, 2022	April 30, 2022	January 31, 2022	October 31, 2021
	Total	Total	Total	Total	Total
Credit risk – Risk-weighted assets at beginning	91,229	88,878	88,889	87,213	85,914
Book size	2,405	2,500	1,780	1,002	1,944
Book quality	93	(59)	(1,397)	(22)	(430)
Model updates	300	13	(666)	29	(7)
Methodology and policy	339	–	–	–	–
Acquisitions and disposals	–	–	–	–	–
Foreign exchange movements	1,775	(103)	272	667	(208)
Credit risk – Risk-weighted assets at end	96,141	91,229	88,878	88,889	87,213
Market risk – Risk-weighted assets at beginning	5,696	4,453	3,498	3,770	4,072
Movement in risk levels ⁽²⁾	329	1,243	542	(272)	(302)
Model updates	–	–	413	–	–
Methodology and policy	–	–	–	–	–
Acquisitions and disposals	–	–	–	–	–
Market risk – Risk-weighted assets at end	6,025	5,696	4,453	3,498	3,770
Operational risk – Risk-weighted assets at beginning	14,452	14,147	13,781	13,375	13,153
Movement in risk levels	222	305	366	406	222
Acquisitions and disposals	–	–	–	–	–
Operational risk – Risk-weighted assets at end	14,674	14,452	14,147	13,781	13,375
Risk-weighted assets at end	116,840	111,377	107,478	106,168	104,358

(1) See the Financial Reporting Method section on pages 16 to 21 for additional information on capital management measures.

(2) Also includes foreign exchange rate movements that are not considered material.

The table above provides the risk-weighted assets movements by key drivers underlying the different risk categories.

The *Book size* item reflects organic changes in book size and composition (including new loans and maturing loans). RWA movements attributable to book size include increases or decreases in exposures, measured by exposure at default, assuming a stable risk profile.

The *Book quality* item is the Bank's best estimate of changes in book quality related to experience, such as underlying customer behaviour or demographics, including changes resulting from model recalibrations or realignments and also including risk mitigation factors.

The *Model updates* item is used to reflect implementations of new models, changes in model scope, and any other change applied to address model malfunctions. During the year ended October 31, 2022, the Bank updated the models used for retail lines of credit, mortgages, home equity lines of credit, and certain non-retail exposures. It also changed the SVaR period of the 2008 Global Financial Crisis (GFC) to the 2020 COVID-19 period at the start of the second quarter of 2022 and then returned to the 2008 GFC period towards the end of the same quarter. Lastly, the Bank transitioned a retail loan portfolio from the Standardized Approach to the Advanced Internal Ratings-Based (AIRB) Approach for measuring credit risk.

The *Methodology and policy* item presents the impact of changes in calculation methods resulting from changes in regulatory policies or from new regulations. During the year ended October 31, 2022, the Bank decided to early adopt the Basel III reform requirements related to risk parameter floors for certain exposures calculated using the Internal Ratings-Based Approach for credit risk.

Allocation of Economic Capital and Regulatory RWA

Economic capital is an internal measure that the Bank uses to determine the capital it needs to remain solvent and to pursue its business operations. Economic capital takes into consideration the credit, market, operational, business, and other risks to which the Bank is exposed as well as the risk diversification effect among them and among the business segments. Economic capital thus helps the Bank to determine the capital required to protect itself against such risks and ensure its long-term viability. The by-segment allocation of economic capital and regulatory RWA was carried out on a stand-alone basis before attribution of goodwill and intangible assets. The method used to assess economic capital is reviewed regularly in order to accurately quantify these risks.

The Risk Management section of this MD&A provides comprehensive information about the main types of risk. The "Other risks" presented below include risks such as business risk and structural interest rate risk in addition to the benefit of diversification among types of risk.

Allocation of Risks by Business Segment

As at October 31, 2022

(millions of Canadian dollars)

National Bank of Canada					
Business segments	Personal and Commercial	Wealth Management	Financial Markets	U.S. Specialty Finance and International	Other
Major activities	Banking services Credit services Financing Investment solutions Insurance	Full-service brokerage Private banking Direct brokerage Investment solutions Administrative and trade execution services Transaction products for advisors Trust and estate services	Equities, fixed-income, commodities and foreign exchange Corporate banking Investment banking	U.S. Specialty Finance • Credigy International • ABA Bank (Cambodia) • Minority interests in emerging markets	Treasury activities Liquidity management Bank funding Asset and liability management Corporate units Fintech services • Flinks
Economic capital by type of risk	Credit 3,120 Market – Operational 459 Other risks 282 Total 3,861	Credit 74 Market – Operational 299 Other risks 475 Total 848	Credit 2,686 Market 324 Operational 350 Other risks 765 Total 4,125	Credit 1,177 Market – Operational 134 Other risks 72 Total 1,383	Credit 134 Market (91) Operational (56) Other risks (557) Total (570)
Risk-weighted assets⁽¹⁾	Credit 41,500 Market – Operational 5,661 Total 47,161	Credit 1,529 Market – Operational 3,711 Total 5,240	Credit 32,557 Market 5,891 Operational 4,321 Total 42,769	Credit 14,199 Market – Operational 1,677 Total 15,876	Credit 6,356 Market 134 Operational (696) Total 5,794

(1) See the Financial Reporting Method section on pages 16 to 21 for additional information on capital management measures.

Risk Management

In this section of the MD&A, grey-shaded text and tables marked with an asterisk (*) are integral parts of the consolidated financial statements. They represent the Bank's objectives, its risk management policies and procedures, and the methods it applies to measure credit risk, market risk as well as liquidity and funding risk, as required by IFRS 7 – *Financial Instruments: Disclosures*.

Risk-taking is intrinsic to a financial institution's business. The Bank views risk as an integral part of its development and the diversification of its activities. It advocates a risk management approach that is consistent with its business strategy. The Bank voluntarily exposes itself to certain risk categories, particularly credit and market risk, in order to generate revenue. It also assumes certain risks that are inherent to its activities—to which it does not choose to expose itself—and that do not generate revenue, i.e., mainly operational risks. The purpose of sound and effective risk management is to provide reasonable assurance that incurred risks do not exceed acceptable thresholds, to control the volatility in the Bank's results, and to ensure that risk-taking contributes to the creation of shareholder value.

Risk Management Framework

Risk is rigorously managed. Risks are identified, measured, and controlled to achieve an appropriate balance between returns obtained and risks assumed. Decision-making is therefore guided by risk assessments that align with the Bank's risk appetite and by prudent levels of capital and liquidity. Despite the exercise of stringent risk management and existing mitigation measures, risk cannot be eliminated entirely, and residual risks may occasionally cause significant losses.

The Bank has developed guidelines that support sound and effective risk management and that help preserve its reputation, brand, and long-term viability.

- risk is everyone's business: the business units, the risk management and oversight functions, and Internal Audit all play an important role in ensuring a risk management framework is in place; operational transformations and simplifications are conducted without compromising rigorous risk management;
- client-centric: having quality information is key to understanding clients, effectively managing risk, and delivering excellent client service;
- enterprise-wide: an integrated view of risk is the basis for sound and effective risk management and decision-making by management;
- human capital: the Bank's employees are engaged, experienced and have a high level of expertise; their curiosity supports continuous development and their rigour ensures that risk management is built into the corporate culture; incentive-based compensation programs are designed to adhere to the Bank's risk tolerance;
- fact-based: good risk management relies heavily on common sense and good judgment and on advanced systems and models.

Risk Appetite

Risk appetite represents how much risk an organization is willing to assume to achieve its business strategy. The Bank defines its risk appetite by setting tolerance thresholds, by aligning those thresholds with its business strategy, and by integrating risk management throughout its corporate culture. Risk appetite is built into decision-making processes as well as into strategic, financial, and capital planning.

The Bank's risk appetite framework consists of principles, statements, metrics as well as targets and is reinforced by policies and limits. When setting its risk appetite targets, the Bank considers regulatory constraints and the expectations of stakeholders, in particular customers, employees, the community, shareholders, regulatory agencies, governments, and rating agencies. The risk appetite framework is defined by the following principles and statements:

The Bank's reputation, brand and long-term viability are at the centre of our decisions, which demand:

- a strong credit rating to be maintained;
- a strong capital and cash position;
- rigorous management of regulatory compliance risk, including sales practices;
- zero tolerance for negligence in information security.

The Bank understands the risks taken; they are aligned with our business strategy and translate into:

- a risk-reward balance;
- a stable risk profile;
- a strategic level of concentration aligned with approved targets.

The Bank's transformation and simplification plan is being carried out without compromising rigorous risk management, which is reflected in:

- a low tolerance to operational and reputation risk;
- operational and information systems stability, both under normal circumstances and in times of crisis.

The Bank's management and business units are involved in the risk appetite setting process and are responsible for adequately monitoring the chosen risk indicators. These needs are assessed by means of the enterprise strategic planning process. The risk indicators are reported on a regular basis to ensure an effective alignment between the Bank's risk profile and its risk appetite, failing which appropriate actions might be taken. Additional information on the key credit, market and liquidity risk indicators monitored by the Bank's management is presented on the following pages.

Enterprise-Wide Stress Testing

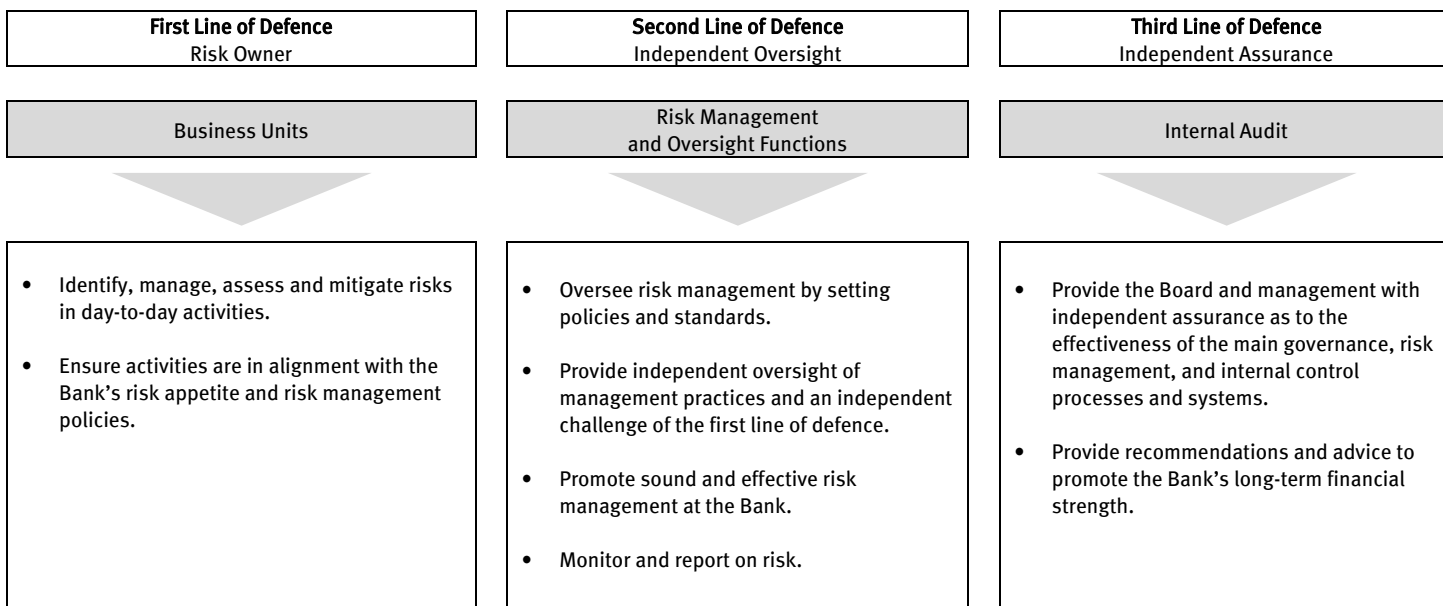
An enterprise-wide stress testing program is in place at the Bank. It is part of a more extensive process aimed at ensuring that the Bank maintains adequate capital levels commensurate with its business strategy and risk appetite. Stress testing can be defined as a risk management method that assesses the potential effects—on the Bank's financial position, capital and liquidity—of a series of specified changes in risk factors, corresponding to exceptional but plausible events. The program supports management's decision-making process by identifying potential vulnerabilities for the Bank as a whole and that are considered in setting limits as well as in longer term business planning. The scenarios and stress test results are approved by the Stress Testing Oversight Committee and are reviewed by the Global Risk Committee (GRC) and the Risk Management Committee (RMC). For additional information, see the Stress Testing section of this MD&A applicable to credit risk, market risk, and liquidity risk.

Incorporation of Risk Management into the Corporate Culture

Risk management is supported by the Bank's cultural evolution through, notably, the following pillars:

- **Tone set by management:** The Bank's management continually promotes risk management through internal communications. The Bank's risk appetite is therefore known to all.
- **Shared accountability:** A balanced approach is advocated, whereby business development initiatives are combined with a constant focus on sound and effective risk management. In particular, risk is taken into consideration when preparing the business plans of the business segments, when analyzing strategic initiatives, and when launching new products.
- **Transparency:** A foundation of the business's values, transparency lets us communicate our concerns quickly without fear of reprisal. We are a learning-focused organization where employees are allowed to make mistakes.
- **Behaviour:** The Bank's risk management is strengthened by incentive compensation programs that are structured to reflect the Bank's risk appetite.
- **Continuous development:** All employees must complete mandatory annual regulatory compliance training focused on the Bank's *Code of Conduct* and on anti-money laundering and anti-terrorist financing (AML/ATF) efforts as well as cybersecurity training. Risk management training is also offered across all of the Bank's business units.

In addition to these five pillars, Internal Audit carries out an evaluation of the corporate culture as part of its mandate. Furthermore, to ensure the effectiveness of the existing risk management framework, the Bank has defined clear roles and responsibilities by reinforcing the concept of the three lines of defence. The Governance Structure section presented on the following pages defines this concept as well as the roles and responsibilities of the three lines of defence.



Governance Structure *

The following chart shows the Bank's overall governance architecture and the governance relationships established for risk management.



The Board of Directors (Board)⁽¹⁾

The Board is responsible for approving and overseeing management of the Bank's internal and commercial affairs, and it establishes strategic directions together with management. It also approves and oversees the Bank's overall risk philosophy and risk appetite, acknowledges and understands the main risks faced by the Bank, and makes sure appropriate systems are in place to effectively manage and control those risks. In addition, the Board ensures that the Bank operates in accordance with environmental, social and governance (ESG) practices and strategies. It carries out its mandate both directly and through its committees: the Audit Committee, the Risk Management Committee, the Human Resources Committee, the Conduct Review and Corporate Governance Committee, and the Technology Committee. In addition, the various oversight functions, the Global Risk Committee and the working groups report to the Board and advise it.

The Audit Committee⁽¹⁾

The Audit Committee oversees the work of the Bank's internal auditor and independent auditor; ensures the Bank's financial strength; establishes the Bank's financial reporting framework, analysis processes and internal controls; and reviews any reports of irregularities in accounting, internal controls, or audit.

The Risk Management Committee (RMC)⁽¹⁾

The Risk Management Committee examines the risk appetite framework and recommends it to the Board for approval. It approves the main risk management policies and risk tolerance limits. It ensures that appropriate resources, processes, and procedures are in place to properly and effectively manage risk on an ongoing basis. Finally, it monitors the risk profile and risk trends of the Bank's activities and ensures alignment with the risk appetite.

The Human Resources Committee⁽¹⁾

The Human Resources Committee examines and approves the Bank's total compensation policies and programs, taking into consideration the risk management framework and ESG strategies, and recommends their approval to the Board. It recommends, for Board approval, the compensation of the President and Chief Executive Officer, of the members of the Senior Leadership Team, and of the heads of the oversight functions. This committee oversees all human resources practices, including employee health and well-being, talent management matters such as succession planning for management and oversight functions, as well as inclusion and diversity.

The Conduct Review and Corporate Governance Committee⁽¹⁾

The Conduct Review and Corporate Governance Committee ensures that the Bank maintains sound practices that comply with legislation and best practices, particularly in the area of ESG responsibilities, and that they align with the Bank's One Mission. It periodically reviews and approves professional conduct and ethical behaviour standards, including the *Code of Conduct*. The committee oversees the application of complaint review mechanisms and implements mechanisms that ensure compliance with consumer protection provisions, including the *Whistleblower Protection Policy*, and that prevent prohibited financial transactions between the Bank and related parties. Lastly, it ensures that the directors are qualified by evaluating the performance and effectiveness of the Board and its members and by planning director succession and the composition of the Board.

The Technology Committee⁽¹⁾

The Technology Committee oversees the various components of the Bank's technology program. It reviews, among other things, the Bank's technology strategy and monitors technology risks, including cyberrisks, cybercrime, and protection of personal information. The IT Risk Management Strategic Committee and the Privacy Office report to the Technology Committee.

(1) Additional information about the Bank's governance architecture can be found in the *Management Proxy Circular for the 2023 Annual Meeting of Holders of Common Shares*, which will soon be available on the Bank's website at nbc.ca and on SEDAR's website at sedar.com. The mandates of the Board and of its committees are available in their entirety at nbc.ca.

Senior Leadership Team of the Bank

Composed of the President and Chief Executive Officer and the officers responsible for the Bank's main functions and business units, the Bank's Senior Leadership Team ensures that risk management is sound and effective and aligned with the Bank's pursuit of its objectives and strategies. The Senior Leadership Team promotes the integration of risk management into its corporate culture and manages the primary risks facing the Bank.

The Internal Audit Oversight Function

The Internal Audit Oversight Function is the third line of defence in the risk management framework. It is responsible for providing the Bank's Board and management with objective, independent assurance on the effectiveness of the main governance, risk management, and internal control processes and systems and for making recommendations and providing advice to promote the Bank's long-term strength.

The Finance Oversight Function

The Finance Oversight Function is responsible for optimizing management of financial resources and ensuring sound governance of financial information. It helps the business segments and support functions with their financial performance, ensures compliance with regulatory requirements, and carries out the Bank's reporting to shareholders and the external reporting of the various units, entities, and subsidiaries of the Bank. It is responsible for capital management and actively participates in the activities of the Asset/Liability Management Committee.

The Risk Management Oversight Function

The Risk Management service is responsible for identifying, assessing and monitoring—independently and using an integrated approach—the various risks to which the Bank and its subsidiaries are exposed and for promoting a risk management culture throughout the Bank. The Risk Management team helps the Board and management understand and monitor the main risks. This service also develops, maintains, and communicates the risk appetite framework while overseeing the integrity and reliability of risk measures.

The Compliance Oversight Function

The Compliance Oversight Function is responsible for implementing a Bank-wide regulatory compliance risk management framework by relying on an organizational structure that includes functional links to the main business segments. It also exercises independent oversight and conducts assessments of the compliance of the Bank and its subsidiaries with regulatory compliance risk standards and policies.

The Global Risk Committee (GRC)

The Global Risk Committee is the overriding governing entity of all the Bank's risk committees, and it oversees every aspect of the overall management of the Bank's risk. It sets the parameters of the policies that determine risk tolerance and the overall risk strategy, for the Bank and its subsidiaries as a whole, and sets limits as well as tolerance and intervention thresholds enabling the Bank to properly manage the main risks to which it is exposed. The committee approves and monitors all large credit facilities. It reports to the Board, and recommends for Board approval, the Bank's risk philosophy, risk appetite, and risk profile management. The Operational Risk Management Committee, the Financial Markets Risk Committee, and the Enterprise-Wide Risk Management Committee presented in the governance structure chart are the primary committees reporting to the Global Risk Committee. The Global Risk Committee also carries out its mandate through the Senior Complex Valuation Committee, the Models Oversight Committee, and the Product and Activity Review Committees.

The Compensation Risk Oversight Working Group

The working group that monitors compensation-related risks supports the Human Resources Committee in its compensation risk oversight role. It is made up of at least three members, namely, the Executive Vice-President, Risk Management; the Chief Financial Officer and Executive Vice-President, Finance; and the Executive Vice-President, Employee Experience. The working group helps to ensure that compensation policies and programs do not unduly encourage senior management members, officers, material risk takers, or bank employees to take risks beyond the Bank's risk tolerance thresholds. As part of that role, it ensures that the Bank is adhering to the Corporate Governance Guidelines issued by OSFI and to the Principles for Sound Compensation Practices issued by the Financial Stability Board, for which the Canadian implementation and monitoring is conducted by OSFI. The RMC also reviews the reports presented by this working group.

The ESG Working Group

Under the leadership of the Chief Financial Officer and Executive Vice-President, Finance, and made up of several officers from different areas of the Bank, the ESG Working Group's main role is to develop and support the Bank's environmental, social and governance initiatives and strategies. Its members meet on a monthly basis. The ESG Working Group is responsible for implementing the recommendations made by the Task Force on Climate-related Financial Disclosures (TCFD) and by the UN Principles for Responsible Banking as well as for implementing the Bank's climate commitments. At least twice a year, the ESG Working Group reports to the Conduct Review and Governance Committee on the progress made and on ongoing and upcoming ESG projects. In addition, and in a timely fashion, the ESG Working Group makes presentations on topics of particular interest, such as the TCFD report, to the Audit Committee and the RMC.

The IT Risk Management Strategic Committee (ITRMSC)

The Bank's management has entrusted the ITRMSC with responsibility for the governance of technology-related risk and cyber risk. Under the leadership of the Executive Vice-President, Risk Management and the Executive Vice-President, Technology and Operations, this committee approves the technology and cyber risk management policy as well as other policies related to technology risk management. Among other responsibilities, it reviews the technology risk and cyber risk posture as well as any matter requiring an alignment between the technology strategy and the associated risks.

The Privacy Office

The Privacy Office develops and implements the personal information privacy program and the Bank's strategy for ensuring privacy and protecting personal information. It oversees the development, updating, and application of appropriate documentation in support of the Bank's personal information privacy program, including policies, standards, and procedures. It also oversees the risk governance framework and the implementation of appropriate controls designed to mitigate privacy risk. Lastly, it supports the business units in their execution of the Bank's strategic directions and ensures adherence to privacy best practices.

The Business Units

As the first line of defence, the business units manage risks related to their operations within established limits and in accordance with risk management policies by identifying, analyzing, managing, and understanding the risks to which they are exposed and implementing risk mitigation mechanisms. The management of these units must ensure that employees are adhering to current policies and limits.

Risk Management Policies

The risk management policies and related standards and procedures set out responsibilities, define and describe the main business-related risks, specify the requirements that business units must fulfill when assessing and managing these risks, stipulate the authorization process for risk-taking, and set the risk limits to be adhered to. They also establish the accountability reporting that must be provided to the various risk-related bodies, including the RMC. The policies cover the Bank's main risks, are reviewed regularly to ensure they are still relevant given market changes, regulatory changes and changes in the business plans of the Bank's business units, and they apply to the entire Bank and its subsidiaries, when applicable. Other policies, standards, and procedures complement the main policies and cover more specific aspects of risk management such as business continuity; the launch of new products, initiatives, or activities; or financial instrument measurement.

Governance of Model Risk Management

The Bank uses several models to guide enterprise-wide risk management, financial markets strategy, economic and regulatory capital allocation, global credit risk management, wealth management, and profitability measures. The model risk management policies as well as a rigorous model management process ensure that model usage is appropriate and effective.

The key components of the Bank's model risk management governance framework are as follows: the model risk management policies and standards, the model validation group, and the Models Oversight Committee. The policies and standards set the rules and principles applicable to the development and independent validation of models. The scope of models covered is wide, ranging from market risk pricing models and automated credit decision-making models to the business risk capital models, including models used for regulatory capital and stressed capital purposes, expected credit losses models, and financial-crime models. The framework also includes more advanced artificial intelligence models.

One of the cornerstones of the Bank's policies is the general principle that all models deemed important for the Bank or used for regulatory capital purposes require heightened lifecycle monitoring and independent validation. All models used by the Bank are therefore classified in terms of risk level (low, medium, or high). Based on this classification, the Bank applies strict guidelines regarding the requirements for model development and documentation, independent review thereof, performance monitoring thereof, and minimum review frequency. The Bank believes that the best defence against "model risk" is the implementation of a robust development and validation framework.

Independent Oversight by the Compliance Service

Compliance is an independent oversight function within the Bank. Its Senior Vice-President, Chief Compliance Officer and Chief Anti-Money Laundering Officer has direct access to the RMC and to the President and Chief Executive Officer and can communicate directly with officers and directors of the Bank and of its subsidiaries and foreign centres. The Senior Vice-President, Chief Compliance Officer and Chief Anti-Money Laundering Officer regularly meets with the Chair of the RMC, in the absence of management, to review matters on the relationship between the Compliance Service and the Bank's management and on access to the information required.

Business unit managers must oversee the implementation of mechanisms for the daily control of regulatory compliance risks arising from the operations under their responsibility. Compliance exercises independent oversight in order to assist managers in effectively managing these risks and to obtain reasonable assurance that the Bank is compliant with the regulatory requirements in effect where it does business, both in Canada and internationally.

Independent Assessment by Internal Audit

Internal Audit is an independent oversight function created by the Audit Committee. Its Senior Vice-President has direct access to the Chair of the Audit Committee and to the Bank's President and Chief Executive Officer and can communicate directly with officers and directors of the Bank and of its subsidiaries and foreign centres. The Senior Vice-President, Internal Audit, regularly meets with the Chair of the Audit Committee, in the absence of management, to review matters on the relationship between Internal Audit and the Bank's management.

Internal Audit provides reasonable assurance that the main governance, risk management, and internal control processes and systems are ensuring that, in all material respects, the Bank's key control procedures are effective and compliant. Internal Audit also provides recommendations and advice on how to strengthen these key control procedures. Business unit managers and senior management must ensure the effectiveness of the main governance, risk management, and internal control processes and systems, and they must implement corrective measures if needed.

Top and Emerging Risks

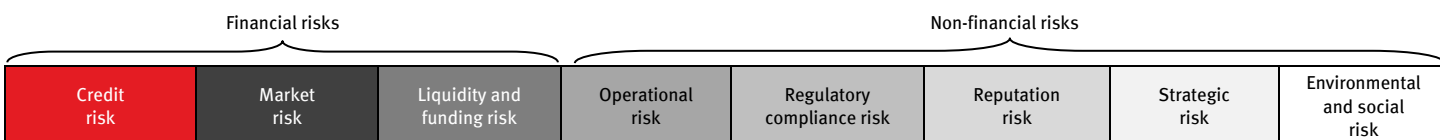
Managing risk requires a solid understanding of every type of risk found across the Bank, as they could have a material adverse effect on the Bank's business, results of operations, financial position, and reputation. As part of its approach to risk management, the Bank identifies, assesses, reviews and monitors the range of top and emerging risks to which it is exposed in order to proactively manage them and implement appropriate mitigation strategies. Identified top and emerging risks are presented to senior management and communicated to the RMC.

The Bank applies a risk taxonomy that categorizes, into two groups, the top risks to which the Bank is exposed in the normal course of business:

- Financial risks: Directly tied to the Bank's key business activities and are generally more quantifiable or predictable;
- Non-financial risks: Inherent to the Bank's activities and to which it does not choose to expose itself.

The Bank separately qualifies the risks to which it is exposed: a "top risk" is a risk that has been identified, is clearly defined, and could have a significant impact on the Bank's business, results of operations, financial position, and reputation, whereas an "emerging risk" is a risk that, while it may also have an impact on the Bank, is not yet well understood in terms of its likelihood, consequences, timing, or the magnitude of its potential impact.

In the normal course of business, the Bank is exposed to the following top risks.








The Bank is also exposed to other new, so-called emerging or significant risks, which are defined as follows.

Risk and Trend	Description
<p>Geopolitical risk</p> 	<p>Government decisions and international relations can have a significant impact on the environment in which the Bank operates. Geopolitical events can lead to volatility, have a negative impact on at-risk assets, and cause financial conditions to deteriorate. They could also directly or indirectly affect banking activities by having repercussions on clients. The war in Ukraine, which has disrupted energy and agricultural supply chains, is a good example. The economic sanctions taken against Russia for its invasion of Ukraine and the steps taken by Russia to significantly reduce natural gas supply to Europe have led to soaring energy costs. This situation has triggered the negative economic headwinds now facing Europe and heightened the risk of a political reaction in the form of new governments taking power and social unrest. Even if the war was expected to end relatively quickly, the shattered trust suggests that Europe and Russia will continue to take measures to become less dependant on one another, notably regarding energy matters. While new risks could arise at any time, certain concerns are compelling us to monitor other situations at this time. The geopolitical power struggle that for years has pitted the U.S. against China is one such concern. Businesses, in particular those operating in sectors deemed strategic, run an increasing risk of finding themselves in a maze of contradictory regulations, where complying with U.S. regulations means violating Chinese law, and vice versa. These tensions could also partially undo some of the ties forged between these two superpowers in the financial markets, and Canada might get caught in the crosshairs of the two countries. A recent escalation in tensions between China and the United States on the subject of Taiwan is a new source of disagreement between the two superpowers. While we do not believe an invasion is imminent, China will continue to exert pressure on Taiwan through a combination of unprecedented military exercises and economic sanctions. Taiwan's importance is highlighted by the fact that it is by far the leading global producer of advanced microchips (over 90% of the market share). But the potential for confrontation is not limited to the China-U.S. relationship, as protectionism is gaining popularity, and a growing number of countries are implementing measures to both financially support domestic businesses in key sectors (high tech, health care, and food) and to protect them against global competition through business restrictions. The combined effects of supply shortages and geopolitical tensions have shifted the focus from efficiency to supply security. We will continue to monitor all of these developments, analyze any new risks that arise, and assess the impacts that they may have on our organization.</p>
<p>Economic risk</p> 	<p>Although the economy recovered quickly during the pandemic, a number of risks still remain and others are emerging. Most countries are now dealing with variants, but we are not immune to the emergence of new, more infectious strains that could once again destabilize the economy. For its part, China is going it alone with its zero-COVID policy. Given China's importance to the global economy and supply chain, such a policy, which involves repeated lockdowns, has repercussions not only on growth but also on inflationary pressure. With this in mind, the inflationary outlook remains uncertain insofar as supply chain bottlenecks could stop improving or worse, deteriorate once again.</p>

Risk and Trend	Description
	<p>The war in Ukraine and extreme weather events have proven just how vulnerable the global economy is to such shocks. The sharp rise in inflation in 2022 is presenting another risk, i.e., the risk of spiralling inflation created by higher wages. In fact, the inflationary shock has prompted employees to demand compensation for their lost buying power, which could subsequently compel businesses to raise prices in order to maintain margins, thus creating a vicious cycle. If this scenario of unchecked inflation above central bank targets were to occur, the central banks could move towards a much tighter monetary policy by hiking interest rates even higher. Given that interest rates have remained quite low over the past few years, market participants seeking additional returns may have engaged in excessive risk-taking strategies and would not be immune from negative repercussions should interest rates suddenly spike higher. This would serve as a major headwind for the real estate sector and Canadian households, which have seen their debt levels rise sharply over the past few years. Lastly, climate issues are an added risk in the current context. If too few measures are adopted on the climate front, severe weather events will intensify and result in economic woes over the long term. Conversely, a too-swift transition could result in other risks, particularly short- and medium-term costs and rising pressure on production costs. In short, given the ongoing uncertainties in this environment, the Bank remains vigilant in the face of numerous factors and is continuing to rely on its strong risk management framework to identify, assess, and mitigate the negative impacts while also remaining within its risk appetite limits.</p> <p>In accordance with the TCFD's recommendations, the Bank has identified two types of direct climate-change-related risks (climate risk), i.e., physical risks and transition risks. Physical risks refer to the potential impacts of more frequent and more intense extreme weather events and/or of chronic changes in weather conditions on physical assets, infrastructures, the value chain, productivity, and other physical aspects. Transition risks refer to the potential impacts of moving toward a low-carbon economy (such as technological changes, behavioural changes by consumers, or political or public policy shifts designed to reduce GHG emissions through taxes or incentives) as well as to regulatory changes made to manage and support such an economy. In addition to these two risks are indirect risks, such as the risk of lawsuits, reputation risk, and regulatory compliance risk in an environment that is constantly changing due to ongoing and upcoming initiatives enacted by governments and regulators. Climate risk could have an impact on the traditional risks that are inherent to a financial institution's operations, including credit risk, market risk, liquidity and funding risk, and operational risk, among others.</p> <p>Managing climate risk has become increasingly important, as evidenced by the interest level in this risk, aligned over a societal, political, and regulatory landscape in constant flux, shown by the Bank's stakeholders, in particular clients, shareholders, governments, and regulators. This past year, several initiatives and public consultations were announced, including OSFI's guideline B-15, <i>Climate Risk Management</i>, the International Sustainability Standards Board's initiative to establish a financial disclosure framework addressing sustainability and climate; and the CSA's proposed <i>National Instrument 51-107 – Disclosure of Climate-related matters</i>. Other announcements include the Government of Canada's <i>2030 Emissions Reduction Plan</i> and the Government of Quebec's <i>Plan for a Green Economy</i>.</p> <p>It is possible that the Bank's or its clients' business models fail to align with a low-carbon economy or that their responses to government strategies and regulatory changes prove inadequate or fail to achieve the target objectives. Another possibility is that events caused by physical risks prove catastrophic (extreme episodes) or that there are adaptability issues (chronic episodes). As such, these risks could result in financial losses for the Bank, affect its business activities and how they are conducted, harm its reputation and increase its regulatory compliance risk, or even affect the activities and financial position of the clients to whom it offers financial services.</p> <p>The actual impact of climate risk will depend on future events that are beyond the Bank's control. The Bank must therefore devote special attention to reducing its exposure to these negative outside factors and, at the same time, to seizing new growth opportunities. Its strategies and policies have therefore been designed to consider climate risks while also supporting the transition to a low-carbon economy. The Bank constantly strives to remain apprised of best practices and to support and advise its clients in their move to a low-carbon economy. From this perspective, we will continue to deliver climate risk management training across the organization, in particular among front-line employees who have direct contact with clients. To better understand and mitigate climate change risks, the Bank also takes part in major national and international financial initiatives, including TCFD, the United Nations Principles for Responsible Banking (UNPRB), the United Nations Principles for Responsible Investing (UNPRI), and others. However, it cannot predict the effectiveness of government-led climate strategies or of regulatory changes enacted, nor can it assume responsibility for achieving the objectives set out in these strategies and changes.</p> <p>The Bank continues to closely monitor developments on this topic and to deploy its climate change risk management framework.</p> <p>For additional information, see the Environmental and Social Risk section of this MD&A.</p>



Risk and Trend	Description
<p>Information security and cybersecurity</p> 	<p>Technology, which is now omnipresent in our daily lives, is at the heart of banking services and has become the main driver of innovation in the financial sector. While this digital transformation meets the growing needs of customers by enhancing the operational efficiency of institutions, it nevertheless comes with information security and cybersecurity risks. The personal information and financial data of financial institution customers are prime targets for criminals. These criminals, who are increasingly well organized and employing ever more sophisticated schemes, try to use technology to steal information.</p> <p>Faced with a resurgence of cyberthreats and the sophistication of cybercriminals, the Bank is exposed to the risks associated with data breaches, malicious software, unauthorized access, hacking, phishing, identity theft, intellectual property theft, asset theft, industrial espionage, and possible denial of service due to activities causing network failures and service interruptions.</p> <p>Cyberattacks, as with breaches or interruptions of systems that support the Bank and its customers, could cause client attrition; financial loss; an inability of clients to do their banking; non-compliance with privacy legislation or any other current laws; legal disputes; fines; penalties or regulatory action; reputational damage; compliance costs, corrective measures, investigative, or restoration costs; cost hikes to maintain and upgrade technological infrastructures and systems, all of which could affect the Bank's operating results or financial position, in addition to having an impact on its reputation.</p> <p>It is also possible for the Bank to be unable to prevent or implement effective preventive measures against every potential cyberthreat, as the tactics used are multiplying, change frequently, come from a wide range of sources, and are increasingly sophisticated.</p> <p>Within this context, the Bank works to ensure the integrity and protection of its systems and the information they contain. The Bank reaffirms its commitment to continuous improvement in the area of information security, the ultimate goal being to protect its customers and maintain their trust. Along with its partners in the financial sector and with the regulatory authorities, the Bank is committed to making a sustained effort to mitigate technology risks. Measures specifically directed at anticipating this type of threat include the formation of multidisciplinary teams comprising cybersecurity and fraud prevention specialists. The Bank is also pursuing initiatives under its own cybersecurity program aimed at adapting its protection, surveillance, detection, and response capabilities according to changing threats, the aim being to continue to reduce delays in detecting any anomalies or cybersecurity incidents and limiting the impact thereof as much as possible. A governance and accountability structure has also been established to support decision-making based on sound risk management. The Technology Committee is regularly informed of the cybersecurity posture, of cybersecurity trends and developments, and of lessons learned from operational incidents that have occurred in other large organizations such that it can gain a better understanding of risks, particularly risks related to cybersecurity and the protection of personal information.</p>
<p>Protection of personal information</p> 	<p>Risks related to protecting personal information exist through the entire lifecycle of information and arise, in particular, from inadequate control measures and weak processes. Such risks could also arise from information being improperly created, collected, used, communicated, stored, or destroyed. Greater attention will be paid to the collection, use, and communication of personal information as well as the management and governance applied to such information as the Bank continues to invest in technological solutions and innovations and according to the evolution of its commercial activities.</p> <p>Risks related to the protection of personal information could cause client attrition; financial loss; non-compliance with legislation; legal disputes; fines; penalties; punitive damages; regulatory action; reputational damage; compliance, remediation, investigative, or restoration costs; cost hikes to maintain and upgrade technological infrastructures and systems, all of which could affect the Bank's operating results or financial position, in addition to having an impact on its reputation.</p> <p>In recent years, innovations and the proliferation of technological solutions that collect, use, and communicate personal information such as cloud computing, artificial intelligence, automated learning and open banking, have given rise to significant legislative changes in many jurisdictions, including Canada and Quebec. For example, in September 2021, the Quebec government passed <i>An Act to modernize legislative provisions as regards the protection of personal information</i>, which will gradually come into effect over the next three years. And on June 16, 2022, the federal government tabled Bill C-27 entitled <i>Digital Charter Implementation Act, 2022</i>, which aims to enhance and modernize the personal information protection framework.</p> <p>The Bank continues to monitor relevant legislative developments and has bolstered its governance structure by updating its policies, standards and practices and by deploying a personal information privacy program that reflects its determination to maintain the trust of its clients.</p>

Risk and Trend	Description
<p>Reliance on technology and third-party providers</p> 	<p>The Bank's clients have high expectations regarding the accessibility to products and services that are offered on various platforms that house substantial amounts of data. In response to those heightened client expectations, to the rapid pace of technological change, and to the growing presence of new actors in the banking sector, the Bank diligently makes significant and ongoing investments in its technology while maintaining the operational resilience and robustness of its controls. Inadequate implementation of technological improvements or new products or services could significantly affect the Bank's ability to serve and retain clients.</p> <p>Third parties provide essential components of the Bank's technological infrastructure such as Internet connections and access to network and other communications services. The Bank also relies on the services of third parties to support certain business processes and to handle certain IT activities. An interruption of these services or a breach of security could have an unfavourable impact on the Bank's ability to provide products and services to its customers and to conduct business, not to mention the impact that such events would have on the Bank's reputation. To mitigate this risk, the Bank has a third-party risk management framework wherein information security, financial health, and performance are validated before any agreements are reached and throughout the life of the agreements. It also includes business continuity plans, which are tested periodically to ensure their effectiveness in times of crisis. A governance and accountability structure has also been established to support decision-making based on sound risk management. Despite these preventive measures and the efforts deployed by the Bank to manage third parties, there remains a possibility that certain risks will materialize. In such cases, the Bank would rely on mitigation mechanisms developed in collaboration with the various agreement owners and third parties concerned. Aware of the significance of third-party risk, the Bank makes sure that its practices evolve in collaboration with its financial sector partners and with regulatory authorities.</p>
<p>Technological innovation and competition</p> 	<p>On the one hand, the Bank's financial performance depends on its ability to develop and market new and innovative products and services, adopt and develop new technologies that help differentiate its product and services and generate cost savings, and market these new products and services at the right time and at competitive prices. On the other hand, failure to properly review critical changes within the business before and during the implementation and deployment of key technological systems or failure to align client expectations with the Bank's client commitments and operating capabilities could adversely affect the Bank's business, operating results, financial position, and reputation.</p> <p>The transition toward new digital channels and solutions has accelerated greatly following the COVID-19 pandemic, where demand for digital banking services grew to the detriment of traditional banking services. The arrival of new, non-conventional players in the market has intensified competitive pressure, as they are proposing to enhance client experience with new technologies, data analysis tools, and customized solutions in a simplified and more cost-effective manner. These businesses are not necessarily subject to the same regulatory requirements as financial institutions and may sometimes be able to react more quickly to new consumer habits.</p> <p>As such, to mitigate disintermediation risk and help make innovative technologies accessible to its clients, the Bank continues to incorporate artificial intelligence into its business processes and remains highly committed to innovation by making strategic investments in emerging technologies through its specialized venture capital arm, NAventures.</p>
<p>Ability to recruit and retain key resources</p> 	<p>The Bank's future performance depends greatly on its ability to recruit, develop, and retain key resources. There is strong competition, partly supported by a relatively low unemployment rate, in the financial services sector in terms of attracting and retaining the most qualified people, notably with the arrival of new players in certain sectors and the emergence of the global workforce concept. As a result, reports are periodically presented to the Board through the governance mechanisms of the Human Resources Committee, the aim being to deploy appropriate strategies to implement conditions favourable to the Bank's competitiveness as an employer. There is no assurance that the Bank or a business acquired by the Bank will be able to continue recruiting or retaining talented people.</p>

Other Factors That Can Affect the Bank's Business, Operating Results, Financial Position, and Reputation

Risks Related to the COVID-19 Pandemic

The COVID-19 pandemic continues to have disruptive and adverse effects in the countries where the Bank operates and, more broadly, on the global economy, supply chains, and financial markets. The pandemic has also had, and could continue to have, repercussions on the Bank, notably on the way in which it carries out its business activities as well as on its operating results, financial position, regulatory capital and liquidity ratios, reputation, and ability to satisfy regulatory requirements, as well as on its clients, which could exacerbate certain top and emerging risks to which the Bank is exposed. Since a large part of the Bank's activities consist of granting loans or providing various liquidity channels to clients, namely, to individuals, businesses in various sectors, and governments, the impacts of the pandemic on these parties could also significantly influence the provisions for credit losses recorded by the Bank. As the pandemic evolves, certain industries and geographic sectors have been facing more persistent consequences thereof. The Bank has therefore continued to closely monitor the situation and, given the considerable degree of uncertainty surrounding the post-pandemic landscape, additional mitigation measures may be needed. The actual impacts will depend on future events that are highly uncertain, including the extent, severity, and duration of the COVID-19 pandemic, and on the effectiveness of actions and measures taken by governments, monetary authorities, and regulators over the long term.

International Risks

Through the operations of some of the Bank's units (mainly its New York and London offices) and subsidiaries in Canada and abroad (in particular, Credigy Ltd., NBC Global Finance Limited, and Advanced Bank of Asia Limited), the Bank is exposed to risks arising from its presence in international markets and foreign jurisdictions. While these risks do not affect a significant proportion of the Bank's portfolios, their impact must not be overlooked, especially those that are of a legal or regulatory nature. International risks can be particularly high in territories where the enforceability of agreements signed by the Bank is uncertain, in countries and regions facing political or socio-economic disturbances, or in countries that may be subject to international sanctions. Generally speaking, there are many ways in which the Bank may be exposed to the risks posed by other countries, not the least of which being foreign laws and regulations. In all such situations, it is important to consider what is referred to as "country risk." Country risk affects not only the activities that the Bank carries out abroad but also the business that it conducts with non-resident clients as well as the services it provides to clients doing business abroad, such as electronic funds transfers, international products, and transactions made from Canada in foreign currencies.

As part of its activities, the Bank must adhere to anti-money laundering and anti-terrorist financing (AML/ATF) regulatory requirements in effect in each jurisdiction where it conducts business. It must also comply with the requirements pertaining to current international sanctions in these various jurisdictions. Money laundering and terrorist financing is a financial, regulatory, and reputation risk. For additional information, see the Regulatory Compliance Risk Management section of this MD&A.

The Bank is exposed to financial risks outside Canada and the United States, primarily through its interbank transactions on international financial markets or through international trade finance activities. This geographic exposure represents a moderate proportion of the Bank's total risk. The geographic exposure of loans is disclosed in the quarterly *Supplementary Financial Information* report available on the Bank's website at nbc.ca. To control country risk, the Bank sets credit concentration limits by country and reviews and submits them to the Board for approval upon renewal of the Credit Risk Management Policy. These limits are based on a percentage of the Bank's regulatory capital, in line with the level of risk represented by each country, particularly emerging countries. The risk is rated using a classification mechanism similar to the one used for credit default risk. In addition to the country limits, authorization caps and limits are established, as a percentage of capital, for the world's high-risk regions, i.e., essentially all regions except for North America, Western European countries, and the developed countries of Asia.

Acquisitions

The Bank's ability to successfully complete an acquisition is often conditional on regulatory approval, and the Bank cannot be certain of the timing or conditions of regulatory decisions. Acquisitions could affect future results should the Bank experience difficulty integrating the acquired business. If the Bank does encounter difficulty integrating an acquired business, maintaining an appropriate governance level over the acquired business, or retaining key officers within the acquired business, these factors could prevent the Bank from realizing expected revenue growth, cost savings, market share gains, and other projected benefits of the acquisition.

Intellectual Property

The Bank protects the intellectual property developed by its employees in connection with their duties. However, in some cases, the Bank's ability to acquire intellectual property rights may be more limited. In addition, the intellectual property rights acquired by the Bank provide no guarantees that they will be effective in deterring or preventing a third party from misappropriating intellectual property or providing a defense against the misappropriation of intellectual property. Moreover, the goods and services developed by the Bank are provided in a competitive market where third parties could hold intellectual property rights prior to those held by the Bank. In such circumstances, there is no guarantee that the Bank will successfully provide a defense against an infringement claim, that it will be able to modify its goods and services to avoid infringing upon third party rights, or that it will obtain a licence with commercially acceptable conditions.

Judicial and Regulatory Proceedings

The Bank takes reasonable measures to comply with the laws and regulations in effect in the jurisdictions where it operates. Still, the Bank could be subject to judicial or regulatory decisions resulting in fines, damages, or other costs or to restrictions likely to adversely affect its operating results or its reputation. The Bank may also be subject to litigation in the normal course of business. Although the Bank establishes provisions for the measures it is subject to under accounting requirements, actual losses resulting from such litigation could differ significantly from the recognized amounts, and unfavourable outcomes in such cases could have a significant adverse effect on the Bank's operating results. The resulting reputational damage could also affect the Bank's future business prospects. For additional information, see Note 26 to the consolidated financial statements.

Tax Risk

The tax laws applicable to the Bank are numerous, complex, and subject to amendment at any time. This complexity can result in differing legal interpretations between the Bank and the respective tax authorities with which it deals. In addition, legislative changes and changes in tax policy, including the interpretation thereof by tax authorities and courts, could affect the Bank's earnings. International and domestic initiatives may also result in changes to tax laws and policies, including international efforts by the G20 and the Organisation for Economic Co-operation and Development to broaden the tax base and domestic proposals to increase the taxes payable by banks and insurance companies. For additional information on income taxes, see the Income Taxes section on page 52 of this MD&A, the Critical Accounting Policies and Estimates section on page 110 of this MD&A, and Note 24 to the consolidated financial statements.

Accounting Policies, Methods and Estimates Used by the Bank

The accounting policies and methods used by the Bank determine how the Bank reports its financial position and operating results and require management to make estimates or rely on assumptions about matters that are inherently uncertain. Any changes to these estimates and assumptions may have a significant impact on the Bank's operating results and financial position.

Additional Factors

Other factors that could affect the Bank's business, operating results, and reputation include unexpected changes in consumer spending and saving habits; the timely development and launch of new products and services; the ability to successfully align its organizational structure, resources and processes; the ability to activate a business continuity plan within a reasonable time; the potential impact of international conflicts, natural disasters or public health emergencies such as COVID-19; and the Bank's ability to foresee and effectively manage the risks resulting from these factors through rigorous risk management.

Credit Risk

Credit risk is the risk of incurring a financial loss if an obligor does not fully honour its contractual commitments to the Bank. Obligors may be debtors, issuers, counterparties, or guarantors. Credit risk is the most significant risk facing the Bank in the normal course of its business. The Bank is exposed to credit risk not only through its direct lending activities and transactions but also through commitments to extend credit and through letters of guarantee, letters of credit, over-the-counter derivatives trading, debt securities, securities purchased under reverse repurchase agreements, deposits with financial institutions, brokerage activities, and transactions carrying a settlement risk for the Bank such as irrevocable fund transfers to third parties via electronic payment systems.

Governance

A policy framework centralizes the governance of activities that generate credit risk for the Bank and its subsidiaries and is supplemented by a series of subordinate internal policies and standards. These policies and standards address specific management issues such as concentration limits by borrower group and sector, credit limits, collateral requirements, and risk quantification or issues that provide more thorough guidance for given business segments.

For example, the institutional activities of the Bank and its subsidiaries on financial markets and international commercial transactions are governed by business unit directives that set out standards adapted to the specific environment of these activities. This also applies to retail brokerage subsidiaries. In isolated cases, a business unit or subsidiary may have its own credit policy, and that policy must always fall within the spirit of the Bank's policy framework. Risk Management's leadership team defines the scope of the universe of subsidiaries carrying significant credit risks and the magnitude of the risks incurred.

Credit risk is controlled through a rigorous process that comprises the following elements:

- credit risk rating and assessment;
- economic capital assessment;
- stress testing;
- credit granting process;
- revision and renewal process;
- risk mitigation;
- follow-up of monitored accounts and recovery;
- counterparty risk assessment;
- settlement risk assessment;
- environmental risk assessment.

Concentration Limits

The Bank sets credit concentration and settlement limits by obligor group, by industry sector, by country, and by region. These limits are subject to the approval of the RMC. Certain types of financing or financing programs are also subject to specific limits. Breaches of concentration limits by obligor group or by region are reported to the RMC each quarter. Furthermore, every industry sector, country, and region whose exposure equals a predetermined percentage of the corresponding authorized limit are reported to the Bank's Risk Management leadership team. At least once a year, the Bank revises these exposures by industry sector, by country, and by region in order to determine the appropriateness of the corresponding concentration limits.

Reporting

Every quarter, an integrated risk management report is presented to senior management and the RMC. It presents changes in the credit portfolio and highlights on the following matters:

- credit portfolio volume growth by business segment;
- a breakdown of the credit portfolio according to various criteria for which concentration limits have been set;
- changes in provisions and allowances for credit losses;
- changes in impaired loans;
- follow-up of monitored accounts.

Credit Risk Rating and Assessment

Before a sound and prudent credit decision can be made, an obligor's or counterparty's credit risk must be accurately assessed. This is the first step in processing credit applications. Using a credit rating system developed by the Bank, each application is analyzed and assigned one of 19 grades on a scale of 1 to 10 for all portfolios exposed to credit risk. As each grade corresponds to a debtor's, counterparty's, or third party's probability of default, the Bank can estimate the credit risk. The credit risk assessment method varies according to portfolio type. There are two main methods for assessing credit risk, i.e., the Advanced Internal Ratings-Based (AIRB) Approach and the Standardized Approach, as defined by the Basel Accord, to determine minimum regulatory capital requirements for most of its portfolios.

The main parameters used to measure the credit risk of loans outstanding and undrawn amounts under the AIRB Approach are as follows:

- probability of default (PD), which is the probability of through-the-cycle 12-month default by the obligor, calibrated on a long-run average PD throughout a full economic cycle;
- loss given default (LGD), which represents the magnitude of the loss from the obligor's default that would be expected in an economic downturn and subject to certain regulatory floors, expressed as a percentage of exposure at default;
- exposure at default (EAD), which is an estimate of the amount drawn and of the expected use of any undrawn portion prior to default, and cannot be lower than the current balance.

The methodology as well as the data and the downturn periods used to estimate LGD are described below.

AIRB APPROACH	DATA ⁽¹⁾	DOWNTURN PERIOD ⁽¹⁾	METHODOLOGY FOR CALCULATING LGD
Retail	The Bank's internal historical data from 1996 to 2021	1996-1998 and 2008-2009	LGD based on the Bank's historical internal data on recoveries and losses
Corporate	The Bank's internal historical data from 2000 to 2021 Benchmarking results using: <ul style="list-style-type: none"> • Moody's observed default price of bonds, from 1983 to 2021 • Global Credit Data Consortium historical loss and recovery database from 1998 to 2021 	2000-2003, 2008-2009 and 2020	LGD based on the Bank's historical recoveries and losses internal data and on Moody's data
Sovereign	Moody's observed default price of bonds, from 1983 to 2015 S&P rating history from 1975 to 2016	1999-2001 and 2008-2012	Based on implied market LGD using observed bond price decreases following the issuer's default
Financial institutions	Global Credit Data Consortium historical loss and recovery database from 1991 to 2013	1991-1992, 1994, 1997-1998, 2001-2002, and 2008-2009	Model for predicting LGD based on different issue- and issuer-related risk drivers

(1) The performance of the models resulting from the AIRB Approach is measured quarterly, and the methodologies are validated by an independent third party annually. A report on model performance under the AIRB Approach is presented annually to the RMC. According to the most recent performance report, the models continue to perform well and do not require the addition of new data.

Personal Credit Portfolios

This category comprises portfolios of residential mortgage loans, consumer loans, and loans to certain small businesses. To assess credit risk, AIRB models are in place for the main portfolios, particularly mortgage loans, home equity lines of credit, credit cards, budget loans, lines of credit, and SME retail. A risk analysis based on loan grouping in pools of homogeneous obligor and product profiles is used for overall management of personal credit portfolios. This personal credit assessment approach, which has proven particularly effective for estimating credit defaults and losses, takes a number of factors into account, namely:

- Attributes from credit rating agencies (scoring) related to behaviour;
- loan product characteristics;
- collateral provided;
- the length of time on the Bank's balance sheet;
- loan status (active, delinquent, or defaulted).

This mechanism provides adequate risk measurement inasmuch as it effectively differentiates risk levels by pool. Therefore, the results are periodically reviewed and, if necessary, adjustments are made to the models. Obligor migrations between pools are among the factors considered when assessing credit risk.

Loan pools are also established based on PD, LGD, and EAD, which are measured based on the characteristics of the obligor and the transaction itself. The credit risk of these portfolios is estimated using credit scoring models that determine the obligor's PD. LGD is estimated based on transaction-specific factors such as loan product characteristics (for example, a line of credit versus a term loan), loan-to-value ratio, and types of collateral.

Credit scoring models are also used to grant credit. These models use proven statistical methods that measure an obligor's demand characteristics and history based on internal and external historical information to estimate the obligor's future credit behaviour and assign a probability of default. The underlying data include obligor information such as current and past employment, historical loan data in the Bank's management systems, and information from external sources such as credit rating agencies.

The Bank also uses behaviour scoring models to manage and monitor current commitments. The risk assessment is based on statistical analyses of the past behaviour of obligors with which the Bank has a long-term relationship in an effort to predict their future behaviour. The underlying information includes the obligor's cash flows and borrowing trends. Information on characteristics that determine behaviour in these models also comes from both internal sources on current commitments and external sources. The table on the following page presents the PD categories and credit quality of the associated personal credit portfolio.

Mortgage Loan Underwriting

To mitigate the impact of an economic slowdown and ensure the long-term quality of its portfolio, the Bank uses sound risk management when granting residential mortgages to confirm: (i) the obligor's intention to meet its financial obligations, (ii) the obligor's ability to repay its debts, and (iii) the quality of the collateral. In addition, in accordance with the applicable rules, the Bank takes a prudent approach to client qualification by using, for example, a higher interest rate to mitigate the risk of short- or medium-term rate hikes.

Nonetheless, the risk of economic slowdown could adversely affect the profitability of the mortgage portfolio. In stress test analyses, the Bank considers a variety of scenarios to measure the impact of adverse market conditions. In such circumstances, our analyses show significantly higher credit losses, which would decrease profitability and reduce the Bank's capital ratios.

New Regulatory Developments

On December 17, 2021, OSFI confirmed the qualifying rate for uninsured mortgages (i.e., residential mortgages with a down payment of 20% or more) will remain as the greater of the mortgage contract interest rate plus 2% and a minimum floor of 5.25%. OSFI is well aware that the country's post-pandemic economic recovery must be backed by a strong financial system capable of supporting the Canadian population in the current environment and that real estate market conditions in Canada could heighten the financial risk weighing on lenders. The minimum qualifying interest rate provides an additional level of safety to ensure that borrowers would have the ability to make mortgage payments should circumstances change, e.g., in the case of reduced income or a rise in interest rates.

On June 28, 2022, OSFI published an Advisory entitled *Clarification on the Treatment of Innovative Real Estate Secured Lending Products Under Guideline B-20*. The Advisory complements the existing expectations set out in *Guideline B-20 – Residential Mortgage Underwriting Practices and Procedures*. The Advisory specifies OSFI's expectations concerning underwriting practices and procedures for reverse residential mortgages, residential mortgages with shared equity features, and combined loan plans (CLPs), notably for CLPs and the re-advanceability of credit above the 65% loan-to-value (LTV) limit. For loans that exceed the 65% LTV limit, there will be a transition period where a portion of the principal payments will go towards repaying the overall mortgage amount until it is below 65% of the original LTV ratio and not re-advanceable. The implementation date for this change is October 31, 2023.

On August 1, 2022, Quebec's consumer protection organization, the *Office de la protection du consommateur*, increased the monthly minimum payment percentage to 3.5% of the balance for credit cardholders in Quebec whose contract was issued before August 1, 2019. Annual increases of 0.5% until 2025 are planned in order to raise the monthly minimum payment percentage to the 5% minimum currently applicable to contracts issued in Quebec after August 1, 2019. The purpose of these measures is to help households avoid debt issues and to reduce the risk of loss among lenders.

The objective of Bill 53 is to tighten the regulatory framework governing credit assessment agents and ensure that Quebec consumers can access protection measures, including security freezes of their credit files, which would limit access to lenders for credit authorization purposes. This measure is expected to come into force on February 1, 2023.

Business and Government Credit Portfolios

This category comprises business (other than some small businesses that are classified in personal credit portfolios), government, and financial institution credit portfolios.

These credit portfolios are assigned a risk rating that is based on a detailed individual analysis of the financial and non-financial aspects of the obligor, including the obligor's financial strength, sector of economic activity, competitive ability, access to capital management quality, and number of years in business. The Bank uses risk-rating tools and models to specifically assess the risk represented by an obligor in relation to its industry and peers. The models used are adapted to the obligor's broad sector of activity. Models are in place for ten sectors: business/commercial, large business, financial institutions, sovereigns, investment funds, energy, real estate, agriculture, insurance, and public-private partnership project financing.

This risk assessment method assigns a default risk rating to an obligor that reflects its credit quality. To each default credit risk rating corresponds a PD (see the table below). Using this classification of obligor credit risk, the Bank can differentiate appropriately between the various assessments of an obligor's capacity to meet its contractual obligations. Default risk ratings are assigned according to an assessment of an obligor's commercial and financial risks based on a solvency review. Various risk quantification models, described below, are used to perform this assessment.

The business and government default risk rating scale used by the Bank is similar to the systems used by major external rating agencies. The following table presents a grouping of the ratings by major risk category and compares them with the ratings of two major rating agencies.

Internal Default Risk Ratings*

Description ⁽¹⁾	Personal credit portfolios	PD (%) –			Business and government credit portfolios	
	PD (%) – Retail	Ratings	Corporate and financial institutions	PD (%) – Sovereign	Standard & Poor's	Moody's
Excellent	0.000–0.144	1–2.5	0.000–0.112	0.000–0.060	AAA to A-	Aaa to A3
Good	0.145–0.506	3–4	0.112–0.384	0.060–0.331	BBB+ to BBB-	Baa1 to Baa3
Satisfactory	0.507–2.681	4.5–6.5	0.384–4.235	0.331–5.738	BB+ to B	Ba1 to B2
Special mention	2.682–9.348	7–7.5	4.235–10.182	5.738–17.964	B- to CCC+	B3 to Caa1
Substandard	9.349–9.999	8–8.5	10.182–99.999	17.964–99.999	CCC & CCC-	Caa2 & Caa3
Default	1	9–10	100	100	CC, C & D	Ca, C & D

(1) Additional information is provided in Note 7 – *Loans and Allowances for Credit Losses* to the consolidated financial statements.

The Bank also uses individual assessment models by industry to assign a risk rating to the credit facility based on the collateral that the obligor is able to provide and, in some cases, based on other factors. The Bank consequently has a bi-dimensional risk-rating system that, using models and internal and external historical data, establishes a default risk rating for each obligor. In addition, the models assign, to each credit facility, an LGD risk rating that is independent of the default risk rating assigned to the obligor.

The Bank's default risk ratings and LGD risk ratings as well as the related risk parameters contribute directly to informed credit-granting, renewal, and monitoring decisions. They are also used to determine and analyze risk-based pricing. In addition, from a credit portfolio management perspective, they are used to establish counterparty credit concentration limits and segment concentration limits as well as limits to decision-making power and to determine the credit risk appetite of these portfolios. Moreover, they represent an important component in estimating expected and unexpected losses, measuring minimum required economic capital, and measuring the minimum level of capital required, as prescribed by the regulatory authorities.

The credit risk of obligors and of their facilities is assessed with the PD and LGD parameters at least once a year or more often if significant changes (triggers) are observed when updating financial information or if another qualitative indicator of a deterioration in the obligor's solvency or in the collateral associated with the obligor's facilities is noted. The Bank also uses a watchlist to more actively monitor the financial position of obligors whose default-risk rating is greater than or equal to 7.0. This process seeks to minimize an obligor's default risk and allows for proactive credit risk management.

Validation

The Risk Management Group monitors the effectiveness of the risk-rating systems and associated parameters, which are also reviewed regularly in accordance with the Bank's policies. Backtesting is performed at regular intervals to validate the effectiveness of the models used to estimate PD, LGD, and EAD. For PD in particular, this backtesting takes the form of sequentially applied measures designed to assess the following criteria:

- the model's discriminatory power;
- the proportion of overrides;
- model calibration;
- the stability of the model's inputs and outputs.

The credit risk quantification models are developed and tested by a team of specialists with model performance being monitored by the applicable business units and related credit risk management services. Models are validated by a unit that is independent of both the specialists who developed the model and the concerned business units. Approvals of new models or changes to existing models are subject to an escalation process established by the model risk management policy. Furthermore, new models or changes to existing models that markedly impact regulatory capital must be approved by the Board before being submitted to the regulatory agencies.

The facility and default risk-rating systems, methods, and models are also subject to periodic independent validation, the frequency of which depends on the model's risk level. Models that have a significant impact on regulatory capital must be reviewed regularly, thereby further raising the certainty that these quantification mechanisms are working as expected.

The key aspects to be validated are risk factors allowing for accurate classification of default risk by level, adequate quantification of exposure, use of assessment techniques that consider external factors such as economic conditions and credit status and, lastly, compliance with internal policies and regulatory provisions.

The Bank's credit risk assessment and rating systems are overseen by the Models Oversight Committee, the GRC, and the RMC, and these systems constitute an integral part of a comprehensive Bank-wide credit risk oversight framework. Along with the above-mentioned elements, the Bank documents and periodically reviews the policies, definitions of responsibilities, resource allocation, and existing processes.

Assessment of Economic Capital

The assessment of the Bank's minimum required economic capital is based on the credit risk assessments of obligors. These two activities are therefore interlinked. The different models used to assess the credit risk of a given portfolio type also enable the Bank to determine the default correlation among obligors. This information is a critical component in the evaluation of potential losses for all portfolios carrying credit risk. Estimates of potential losses, whether expected or not, are based on historical loss experience, portfolio monitoring, market data, and statistical modelling. Expected and unexpected losses are factors used in assessing the minimum required economic capital for all of the Bank's credit portfolios. The assessment of economic capital also considers the anticipated potential migrations of the default risk ratings of obligors during the remaining term of their credit commitments. The main risk factors that have an impact on economic capital are as follows:

- the obligor's PD;
- the obligor's EAD;
- the obligor's LGD;
- the default correlation among various obligors;
- the residual term of credit commitments;
- the impact of economic and sector-based cycles on asset quality.

Stress Testing

The Bank carries out stress tests to evaluate its sensitivity to crisis situations in certain activity sectors and key portfolios. A global stress test methodology covers most business, government, and personal credit portfolios to provide the Bank with an overview of the situation. By simulating specific scenarios, these tests enable the Bank to measure allowances for credit losses according to IFRS 9 – *Financial Instruments* (IFRS 9), to assess the level of regulatory capital needed to absorb potential losses, and to determine the impact on its solvency. In addition, these tests contribute to portfolio management as they influence the determination of concentration limits by obligor, product, or business sector.

Credit-Granting Process

Credit-granting decisions are based first and foremost on the results of the risk assessment. Aside from an obligor's solvency, credit-granting decisions are also influenced by factors such as available collateral and guarantees, transaction compliance with policies, standards and procedures, and the Bank's overall risk-adjusted return objective. Each credit-granting decision is made by authorities within the risk management teams and management, who are independent of the business units and are at a reporting level commensurate with the size of the proposed credit transaction and the associated risk. Decision-making authority is determined in compliance with the delegation of authority set out in the Credit Risk Management Policy. A person in a senior position in the organization approves credit facilities that are substantial or carry a higher risk for the Bank. The GRC approves and monitors all substantial credit facilities. Credit applications that exceed management's latitudes are submitted to the Board for approval. The credit-granting process demands a high level of accountability from managers, who must proactively manage the credit portfolio.

Review and Renewal Processes

The Bank periodically reviews credit files. The review process enables the Bank to update information on the quality of the facilities and covers, among other things, risk ratings, compliance with credit conditions, and obligor behaviour. In the specific case of business credit portfolios, the credit risk of all obligors is reviewed at least once per year. After this periodic review, for on-demand or unused credit, the Bank decides whether to pursue its business relationship with the obligor and, if so, revises the credit conditions. For personal credit portfolios, the credit risk of all obligors is reviewed on a continual basis.

Risk Mitigation

The Bank also controls credit risk using various risk mitigation techniques. In addition to the standard practice of requiring collateral to guarantee repayment of the credit it grants, the Bank also uses protection mechanisms such as credit derivative financial instruments, syndication, and loan assignments as well as an orderly reduction in the amount of credit granted.

The most common method used to mitigate credit risk is obtaining quality collateral from obligors. Obtaining collateral cannot replace a rigorous assessment of an obligor's ability to meet its financial obligations, but, beyond a certain risk threshold, it is an essential complement. The obtaining of collateral depends on the level of risk presented by the obligor and the type of loan granted. The legal validity and enforceability of any collateral obtained and the Bank's ability to regularly and correctly measure the collateral's value are critical for this mechanism to play its proper role in risk mitigation.

In its internal policies and standards, the Bank has established specific requirements regarding the appropriate legal documentation and assessment for the kinds of collateral that business units may require to guarantee the loans granted. The categories of eligible collateral and the lending value of the collateralized assets have also been defined by the Bank. For the most part, they include the following asset categories as well as guarantees (whether secured by collateral or unsecured) and government and bank guarantees:

- accounts receivable;
- inventories;
- machinery and equipment and rolling stock;
- residential and commercial real estate, office buildings and industrial facilities;
- cash and marketable securities.

Portfolio Diversification and Management

The Bank is exposed to credit risk, not only through outstanding loans and undrawn amounts of commitments to a particular obligor but also through the sectoral distribution of the outstanding loans and undrawn amounts and through the exposure of its various credit portfolios to geographical, concentration, and settlement risks.

The Bank's approach to controlling these diverse risks begins with a diversification of exposures. Measures designed to maintain a healthy degree of credit risk diversification in its portfolios are set out in the Bank's policies, standards, and procedures. These instructions are mainly reflected in the application of various exposure limits: credit concentration limits by counterparty and credit concentration limits by business sector, country, region, product, and type of financial instrument. These limits are determined based on the Bank's credit risk appetite framework and are reviewed periodically. Compliance with these limits, particularly exceptions, is monitored through periodic reports submitted by the Risk Management Group's officers to the Board.

Continuous analyses are performed in order to anticipate problems with a sector or obligor before they materialize, notably as defaulted payments.

Other Risk Mitigation Methods

Credit risk mitigation measures for transactions in derivative financial instruments, which are regularly used by the Bank, are described in detail in the Counterparty Risk section.

Credit Derivative Financial Instruments and Financial Guarantee Contracts

The Bank also reduces credit risk by using the protection provided by credit derivative financial instruments such as credit default swaps. When the Bank acquires credit protection, it pays a premium on the swap to the counterparty in exchange for the counterparty's commitment to pay if the underlying entity defaults or another event involving the counterparty and covered by the legal agreement occurs. Since, like obligors, providers of credit protection must receive a default risk rating, the Bank's standards set out all the criteria under which a counterparty may be judged eligible to mitigate the Bank's credit risk. The Bank may also reduce its credit risk by entering into financial guarantee contracts whereby a guarantor indemnifies the Bank for a loss resulting from an obligor failing to make a payment when due in accordance with the contractual terms of a debt instrument.

Loan Syndication

The Bank has developed specific instructions on the appropriate objectives, responsibilities, and documentation requirements for loan syndication.

Follow-Up of Monitored Accounts and Recovery

Credit granted and obligors are monitored on an ongoing basis and in a manner commensurate with the degree of risk. Loan portfolio managers use an array of intervention methods to conduct a particularly rigorous follow-up on files that show a high risk of default, and they submit comments to credit risk management groups about each identified borrower on the watchlist for whom they are responsible. When loans continue to deteriorate and there is an increase in risk to the point where monitoring has to be increased, a group specialized in managing problem accounts (Work Out units) steps in to maximize collection of the disbursed amounts and tailor strategies to these accounts.

Each quarter, the Work Out units submit a monitoring report (called a watchlist) to a monitoring committee that tracks the status of at-risk obligors and the corrective measures undertaken. In addition, files in which the authorized amount is \$5 million and up are presented to the Watchlist Committee, which in turn reviews the action plans and watchlist reports. The authority to approve allowances for credit losses is attributed using limits delegated on the basis of hierarchical level presented in the Credit Risk Management Policy.

Information on the recognition of impaired loans and allowances for credit losses is presented in Notes 1 and 7 to the consolidated financial statements.

Forbearance and Restructuring

Situations where a business or retail obligor begins showing clear signs of potential insolvency are managed on a case-by-case basis and require the use of judgment. The Loan Work Out Policy sets out the principles applicable in such situations to guide loan restructuring decisions and identify situations where distressed restructuring applies. A distressed restructuring situation occurs when the Bank, for economic or legal reasons related to the obligor's financial difficulties, grants the obligor a special concession that is contrary to the Bank's policies. Such concessions could include a lower interest rate, waiver of principal, and extension of the maturity date.

The Bank has established a management framework for commercial and corporate obligors that represent higher-than-normal risk of default. It outlines the roles and responsibilities of loan portfolio managers with respect to managing high-risk accounts and the responsibilities of the Work Out units and other participants in the process. Lastly, the Credit Risk Management Policy and a management framework are used to determine the authorization limits for distressed restructuring situations. During fiscal years 2022 and 2021, the amount of distressed loan restructurings was not significant.

Counterparty Risk Assessment

Counterparty risk is a credit risk that the Bank incurs on various types of transactions involving financial instruments. The most significant risks are those it faces when it trades derivative financial instruments with counterparties on the over-the-counter market or when it purchases securities under reverse repurchase agreements or sells securities under repurchase agreements. Securities lending transactions and securities brokerage activities involving derivative financial instruments are also sources of counterparty risk. Note 16 to the consolidated financial statements provides a complete description of the credit risk for derivative financial instruments by type of traded product.

The Risk Management Group has developed models by type of counterparty through which it applies an advanced methodology for calculating the Bank's credit risk exposure and economic capital. The exposures are subject to limits. These limits are established based on the counterparty's internal default risk rating and on the potential volatility of the underlying assets until expiration of the contract.

Counterparty obligations related to the trading of contracts on derivative financial instruments, securities lending transactions, and reverse repurchase agreements are frequently subject to credit risk mitigation measures. The mitigation techniques are somewhat different from those used for loans and advances and depend on the nature of the instrument or the type of contract traded. The most widely used measure is the signing of master agreements: the International Swaps & Derivatives Association, Inc. (ISDA) master agreement, the Global Master Repurchase Agreement (GMRA), and the Global Master Securities Lending Agreement (GMSLA). These agreements make it possible, in the event of default, insolvency, or bankruptcy of one of the contracting parties, to apply full netting of the gross amounts of the market values for each of the transactions covered by the agreement in force at the time of default. The amount of the final settlement is therefore the net balance of gains and losses on each transaction, which reduces exposure when a counterparty defaults. The Bank's policies require that an ISDA, GMRA, or GMSLA agreement be signed with its trading counterparties to derivatives, foreign exchange forward contracts, securities lending transactions, and reverse repurchase agreements.

Another mechanism for reducing credit risk on derivatives and foreign exchange forward contracts complements the ISDA master agreement in many cases and provides the Bank and its counterparty (or either of the parties, if need be) with the right to request collateral from the counterparty when the net balance of gains and losses on each transaction exceeds a threshold defined in the agreement. These agreements, also known as Credit Support Annexes (CSA), are mandatory when financial institutions trade between each other in international financial markets since they limit credit risk while providing traders with additional flexibility to continue negotiating with the counterparty. When required by regulation, the Bank always uses this type of legal documentation in transactions with financial institutions and governments. For business transactions, the Bank prefers to use internal mechanisms, notably involving collateral and mortgages, set out in the credit agreements. The Bank's internal policies set the conditions governing the implementation of such mitigation methods.

Requiring collateral as part of a securities lending transaction or reverse repurchase agreement is not solely the result of an internal credit decision. In fact, it is a mandatory market practice imposed by self-regulating organizations in the financial services sector such as the Investment Industry Regulatory Organization of Canada (IIROC).

The Bank has identified circumstances in which it is likely to be exposed to wrong-way risk. There are two types of wrong-way risk: general wrong-way risk and specific wrong-way risk. General wrong-way risk occurs when the probability of default of the counterparties is positively correlated to general market risk factors. Specific wrong-way risk occurs when the exposure to a specific counterparty is positively correlated to the probability of default of the counterparty due to the nature of the transactions with this counterparty.

Assessment of Settlement Risk

Settlement risk potentially arises from transactions that feature reciprocal delivery of cash or securities between the Bank and a counterparty. Foreign exchange contracts are an example of transactions that can generate significant levels of settlement risk. However, the implementation of multilateral settlement systems that allow settlement netting among participating institutions has contributed greatly to reducing the risks associated with the settlement of foreign exchange transactions among banks. The Bank also uses financial intermediaries to gain access to established clearing houses in order to minimize settlement risk for certain financial derivative transactions. In some cases, the Bank may have direct access to established clearing houses for settling financial transactions such as repurchase agreements or reverse repurchase agreements. In addition, certain derivative financial instruments traded over the counter are settled directly or indirectly by central counterparties. For additional information, see the table that presents notional amounts in Note 16 to the consolidated financial statements.

There are several other types of transactions that may generate settlement risk, in particular the use of certain electronic fund transfer services. This risk refers to the possibility that the Bank may make a payment or settlement on a transaction without receiving the amount owed by the counterparty, and with no opportunity to recover the funds delivered (irrevocable settlement).

The ultimate means for completely eliminating such a risk is for the Bank to complete no payments or settlements before receiving the funds due from the counterparty. Such an approach cannot, however, be used systematically. For several electronic payment services, the Bank is able to implement mechanisms that allow it to make its transfers revocable or to debit the counterparty in the amount of the settlements before it makes its own transfer. On the other hand, the nature of transactions in financial instruments makes it impossible for such practices to be widely used. For example, on foreign exchange transactions involving a currency other than the U.S. dollar, time zone differentials impose strict payment schedules on the parties. The Bank cannot unduly postpone a settlement without facing penalties, due to the large size of the amounts involved.

The most effective way for the Bank to control settlement risks, both for financial market transactions and irrevocable transfers, is to impose internal risk limits based on the counterparty's ability to pay.

Assessment of Environmental Risk

Environmental risk can affect credit risk in that the energy transition movement and extreme weather events could result in a decreased ability to make repayments or in a decrease in the value of assets pledged as collateral. Ultimately, environmental risk can lead to both a higher probability of default and higher loss given default among counterparties. In response, the risk management framework has been expanded to include new measures that identify, assess, control, and monitor environmental risk. In addition, the Bank has developed and is gradually deploying a process used to assess and quantify the impacts of climate changes on its strategy and results. Furthermore, for clients in specific industries, the impacts of climate changes are discussed at least once a year as part of the credit granting or renewal process.

The Bank also assesses its exposure to environment-related credit risk using a variety of control and monitoring mechanisms. For example, analyses are performed on vulnerabilities to physical risks and on loan portfolio transition risks. These analyses are applied to all financing activities and provide greater visibility of the Bank's exposure to environmental risk. In addition, the Bank periodically assesses loan portfolio concentration risk to ensure that such risk is not being significantly affected by environmental risk. Furthermore, an industry sector matrix has been developed to provide the Risk Management Group with a clearer vision of the loan portfolio sectors that are most affected by climate-related risks. Thanks to these initiatives, the Bank can take concrete steps in the process used to review sectoral limits, as each business sector or industry now has an ESG section describing its environmental risk. As well, to help the Bank achieve its business objectives, the Risk Management Group created the position of Vice-President, Credit Analytics and Climate Risk, whose responsibilities consist of increasing the Bank's ability to extract business intelligence, to integrate climate risk into its decision-making processes, and to develop its climate risk analysis capacities. Regarding this latter point, the Bank has begun climate risk impact analyses using the climate scenarios recommended by the Network for Greening the Financial System (NGFS).

This year also saw the emergence of a new environmental risk issue, i.e., the potential financial repercussions of climate change on biodiversity. Financial system participants were called upon by the PRB Biodiversity Community initiative of the United Nations Environment Programme Finance Initiative (UNEP-FI), of which the Bank is a member. Similarly, as part of a Fondation initiative the Bank took part in a one-day brainstorming exercise on biodiversity indicators for investors. As this environmental risk issue begins to emerge, the Bank will continue to closely monitor the various initiatives and contribute to deliberations about potentially incorporating this issue into both investment and credit-granting decisions. The Risk Management Group closely monitors changes in trends and calculation methods and actively participates in various industry discussion groups.

Maximum Credit Risk Exposure

The amounts in the following tables represent the Bank's maximum exposure to credit risk as at the financial reporting date without considering any collateral held or any other credit enhancements. These amounts do not include allowances for credit losses nor amounts pledged as collateral. The tables also exclude equity securities.

Maximum Credit Risk Exposure Under the Basel Asset Categories^{(1)*}

(millions of Canadian dollars)						As at October 31, 2022		
	Drawn ⁽²⁾	Undrawn commitments	Repo-style transactions ⁽³⁾	Derivative financial instruments	Other off-balance-sheet items ⁽⁴⁾	Total	Standardized Approach ⁽⁵⁾	AIRB Approach
Retail								
Residential mortgage	73,324	8,616	–	–	–	81,940	12 %	88 %
Qualifying revolving retail	2,483	6,920	–	–	–	9,403	– %	100 %
Other retail	17,526	2,688	–	–	35	20,249	25 %	75 %
	93,333	18,224	–	–	35	111,592		
Non-retail								
Corporate	81,763	29,811	36,194	322	5,538	153,628	13 %	87 %
Sovereign	56,253	5,821	68,906	–	326	131,306	2 %	98 %
Financial institutions	7,200	166	76,856	1,150	754	86,126	19 %	81 %
	145,216	35,798	181,956	1,472	6,618	371,060		
Trading portfolio								
Securitization	4,409	–	–	–	–	4,409	80 %	20 %
Total – Gross credit risk	242,958	54,022	181,956	15,134	11,026	505,096	12 %	88 %
Standardized Approach⁽⁵⁾	30,704	311	24,783	1,308	4,610	61,716		
AIRB Approach	212,254	53,711	157,173	13,826	6,416	443,380		
Total – Gross credit risk	242,958	54,022	181,956	15,134	11,026	505,096	12 %	88 %

(millions of Canadian dollars)						As at October 31, 2021		
	Drawn ⁽²⁾	Undrawn commitments	Repo-style transactions ⁽³⁾	Derivative financial instruments	Other off-balance-sheet items ⁽⁴⁾	Total	Standardized Approach ⁽⁵⁾	AIRB Approach
Retail								
Residential mortgage	66,791	10,578	–	–	–	77,369	9 %	91 %
Qualifying revolving retail	2,270	6,282	–	–	–	8,552	– %	100 %
Other retail	15,519	2,481	–	–	31	18,031	29 %	71 %
	84,580	19,341	–	–	31	103,952		
Non-retail								
Corporate	70,589	27,783	26,190	161	5,415	130,138	11 %	89 %
Sovereign	55,323	6,217	58,452	294	83	120,369	2 %	98 %
Financial institutions	7,228	126	72,122	2,248	619	82,343	28 %	72 %
	133,140	34,126	156,764	2,703	6,117	332,850		
Trading portfolio								
Securitization	3,269	–	–	–	–	3,269	68 %	32 %
Total – Gross credit risk	220,989	53,467	156,764	19,713	10,354	461,287	13 %	87 %
Standardized Approach⁽⁵⁾	25,009	258	26,385	2,203	3,955	57,810		
AIRB Approach	195,980	53,209	130,379	17,510	6,399	403,477		
Total – Gross credit risk	220,989	53,467	156,764	19,713	10,354	461,287	13 %	87 %

(1) See the Financial Reporting Method section on pages 16 to 21 for additional information on capital management measures.

(2) Excludes equity securities and certain other assets such as investments in deconsolidated subsidiaries and joint ventures, right-of-use properties and assets, goodwill, deferred tax assets, and intangible assets.

(3) Securities purchased under reverse repurchase agreements and sold under repurchase agreements as well as securities loaned and borrowed.

(4) Letters of guarantee, documentary letters of credit, and securitized assets that represent the Bank's commitment to make payments in the event that an obligor cannot meet its financial obligations to third parties.

(5) Includes exposures to qualifying central counterparties (QCCP).

Market Risk

Market risk is the risk of losses arising from movements in market prices. Market risk comes from a number of factors, particularly changes to market variables such as interest rates, credit spreads, exchange rates, equity prices, commodity prices, and implied volatilities. The Bank is exposed to market risk through its participation in trading, investment, and asset/liability management activities. Trading activities involve taking positions on various instruments such as bonds, shares, currencies, commodities, or derivative financial instruments. The Bank is exposed to non-trading market risk through its asset/liability management and investment portfolios.

The trading portfolios include positions in financial instruments and commodities held either with trading intent or to hedge other elements of the trading book. Positions held with trading intent are those held for short-term resale and/or with the intent of taking advantage of actual or expected short-term price movements or to lock in arbitrage profits. These portfolios target one of the following objectives: market making, liquidating positions for clients, or selling financial products to clients.

Non-trading portfolios include financial instruments intended to be held to maturity as well as those held for daily cash management or for the purpose of maintaining targeted returns or ensuring asset and liability management.

Governance

A market risk management policy governs global market risk management across the Bank's units and subsidiaries that are exposed to this type of risk. It is approved by the GRC. The policy sets out the principles for managing market risk and the framework that defines risk measures, control and monitoring activities; sets market risk limits; and reports on breaches.

The Financial Markets Risk Committee oversees all Financial Markets segment risks that could adversely affect the Bank's results, liquidity, or capital. This committee also oversees the Financial Markets segment's risk framework to ensure that controls are in place to contain risk in accordance with the Bank's risk appetite framework.

Market risk limits ensure the link and coherence between the Bank's market risk appetite targets and the day-to-day market risk management by all parties involved, notably senior management, the business units, and the market risk sector in its independent control function. The Bank's monitoring and reporting process consists of comparing market risk exposure to alert levels and to the market risk limits established for all limit authorization and approval levels.

Assessment of Market Risk

The Risk Management Group uses a variety of risk measures to estimate the size of potential losses under more or less severe scenarios, and using both short-term and long-term time horizons. For short-term horizons, the Bank's risk measures include Value-at-Risk (VaR), Stressed VaR (SVaR), and sensitivity metrics. For long-term horizons or sudden significant market moves, including those due to a lack of market liquidity, the risk measures include stress testing across an extensive range of scenarios.

VaR and SVaR Models

VaR is a statistical measure of risk that is used to quantify market risks by activity and by risk type. VaR is defined as the maximum loss at a specific confidence level over a certain horizon under normal market conditions. The VaR method has the advantage of providing a uniform measurement of financial-instrument-related market risks based on a single statistical confidence level and time horizon.

For VaR, the Bank uses a historical price distribution to compute the probable loss levels at a 99% confidence level, using a two-year history of daily time series of risk factor changes. VaR is the maximum daily loss that the Bank could incur, in 99 out of 100 cases, in a given portfolio. In other words, the loss could exceed that amount in only one out of 100 cases.

The trading VaR is measured by assuming a holding period of one day for ongoing market risk management and a 10-day holding period for regulatory capital purposes. VaR is calculated on a daily basis both for major classes of financial instruments (including derivative financial instruments) and for all trading portfolios in the Financial Markets segment and the Bank's Global Funding and Treasury Group.

In addition to the one-day trading VaR, the Bank calculates a trading SVaR, which is a statistical measure of risk that replicates the VaR calculation method but uses, instead of a two-year history of risk factor changes, a 12-month data period corresponding to a continuous period of significant financial stress that is relevant in terms of the Bank's portfolios.

VaR methodology techniques are well suited to measuring risks under normal market conditions. VaR metrics are most appropriate as a risk measure for trading positions in liquid financial markets. However, there are limitations in measuring risks with this method when extreme and sudden market risk events occur, since they are likely to underestimate the Bank's market risk. VaR methodology limitations include the following:

- past changes in market risk factors may not always produce accurate predictions of the distribution and correlations of future market movements;
- a VaR with a daily time horizon does not fully capture the market risk of positions that cannot be liquidated or hedged within one day;
- the market risk factor historical database used for VaR calculation may not reflect potential losses that could occur under unusual market conditions (e.g., periods of extreme illiquidity) relative to the historical period used for VaR estimates;
- the use of a 99% VaR confidence level does not reflect the extent of potential losses beyond that percentile.

Given the limitations of VaR, this measure represents only one component of the Bank's risk management oversight, which also incorporates, among other measures, stress testing, sensitivity analysis, and concentration and liquidity limits and analysis.

The Bank also conducts backtesting of the VaR model. It consists of comparing the profits and losses to the statistical VaR measure. Backtesting is essential to verifying the VaR model's capacity to adequately forecast the maximum risk of market losses and thus validate, retroactively, the quality and accuracy of the results obtained using the model. If the backtesting results present material discrepancies, the VaR model could be revised in accordance with the Bank's model risk management framework. All market risk models and their performance are subject to periodic independent validation by the model validation group.

Controlling Market Risk

A comprehensive set of limits is applied to market risk measures, and these limits are monitored and reported on a regular basis. Instances when limits are exceeded are reported to the appropriate management level. The risk profiles of the Bank's operations remain consistent with its risk appetite and the resulting limits, and are monitored and reported to traders, management of the applicable business unit, senior executives, and Board committees.

The Bank also uses economic capital for market risk as an indicator for risk appetite and limit setting. This indicator measures the amount of capital that is required to absorb unexpected losses due to market risk events over a one-year horizon and with a determined confidence level. For additional information on economic capital, see the Capital Management section of this MD&A.

The following tables provide a breakdown of the Bank's Consolidated Balance Sheet into assets and liabilities by those that carry market risk and those that do not carry market risk, distinguishing between trading positions whose main risk measures are VaR and SVaR and non-trading positions that use other risk measures.

Reconciliation of Market Risk With Consolidated Balance Sheet Items

(millions of Canadian dollars)		As at October 31, 2022			
	Balance sheet	Market risk measures		Not subject to market risk	Non-traded risk primary risk sensitivity
		Trading ⁽¹⁾	Non-Trading ⁽²⁾		
Assets					
Cash and deposits with financial institutions	31,870	837	20,269	10,764	Interest rate ⁽³⁾
Securities					
At fair value through profit or loss	87,375	85,805	1,570	–	Interest rate ⁽³⁾ and equity ⁽⁴⁾
At fair value through other comprehensive income	8,828	–	8,828	–	Interest rate ⁽³⁾ and equity ⁽⁵⁾
At amortized cost	13,516	–	13,516	–	Interest rate ⁽³⁾
Securities purchased under reverse repurchase agreements and securities borrowed	26,486	–	26,486	–	Interest rate ⁽³⁾⁽⁶⁾
Loans and acceptances, net of allowances	206,744	9,914	196,830	–	Interest rate ⁽³⁾
Derivative financial instruments	18,547	16,968	1,579	–	Interest rate ⁽⁷⁾ and exchange rate ⁽⁷⁾
Defined benefit asset	498	–	498	–	Other ⁽⁸⁾
Other	9,876	–	–	9,876	
	403,740	113,524	269,576	20,640	
Liabilities					
Deposits	266,394	15,422	250,972	–	Interest rate ⁽³⁾
Acceptances	6,541	–	6,541	–	Interest rate ⁽³⁾
Obligations related to securities sold short	21,817	21,817	–	–	
Obligations related to securities sold under repurchase agreements and securities loaned	33,473	–	33,473	–	Interest rate ⁽³⁾⁽⁶⁾
Derivative financial instruments	19,632	18,909	723	–	Interest rate ⁽⁷⁾ and exchange rate ⁽⁷⁾
Liabilities related to transferred receivables	26,277	9,927	16,350	–	Interest rate ⁽³⁾
Defined benefit liability	111	–	111	–	Other ⁽⁸⁾
Other	6,250	–	77	6,173	Interest rate ⁽³⁾
Subordinated debt	1,499	–	1,499	–	Interest rate ⁽³⁾
	381,994	66,075	309,746	6,173	

(1) Trading positions whose risk measures are VaR as well as total SVaR. For additional information, see the table in the pages ahead that shows the VaR distribution of the trading portfolios by risk category, their diversification effect, and total trading SVaR.

(2) Non-trading positions that use other risk measures.

(3) For additional information, see the tables in the pages ahead, namely, the table that shows the VaR distribution of the trading portfolios by risk category, their diversification effect, and total trading SVaR as well as the table that shows the interest rate sensitivity.

(4) For additional information, see Note 6 to the consolidated financial statements.

(5) The fair value of equity securities designated at fair value through other comprehensive income is presented in Notes 3 and 6 to the consolidated financial statements.

(6) These instruments are recorded at amortized cost and are subject to credit risk for capital management purposes. For trading-related transactions with maturities of more than one day, interest rate risk is included in the VaR and SVaR measures.

(7) For additional information, see Notes 16 and 17 to the consolidated financial statements.

(8) For additional information, see Note 23 to the consolidated financial statements.

(millions of Canadian dollars)

As at October 31, 2021

	Balance sheet	Market risk measures		Not subject to market risk	Non-traded risk primary risk sensitivity
		Trading ⁽¹⁾	Non-trading ⁽²⁾		
Assets					
Cash and deposits with financial institutions	33,879	401	16,518	16,960	Interest rate ⁽³⁾
Securities					
At fair value through profit or loss	84,811	82,995	1,816	–	Interest rate ⁽³⁾ and equity ⁽⁴⁾
At fair value through other comprehensive income	9,583	–	9,583	–	Interest rate ⁽³⁾ and equity ⁽⁵⁾
At amortized cost	11,910	–	11,910	–	Interest rate ⁽³⁾
Securities purchased under reverse repurchase agreements and securities borrowed	7,516	–	7,516	–	Interest rate ⁽³⁾⁽⁶⁾
Loans and acceptances, net of allowances	182,689	7,827	174,862	–	Interest rate ⁽³⁾
Derivative financial instruments	16,484	16,033	451	–	Interest rate ⁽⁷⁾ and exchange rate ⁽⁷⁾
Defined benefit asset	691	–	691	–	Other ⁽⁸⁾
Other ⁽⁹⁾	8,058	–	–	8,058	
	355,621	107,256	223,347	25,018	
Liabilities					
Deposits	240,938	14,215	226,723	–	Interest rate ⁽³⁾
Acceptances	6,836	–	6,836	–	Interest rate ⁽³⁾
Obligations related to securities sold short	20,266	20,266	–	–	
Obligations related to securities sold under repurchase agreements and securities loaned	17,293	–	17,293	–	Interest rate ⁽³⁾⁽⁶⁾
Derivative financial instruments	19,367	18,999	368	–	Interest rate ⁽⁷⁾ and exchange rate ⁽⁷⁾
Liabilities related to transferred receivables	25,170	9,058	16,112	–	Interest rate ⁽³⁾
Defined benefit liability	143	–	143	–	Other ⁽⁸⁾
Other	6,158	–	113	6,045	Interest rate ⁽³⁾
Subordinated debt	768	–	768	–	Interest rate ⁽³⁾
	336,939	62,538	268,356	6,045	

- (1) Trading positions whose risk measures are VaR as well as total SVaR. For additional information, see the table on the following page that shows the VaR distribution of the trading portfolios by risk category, their diversification effect, and total trading SVaR.
- (2) Non-trading positions that use other risk measures.
- (3) For additional information, see the tables in the pages ahead, namely, the table that shows the VaR distribution of the trading portfolios by risk category, their diversification effect, and total trading SVaR as well as the table that shows the interest rate sensitivity.
- (4) For additional information, see Note 6 to the consolidated financial statements.
- (5) The fair value of equity securities designated at fair value through other comprehensive income is presented in Notes 3 and 6 to the consolidated financial statements.
- (6) These instruments are recorded at amortized cost and are subject to credit risk for capital management purposes. For trading-related transactions with maturities of more than one day, interest rate risk is included in the VaR and SVaR measures.
- (7) For additional information, see Notes 16 and 17 to the consolidated financial statements.
- (8) For additional information, see Note 23 to the consolidated financial statements.
- (9) Certain amounts have been adjusted to reflect an accounting policy change applicable to cloud computing arrangements. For additional information, see Note 1 to the consolidated financial statements.

Trading Activities

The table below shows the VaR distribution of trading portfolios by risk category and their diversification effect as well as total trading SVaR, i.e., the VaR of the Bank's current portfolios obtained following the calibration of risk factors over a 12-month stress period.

VaR and SVaR of Trading Portfolios^{(1)(2)*}

Year ended October 31

(millions of Canadian dollars)

	2022				2021			
	Low	High	Average	Period end	Low	High	Average	Period end
Interest rate	(3.9)	(11.3)	(5.8)	(5.2)	(4.5)	(11.0)	(7.2)	(8.2)
Foreign exchange	(0.4)	(6.9)	(2.1)	(2.1)	(0.3)	(2.3)	(0.9)	(0.9)
Equity	(4.0)	(10.6)	(7.2)	(7.1)	(4.4)	(10.2)	(6.2)	(6.0)
Commodity	(0.5)	(1.6)	(0.9)	(1.2)	(0.4)	(1.9)	(0.9)	(1.4)
Diversification effect ⁽³⁾	n.m.	n.m.	8.1	7.3	n.m.	n.m.	7.8	11.3
Total trading VaR	(4.6)	(11.4)	(7.9)	(8.3)	(4.8)	(12.3)	(7.4)	(5.2)
Total trading SVaR	(5.1)	(26.2)	(14.6)	(18.8)	(6.5)	(23.1)	(13.8)	(9.5)

n.m. Computation of a diversification effect for the high and low is not meaningful, as highs and lows may occur on different days and be attributable to different types of risk.

(1) See the Glossary section on pages 122 to 125 for details on the composition of these measures.

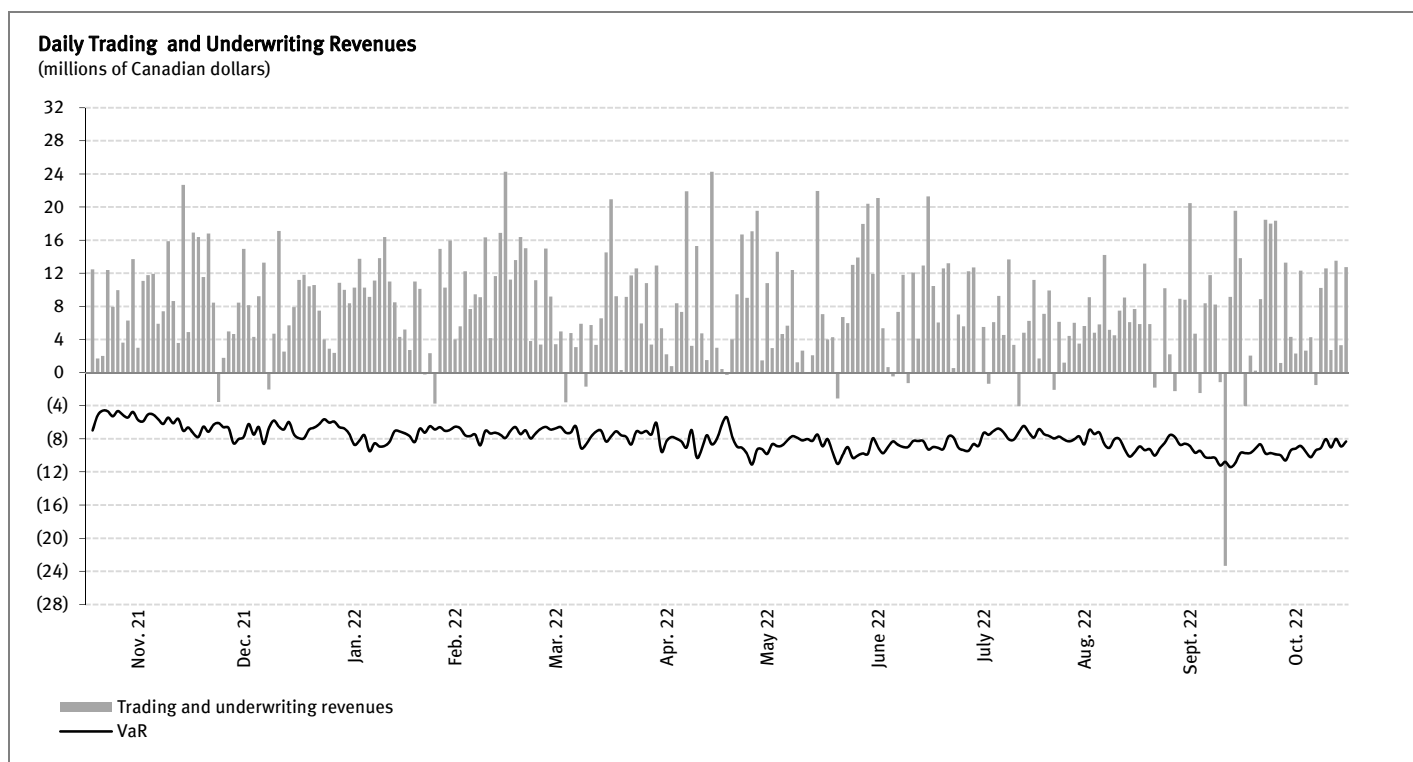
(2) Amounts are presented on a pre-tax basis and represent one-day VaR and SVaR using a 99% confidence level.

(3) The total trading VaR is less than the sum of the individual risk factor VaR results due to the diversification effect.

The average total trading VaR stood at \$7.9 million for fiscal 2022, up slightly from \$7.4 million in fiscal 2021. The average total trading SVaR was also up slightly, increasing from \$13.8 million in fiscal 2021 to \$14.6 million in fiscal 2022. These increases were mainly driven by higher equity risk, largely offset by a lower interest rate risk.

The revenues generated by trading activities are compared with VaR as a backtesting assessment of the appropriateness of this risk measure as well as the financial performance of trading activities relative to the risk undertaken.

The table below shows daily trading and underwriting revenues and VaR. Daily trading and underwriting revenues were positive on 92% of the days for the year ended October 31, 2022. Daily trading and underwriting losses in excess of \$1 million were recorded on 17 days, and on one of those days, the losses exceeded the VaR.



Stress Testing

Stress testing is a risk management technique that consists of estimating potential losses under abnormal market conditions and risk factor movements. This technique enhances transparency by exploring a range of severe but plausible scenarios.

These stress tests simulate the results that the portfolios would generate if the extreme scenarios in question were to occur. The Bank's stress testing framework, which is applied to all positions generating market risk, currently comprises the following categories of stress test scenarios:

- Historical scenarios based on past major disruption situations;
- Hypothetical scenarios designed to be forward-looking in the face of potential market stresses;
- Scenarios specific to asset classes, including:
 - sharp parallel increases/decreases in interest rates; non-parallel movements of interest rates (flattening and steepening) and increases/decreases in credit spreads;
 - sharp stock market crash coupled with a significant increase in volatility of the term structure; increase in stock prices combined with less volatility;
 - significant increases/decreases in commodity prices coupled with increases/decreases in volatility; short-term and long-term increases/decreases in commodity prices;
 - depreciation/appreciation of the U.S. dollar and of other currencies relative to the Canadian dollar.

Structural Interest Rate Risk

As part of its core banking activities, such as lending and deposit taking, the Bank is exposed to interest rate risk. Interest rate risk is the potential negative impact of interest rate fluctuations on the Bank's annual net interest income and the economic value of its equity. Activities related to hedging, investments, and term funding are also exposed to structural interest rate risk. The Bank's main exposure to interest rate risk stems from a variety of sources:

- yield curve risk, which refers to changes in the level, slope, and shape of the yield curve;
- repricing risk, which arises from timing differences in the maturity and repricing of on- and off-balance-sheet items;
- options risk, either implicit (e.g., prepayment of mortgage loans) or explicit (e.g., capped mortgages and rate guarantees) in balance sheet products;
- basis risk that is caused by imperfect correlation between different yield curves.

The Bank's exposure to structural interest rate risk is assessed and controlled mostly through the impact of stress scenarios and market shocks on the economic value of the Bank's equity and on 12-month net interest income projections. These metrics are based on cash flow projections prepared using a number of assumptions. Specifically, the Bank has developed key assumptions on loan prepayment levels, deposit redemptions, and the behaviour of customers that were granted rate guarantees. These specific assumptions were developed based on historical analyses and are reviewed frequently.

Funds transfer pricing is a process by which the Bank's business units are charged or paid according to their use or supply of funding. Through this mechanism, all funding activities as well as the interest rate risk and liquidity risk associated with those activities are centralized in the Global Funding and Treasury Group.

Active management of structural interest rate risk can significantly enhance the Bank's profitability and add to shareholder value. The Bank's goal is to maximize the economic value of its equity and its annual net interest income considering its risk appetite. This goal must be achieved within prescribed risk limits and is accomplished primarily by implementing a policy framework, approved by the GRC and submitted for information purposes to the RMC, that sets a risk tolerance threshold, monitoring structures controlled by the various committees, risk indicators, reporting procedures, delegation of responsibilities, and segregation of duties. The Bank also prepares an annual funding plan that includes the expected growth of assets and liabilities.

Governance

Management of the Bank's structural interest rate risk is mandated to the Global Funding and Treasury Group. In this role, the executives and personnel of this group are responsible for the day-to-day management of the risks inherent to structural interest rate risk hedging decisions and operations. They act as the primary effective challenge function with respect to the execution of these activities. The GRC approves and endorses the structural interest rate exposure and strategies on the recommendation of the Global Funding and Treasury Group. The Risk Management Group is responsible for assessing structural interest rate risk, monitoring activities, and ensuring compliance with the interest rate risk in the banking book policy. The Risk Management Group ensures that an appropriate risk management framework is in place and ensures compliance with the risk appetite framework and policy. Structural interest rate risk supervision is mainly provided by the Financial Markets Risk Committee. This committee reviews exposure to structural interest rate risk, the use of limits, and changes made to assumptions.

Stress Testing

Stress tests are performed on a regular basis to assess the impact of various scenarios on annual net interest income and on the economic value of equity in order to guide the management of structural interest rate risk. Stress test scenarios are performed where the yield curve level, slope, and shape are shocked. Yield curve basis and volatility scenarios are also performed. All risk factors mentioned above are covered by specific scenarios and have Board-approved or GRC-approved risk limits.

Dynamic simulation is also used to project the Bank's future net interest income, future economic value, and future exposure to structural interest rate risk. These simulations project cash flows of assets, liabilities, and off-balance-sheet products over a given investment horizon. Given their dynamic nature, they encompass assumptions pertaining to changes in volume, client term preference, prepayments of deposits and loans, and the yield curve.

The following table presents the potential before-tax impact of an immediate and sustained 100-basis-point increase or of an immediate and sustained 100 basis-point decrease in interest rates on the economic value of equity and on the net interest income of the Bank's non-trading portfolios for the next 12 months, assuming no further hedging is undertaken.

Interest Rate Sensitivity – Non-Trading Activities (Before Tax)*

As at October 31

(millions of Canadian dollars)

	2022			2021		
	Canadian dollar	Other currencies	Total	Canadian dollar	Other currencies	Total
Impact on equity						
100-basis-point increase in the interest rate	(191)	(24)	(215)	(277)	39	(238)
100-basis-point decrease in the interest rate	179	27	206	253	(34)	219
Impact on net interest income						
100-basis-point increase in the interest rate	128	2	130	91	17	108
100-basis-point decrease in the interest rate	(141)	(2)	(143)	(67)	(17)	(84)

Investment Governance

The Bank has created securities portfolios in liquid and less liquid securities for strategic, long-term investment, and liquidity management purposes. These investments carry market risk, credit risk, liquidity risk, and concentration risk.

The investment governance framework sets out the guiding principles and general management standards that must be followed by all those who manage portfolios of these securities included in the portfolios of the Bank and its subsidiaries. Under this investment governance framework, business units that are active in managing these types of portfolios adopt internal investment policies that set, among other things, targets and limits for the allocation of assets in the portfolios concerned and internal approval mechanisms. The primary objective is to reduce concentration risk by industry, issuer, country, type of financial instrument, and credit quality.

Overall limits in value and in proportion to the Bank's equity are set on the outstanding amount of liquid preferred shares, liquid equity securities excluding preferred shares, and instruments classified as illiquid securities in the securities portfolios. The overall exposure to common shares with respect to an individual issuer and the total outstanding amount invested in private equity funds, for investment banking services, are also subject to limits. Restrictions are also set on investments defined as special. Lastly, the Bank has a specific policy, approved by the RMC, applicable to investments in debt and equity securities, including strategic investments. Strategic investments are defined as purchases of business assets or acquisitions of significant interests in an entity for purposes of acquiring control or creating a long-term relationship.

Structural Foreign Exchange Risk

The Bank's structural foreign exchange risk arises from investments in foreign operations denominated in currencies other than the Canadian dollar. This risk, predominantly in U.S. dollars, is measured by assessing the impact of currency fluctuations on retained earnings. The Bank uses financial instruments (derivative and non-derivative) to hedge this risk. An adverse change in foreign exchange rates can also impact the Bank's capital ratios due to the amount of RWA denominated in a foreign currency. When the Canadian dollar depreciates relative to other currencies, unrealized translation gains on the Bank's net investments in foreign operations, as well as the impact on hedging transactions, are reported in other comprehensive income in shareholders' equity. In addition, the Canadian-dollar equivalent of U.S.-dollar-denominated RWA and regulatory capital deductions increases. The reverse is true when the Canadian dollar appreciates relative to the U.S. dollar. The structural foreign exchange risk is managed to ensure that the potential impacts on the capital ratios and net income are within tolerable limits set by risk policies.

Liquidity and Funding Risk

Liquidity and funding risk is the risk that the Bank will be unable to honour daily cash and financial obligations without resorting to costly and untimely measures. Liquidity and funding risk arises when sources of funds become insufficient to meet scheduled payments under the Bank's commitments. Liquidity risk stems from mismatched cash flows related to assets and liabilities as well as the characteristics of certain products such as credit commitments and non-fixed-term deposits.

The Bank's primary objective as a financial institution is to manage liquidity such that it supports the Bank's business strategy and allows it to honour its commitments when they come due, even in extreme conditions. This is done primarily by implementing a policy framework approved by the RMC, which establishes a risk appetite, monitoring structures controlled by various committees, risk indicators, reporting procedures, delegation of responsibilities, and segregation of duties. The Bank also prepares an annual funding plan that incorporates the expected growth of assets and liabilities.

Regulatory Environment

The Bank works closely with national and international regulators to implement regulatory liquidity standards. The Bank adapts its processes and policies to reflect its liquidity risk appetite towards these new requirements.

The *Liquidity Adequacy Requirements* (LAR) are reviewed annually to reflect domestic and international regulatory changes. They constitute OSFI's proposed liquidity framework and include six chapters:

- overview;
- liquidity coverage ratio (LCR);
- net stable funding ratio (NSFR);
- net cumulative cash flow (NCCF);
- liquidity monitoring tools;
- intraday liquidity monitoring tools.

LCR is used to ensure that banks can overcome severe short-term stress, while the NSFR is a structural ratio over a one-year horizon. The NCCF metric is defined as a monitoring tool that calculates a survival period. It is based on the assumptions of a stress scenario prescribed by OSFI that aims to represent a combined systemic and bank-specific crisis. The Bank publishes LCR and NSFR on a quarterly basis, whereas NCCF is produced monthly and communicated to OSFI.

On March 11, 2021, OSFI released, for public consultation, revisions to its LAR guideline, which was to take effect in the first quarter of 2023. OSFI is making changes that will improve the sensitivity to risk and that will ensure that financial institutions hold sufficient cash or other liquid investments to meet potential liquidity needs and to support the continued lending of credit, in particular during periods of financial stress. On November 29, 2021, OSFI postponed the implementation of the revisions to its LAR guideline to April 1, 2023.

On January 31, 2022, OSFI published a final version of the liquidity rules, which reflects the most recent Basel III reforms and, on February 16, 2022, OSFI published the corresponding changes to the regulatory return, i.e., the Net Cumulative Cash Flow (NCCF) return.

On March 31, 2022, OSFI published, for consultation purposes, a draft guideline entitled *Assurance on Capital, Leverage and Liquidity Returns*. OSFI relies largely on the regulatory returns produced by financial institutions when assessing their safety and soundness. The purpose of this draft guideline is to better inform auditors and institutions on the work to be performed on regulatory returns in order to clarify and align OSFI's assurance expectations across all financial institutions. In particular, the draft guideline addresses the assurance that must be provided by an external audit, attestation by senior management, the assurance that must be provided by an internal audit, and the proposed effective dates. The Bank is actively participating in this consultation.

The Bank continues to closely monitor regulatory developments and actively participates in various consultation processes.

Governance

The Global Funding and Treasury Group is responsible for managing liquidity and funding risk. Although the day-to-day and strategic management of risks associated with liquidity, funding, and pledging activities is assumed by the Global Funding and Treasury Group, the Risk Management Group is responsible for assessing liquidity risk and overseeing compliance with the resulting policy. The Risk Management Group ensures that an appropriate risk management framework is in place and ensures compliance with the risk appetite framework. This structure provides an independent oversight and effective challenge for liquidity, funding, and pledging decisions, strategy, and exposure.

The Bank's *Liquidity, Funding and Pledging Governance Policy* requires review and approval by the RMC, based on recommendations from the GRC. The Bank has established three levels of limits. The first two levels involve the Bank's overall cash position and are respectively approved by the Board and the GRC, whereas the third level of limits focuses more on specific aspects of liquidity risk and is approved by the Financial Markets Risk Committee. The Board not only approves the supervision of day-to-day risk management and governance but also backup plans in anticipation of emergency and liquidity crisis situations. If a limit has to be revised, the Risk Management Group with the support of the Global Funding and Treasury Group, submits the proposed revision to the approving committee.

Oversight of liquidity risk is entrusted mainly to the Financial Markets Risk Committee, whose members include representatives of the Financial Markets segment, the Global Funding and Treasury Group, and the Risk Management Group.

The Bank also has policies and guidelines governing its own collateral pledged to counterparties, given the potential impact of such asset transfers on its liquidity. In accordance with its *Liquidity, Funding and Pledging Governance Policy*, the Bank conducts simulations of potential counterparty collateral claims under the CSAs in effect in the event of a Bank downgrade or other unlikely occurrences. The simulations are based on various Bank downgrading scenarios or market value fluctuations of transactions covered by CSAs.

Through the Financial Markets Risk Committee, the Risk Management Group regularly reports changes in liquidity, funding, and pledging indicators and compliance with regulatory-, Board-, and GRC-approved limits. If control reports indicate non-compliance with the limits and a general deterioration of liquidity indicators, the Global Funding and Treasury Group takes remedial action. According to an escalation process, problematic situations are reported to management and to the GRC and the RMC. An executive report on the Bank's liquidity and funding risk management is submitted quarterly to the RMC; this report describes the Bank's liquidity position and informs the Board of non-compliance with the limits and other rules observed during the reference period as well as remedial action taken.

Liquidity Management

The Bank performs liquidity management, funding, and pledging operations not only from its head office and regional offices in Canada, but also through certain foreign centres. Although the volume of such operations abroad represents a sizable portion of global liquidity management, the Bank's liquidity management is centralized. By organizing liquidity management, funding, and pledging activities within the Global Funding and Treasury Group, the Bank can better coordinate enterprise-wide funding and risk monitoring activities. All internal funding transactions between Bank entities are controlled by the Global Funding and Treasury Group.

This centralized structure streamlines the allocation and control of liquidity management, funding, and pledging limits. Nonetheless, the *Liquidity, Funding and Pledging Governance Policy* contains special provisions for financial centres whose size and/or strategic importance makes them more likely to contribute to the Bank's liquidity risk. Consequently, a liquidity and funding risk management structure exists at each financial centre. This structure imposes a set of limits of varying levels, up to the limits approved by the RMC, on diverse liquidity parameters, including liquidity stress tests as well as simple concentration measures.

The Bank's funds transfer pricing system prices liquidity by allocating the cost or income to the various business segments. Liquidity costs are allocated to liquidity-intensive activities, mainly long-term loans, and commitments to extend credit and less liquid securities as well as strategic investments. The liquidity compensation is credited to the suppliers of funds, primarily funding in the form of stable deposits from the Bank's distribution network.

Short-term day-to-day funding decisions are based on a daily cumulative net cash position, which is controlled using liquidity ratio limits. Among these ratios and parameters, the Bank pays particular attention to the funds obtained on the wholesale market and to cumulative cash flows over various time horizons.

Moreover, the Bank's collateral pledging activities are monitored in relation to the different limits set by the Bank and are subject to monthly stress tests using various scenarios. In particular, the Bank uses various scenarios to estimate the potential amounts of additional collateral that would be required in the event of a downgrade to the Bank's credit rating.

Liquidity risk can be assessed in many different ways using different liquidity indicators. One of the key liquidity risk monitoring tools is the Bank's survival period, which is based on contractual maturity and behavioural assumptions applied to balance sheet items as well as off-balance-sheet commitments.

Stress Testing

Using various simulations, survival period measures the number of months it would take to completely utilize the Bank's liquid assets if the Bank were to lose deposits prematurely or if funds from wholesale markets were not renewed at maturity. It is measured monthly using three scenarios, which were developed to assess sensitivity to a Bank-specific and/or systemic crisis. Deposit loss simulations are carried out based on their degree of stability, while the value of certain assets is encumbered by an amount reflecting their readiness for liquidation in a crisis. Appropriate scenarios and limits are included in the Bank's *Liquidity, Funding and Pledging Governance Policy*.

The Bank maintains an up-to-date, comprehensive financial contingency and crisis recovery plan that describes the measures to be taken in the event of a critical liquidity situation. This plan is reviewed and approved annually by the Board as part of business continuity and recovery planning. For additional information, see the Regulatory Compliance Risk section of this MD&A.

Liquidity Risk Appetite

The Bank monitors and manages its risk appetite through liquidity limits, ratios, and stress tests. The Bank's liquidity risk appetite is based on the following three principles:

- ensure the Bank has a sufficient amount of unencumbered liquid assets to cover its financial requirements, in both normal and stressed conditions;
- ensure the Bank keeps a liquidity buffer above the minimum regulatory requirement;
- ensure the Bank maintains diversified and stable sources of funding.

Liquid Assets

To protect depositors and creditors from unexpected crisis situations, the Bank holds a portfolio of unencumbered liquid assets that can be readily liquidated to meet financial obligations. The majority of the unencumbered liquid assets are held in Canadian or U.S. dollars. Moreover, all assets that can be quickly monetized are considered liquid assets. The Bank's liquidity reserves do not factor in the availability of the emergency liquidity facilities of central banks. The following tables provide information on the Bank's encumbered and unencumbered assets.

Liquid Asset Portfolio⁽¹⁾

As at October 31

(millions of Canadian dollars)

	2022					2021
	Bank-owned liquid assets ⁽²⁾	Liquid assets received ⁽³⁾	Total liquid assets	Encumbered liquid assets ⁽⁴⁾	Unencumbered liquid assets	Unencumbered liquid assets
Cash and deposits with financial institutions	31,870	–	31,870	7,690	24,180	27,098
Securities						
Issued or guaranteed by the Canadian government, U.S. Treasury, other U.S. agencies and other foreign governments	38,983	35,996	74,979	49,085	25,894	29,002
Issued or guaranteed by Canadian provincial and municipal governments	13,056	8,864	21,920	13,499	8,421	4,678
Other debt securities	10,399	2,342	12,741	2,932	9,809	7,201
Equity securities	47,281	45,055	92,336	65,045	27,291	26,824
Loans						
Securities backed by insured residential mortgages	11,795	–	11,795	6,213	5,582	3,545
As at October 31, 2022	153,384	92,257	245,641	144,464	101,177	
As at October 31, 2021	149,431	74,070	223,501	125,153		98,348

As at October 31

(millions of Canadian dollars)

	2022	2021
Unencumbered liquid assets by entity		
National Bank (parent)	52,544	62,438
Domestic subsidiaries	14,576	12,471
Foreign subsidiaries and branches	34,057	23,439
	101,177	98,348

As at October 31

(millions of Canadian dollars)

	2022	2021
Unencumbered liquid assets by currency		
Canadian dollar	49,466	47,293
U.S. dollar	24,871	40,999
Other currencies	26,840	10,056
	101,177	98,348

Liquid Asset Portfolio⁽¹⁾ – Average⁽⁵⁾

Year ended October 31

(millions of Canadian dollars)

	2022					2021
	Bank-owned liquid assets ⁽²⁾	Liquid assets received ⁽³⁾	Total liquid assets	Encumbered liquid assets ⁽⁴⁾	Unencumbered liquid assets	Unencumbered liquid assets
Cash and deposits with financial institutions	39,431	–	39,431	8,062	31,369	32,238
Securities						
Issued or guaranteed by the Canadian government, U.S. Treasury, other U.S. agencies and other foreign governments	33,167	32,546	65,713	42,012	23,701	20,349
Issued or guaranteed by Canadian provincial and municipal governments	13,093	7,283	20,376	14,100	6,276	5,895
Other debt securities	8,772	2,408	11,180	2,409	8,771	6,413
Equity securities	55,020	43,610	98,630	74,203	24,427	34,351
Loans						
Securities backed by insured residential mortgages	10,980	–	10,980	6,762	4,218	3,693
As at October 31, 2022	160,463	85,847	246,310	147,548	98,762	
As at October 31, 2021	161,650	75,626	237,276	134,337		102,939

(1) See the Financial Reporting Method section on pages 16 to 21 for additional information on capital management measures.

(2) Bank-owned liquid assets include assets for which there are no legal or geographic restrictions.

(3) Securities received as collateral with respect to securities financing and derivative transactions and securities purchased under reverse repurchase agreements and securities borrowed.

(4) In the normal course of its funding activities, the Bank pledges assets as collateral in accordance with standard terms. Encumbered liquid assets include assets used to cover short sales, obligations related to securities sold under repurchase agreements and securities loaned, guarantees related to security-backed loans and borrowings, collateral related to derivative financial instrument transactions, asset-backed securities, and liquid assets legally restricted from transfers.

(5) The average is based on the sum of the end-of-period balances of the 12 months of the year divided by 12.

Summary of Encumbered and Unencumbered Assets⁽¹⁾

(millions of Canadian dollars)

					As at October 31, 2022	
	Encumbered assets ⁽²⁾		Unencumbered assets		Total	Encumbered assets as % of total assets
	Pledged as collateral	Other ⁽³⁾	Available as collateral	Other ⁽⁴⁾		
Cash and deposits with financial institutions	295	7,395	24,180	–	31,870	1.9
Securities	42,972	–	66,747	–	109,719	10.6
Securities purchased under reverse repurchase agreements and securities borrowed	–	21,818	4,668	–	26,486	5.4
Loans and acceptances, net of allowances	37,426	–	5,582	163,736	206,744	9.3
Derivative financial instruments	–	–	–	18,547	18,547	–
Investments in associates and joint ventures	–	–	–	140	140	–
Premises and equipment	–	–	–	1,397	1,397	–
Goodwill	–	–	–	1,519	1,519	–
Intangible assets	–	–	–	1,360	1,360	–
Other assets	–	–	–	5,958	5,958	–
	80,693	29,213	101,177	192,657	403,740	27.2

(millions of Canadian dollars)

					As at October 31, 2021 ⁽⁵⁾	
	Encumbered assets ⁽²⁾		Unencumbered assets		Total	Encumbered assets as % of total assets
	Pledged as collateral	Other ⁽³⁾	Available as collateral	Other ⁽⁴⁾		
Cash and deposits with financial institutions	275	6,506	27,098	–	33,879	1.9
Securities	38,599	–	67,705	–	106,304	10.9
Securities purchased under reverse repurchase agreements and securities borrowed	–	7,516	–	–	7,516	2.1
Loans and acceptances, net of allowances	37,307	–	3,545	141,837	182,689	10.5
Derivative financial instruments	–	–	–	16,484	16,484	–
Investments in associates and joint ventures	–	–	–	225	225	–
Premises and equipment	–	–	–	1,216	1,216	–
Goodwill	–	–	–	1,504	1,504	–
Intangible assets	–	–	–	1,274	1,274	–
Other assets	–	–	–	4,530	4,530	–
	76,181	14,022	98,348	167,070	355,621	25.4

- (1) See the Financial Reporting Method section on pages 16 to 21 for additional information on capital management measures.
- (2) In the normal course of its funding activities, the Bank pledges assets as collateral in accordance with standard terms. Encumbered assets include assets used to cover short sales, obligations related to securities sold under repurchase agreements and securities loaned, guarantees related to security-backed loans and borrowings, collateral related to derivative financial instrument transactions, asset-backed securities, residential mortgage loans securitized and transferred under the Canada Mortgage Bond program, assets held in consolidated trusts supporting the Bank's funding activities, and mortgage loans transferred under the covered bond program.
- (3) Other encumbered assets include assets for which there are restrictions and that cannot therefore be used for collateral or funding purposes as well as assets used to cover short sales.
- (4) Other unencumbered assets are assets that cannot be used for collateral or funding purposes in their current form. This category includes assets that are potentially eligible as funding program collateral (e.g., mortgages insured by the Canada Mortgage and Housing Corporation that can be securitized into mortgage-backed securities under the *National Housing Act* (Canada)).
- (5) Certain amounts have been adjusted to reflect an accounting policy change applicable to cloud computing arrangements. For additional information, see Note 1 to the consolidated financial statements.

Liquidity Coverage Ratio

The liquidity coverage ratio (LCR) was introduced primarily to ensure that banks could withstand periods of severe short-term stress. LCR is calculated by dividing the total amount of high-quality liquid assets (HQLA) by the total amount of net cash outflows. OSFI has been requiring Canadian banks to maintain a minimum LCR of 100%. An LCR above 100% ensures that banks are holding sufficient high-quality liquid assets to cover net cash outflows given a severe, 30-day liquidity crisis. The assumptions underlying the LCR scenario were established by the BCBS and OSFI's *Liquidity Adequacy Requirements Guideline*.

The following table provides average LCR data calculated using the daily figures in the quarter. For the quarter ended October 31, 2022, the Bank's average LCR was 140%, well above the 100% regulatory requirement and demonstrating the Bank's solid liquidity position.

LCR Disclosure Requirements⁽¹⁾⁽²⁾

(millions of Canadian dollars)	For the quarter ended		
		October 31, 2022	July 31, 2022
	Total unweighted value ⁽³⁾ (average)	Total weighted value ⁽⁴⁾ (average)	Total weighted value ⁽⁴⁾ (average)
High-quality liquid assets (HQLA)			
Total HQLA	n.a.	76,469	71,388
Cash outflows			
Retail deposits and deposits from small business customers, of which:			
Stable deposits	67,086	6,953	5,281
Less stable deposits ⁽⁵⁾	28,709	861	876
Unsecured wholesale funding, of which:	38,377	6,092	4,405
Operational deposits ⁽⁵⁾ (all counterparties) and deposits in networks of cooperative banks	102,020	55,770	56,563
Non-operational deposits (all counterparties)	27,635	6,738	5,715
Unsecured debt	62,319	36,966	39,620
Secured wholesale funding	12,066	12,066	11,228
Additional requirements, of which:	n.a.	20,465	15,955
Outflows related to derivative exposures and other collateral requirements	53,259	14,231	12,559
Outflows related to loss of funding on secured debt securities	15,872	7,381	5,718
Backstop liquidity and credit enhancement facilities and commitments to extend credit	1,580	1,580	1,864
Other contractual commitments to extend credit	35,807	5,270	4,977
Other contingent commitments to extend credit	1,830	1,040	758
Total cash outflows	121,558	1,788	1,771
	n.a.	100,247	92,887
Cash inflows			
Secured lending (e.g., reverse repos)			
Inflows from fully performing exposures	106,713	22,562	20,976
Other cash inflows	10,737	6,673	5,910
Total cash inflows	15,966	15,966	17,496
	133,416	45,201	44,382
		Total adjusted value ⁽⁶⁾	Total adjusted value ⁽⁶⁾
Total HQLA		76,469	71,388
Total net cash outflows		55,046	48,505
Liquidity coverage ratio (%)⁽⁷⁾		140 %	148 %

n.a. Not applicable

(1) See the Financial Reporting Method section on pages 16 to 21 for additional information on capital management measures.

(2) OSFI prescribed a table format in order to standardize disclosure throughout the banking industry.

(3) Unweighted values are calculated as outstanding balances maturing or callable within 30 days (for inflows and outflows).

(4) Weighted values are calculated after the application of respective haircuts (for HQLA) or inflow and outflow rates.

(5) During the quarter ended October 31, 2022, the Bank refined its method for classifying less stable retail deposits and deposits from small business customers as well as unsecured wholesale funding operational deposits.

(6) Total adjusted values are calculated after the application of both haircuts and inflow and outflow rates and any applicable caps.

(7) The data in this table has been calculated using averages of the daily figures in the quarter.

As at October 31, 2022, Level 1 liquid assets represented 84% of the Bank's HQLA, which includes cash, central bank deposits, and bonds issued or guaranteed by the Canadian government and Canadian provincial governments. Cash outflows arise from the application of OSFI-prescribed assumptions on deposits, debt, secured funding, commitments and additional collateral requirements. The cash outflows are partly offset by cash inflows, which come mainly from secured loans and performing loans. The Bank expects some quarter-over-quarter variation between reported LCRs without such variation being necessarily indicative of a trend. The variation between the quarter ended October 31, 2022 and the preceding quarter is a result of normal business operations. The Bank's liquid asset buffer is well in excess of its total net cash outflows. The LCR assumptions differ from the assumptions used for the liquidity disclosures presented in the tables on the previous pages or those used for internal liquidity management rules. While the liquidity disclosure framework is prescribed by the EDTF, the Bank's internal liquidity metrics use assumptions that are calibrated according to its business model and experience.

Intraday Liquidity

The Bank manages its intraday liquidity in such a way that the amount of available liquidity exceeds its maximum intraday liquidity requirements. The Bank monitors its intraday liquidity on an hourly basis, and the evolution thereof is presented monthly to the Financial Markets Risk Committee.

Net Stable Funding Ratio

The BCBS has developed the Net Stable Funding Ratio (NSFR) to promote a more resilient banking sector. The NSFR requires institutions to maintain a stable funding profile in relation to the composition of their assets and off-balance-sheet activities. A viable funding structure is intended to reduce the likelihood that disruptions to an institution's regular sources of funding would erode its liquidity position in a way that would increase the risk of its failure and potentially lead to broader systemic stress. NSFR is calculated by dividing available stable funding by required stable funding. OSFI has been requiring Canadian banks to maintain a minimum NSFR of 100%.

The following table provides the available stable funding and the required stable funding in accordance with OSFI's *Liquidity Adequacy Requirements Guideline*. As at October 31, 2022, the Bank's NSFR was 117%, well above the 100% regulatory requirement and demonstrating the Bank's solid liquidity in a long-term position.

NSFR Disclosure Requirements⁽¹⁾⁽²⁾

(millions of Canadian dollars)	As at October 31, 2022				As at July 31, 2022	
	Unweighted value by residual maturity				Weighted value ⁽³⁾	Weighted value ⁽³⁾
	No maturity	6 months or less	Over 6 months to 1 year	Over 1 year		
Available Stable Funding (ASF) Items						
Capital:	21,746	–	–	1,499	23,245	22,607
Regulatory capital	21,746	–	–	1,499	23,245	22,607
Other capital instruments	–	–	–	–	–	–
Retail deposits and deposits from small business customers:	63,232	11,080	9,025	17,447	90,866	83,433
Stable deposits	26,500	3,102	4,065	5,866	37,850	37,750
Less stable deposits ⁽⁴⁾	36,732	7,978	4,960	11,581	53,016	45,683
Wholesale funding:	62,829	85,492	10,832	37,405	91,959	96,027
Operational deposits ⁽⁴⁾	31,076	–	–	–	15,538	10,600
Other wholesale funding	31,753	85,492	10,832	37,405	76,421	85,427
Liabilities with matching interdependent assets ⁽⁵⁾	–	3,271	3,553	19,453	–	–
Other liabilities ⁽⁶⁾ :	25,445		21,711		710	704
NSFR derivative liabilities ⁽⁶⁾	n.a.		19,055		n.a.	n.a.
All other liabilities and equity not included in the above categories	25,445	1,820	253	583	710	704
Total ASF	n.a.	n.a.	n.a.	n.a.	206,780	202,771
Required Stable Funding (RSF) Items						
Total NSFR high-quality liquid assets (HQLA)	n.a.	n.a.	n.a.	n.a.	8,845	7,235
Deposits held at other financial institutions for operational purposes	–	–	–	–	–	–
Performing loans and securities:	58,799	61,316	22,183	98,980	145,555	140,975
Performing loans to financial institutions secured by Level 1 HQLA	2,595	3,932	–	9	343	83
Performing loans to financial institutions secured by non-Level 1 HQLA and unsecured performing loans to financial institutions	8,325	22,222	1,650	365	5,426	5,383
Performing loans to non-financial corporate clients, loans to retail and small business customers, and loans to sovereigns, central banks and public sector entities, of which:	25,149	27,048	13,868	36,478	70,494	67,324
With a risk weight of less than or equal to 35% under the Basel II Standardized Approach for credit risk	816	2,867	431	279	2,360	1,965
Performing residential mortgages, of which:	9,624	5,166	5,928	57,933	52,743	52,236
With a risk weight of less than or equal to 35% under the Basel II Standardized Approach for credit risk	9,624	5,166	5,928	57,933	52,743	52,236
Securities that are not in default and do not qualify as HQLA, including exchange-traded equities	13,106	2,948	737	4,195	16,549	15,949
Assets with matching interdependent liabilities ⁽⁵⁾	–	3,271	3,553	19,453	–	–
Other assets ⁽⁶⁾ :	3,810		58,136		18,455	18,428
Physical traded commodities, including gold	294	n.a.	n.a.	n.a.	294	292
Assets posted as initial margin for derivative contracts and contributions to default funds of central counterparties ⁽⁵⁾	n.a.		8,413		7,151	7,581
NSFR derivative assets ⁽⁶⁾	n.a.		16,985		–	–
NSFR derivative liabilities before deduction of the variation margin posted ⁽⁶⁾	n.a.		25,686		1,284	949
All other assets not included in the above categories	3,516	5,733	645	674	9,726	9,606
Off-balance-sheet items ⁽⁶⁾	n.a.		101,010		3,787	3,677
Total RSF	n.a.	n.a.	n.a.	n.a.	176,642	170,315
Net Stable Funding Ratio (%)	n.a.	n.a.	n.a.	n.a.	117 %	119 %

n.a. Not applicable

(1) See the Financial Reporting Method section on pages 16 to 21 for additional information on capital management measures.

(2) OSFI prescribed a table format in order to standardize disclosure throughout the banking industry.

(3) Weighted values are calculated after application of the weightings set out in OSFI's *Liquidity Adequacy Requirements Guideline*.

(4) During the quarter ended October 31, 2022, the Bank refined its method for classifying less stable retail deposits and deposits from small business customers as well as wholesale funding operational deposits.

(5) As per OSFI's specifications, liabilities arising from transactions involving the Canada Mortgage Bond program and their corresponding encumbered mortgages are given ASF and RSF weights of 0%, respectively.

(6) As per OSFI's specifications, there is no need to differentiate by maturity.

The NSFR represents the amount of ASF relative to the amount of RSF. ASF is defined as the portion of capital and liabilities expected to be reliable over the time horizon considered by the NSFR, which extends to one year. The amount of RSF of a specific institution is a function of the liquidity characteristics and residual maturities of the various assets held by that institution as well as those of its off-balance-sheet exposures. The amounts of ASF and RSF are calibrated to reflect the degree of stability of liabilities and liquidity of assets. The Bank expects some quarter-over-quarter variation between reported NSFRs without such variation being necessarily indicative of a trend.

The NSFR assumptions differ from the assumptions used for the liquidity disclosures provided in the tables on the preceding pages or those used for internal liquidity management rules. While the liquidity disclosure framework is prescribed by the EDTF, the Bank's internal liquidity metrics use assumptions that are calibrated according to its business model and experience.

Funding Risk

Funding risk is defined as the risk to the Bank's ongoing ability to raise sufficient funds to finance actual or proposed business activities on an unsecured or secured basis at an acceptable price. The Bank maintains a good balance of its funding through appropriate diversification of its unsecured funding vehicles, securitization programs, and secured funding. The Bank also diversifies its funding by currency, geography, and maturity. The funding management priority is to achieve an optimal balance between deposits, securitization, secured funding, and unsecured funding. This brings optimal stability to the funding and reduces vulnerability to unpredictable events.

Liquidity and funding levels remained sound and robust over the year, and the Bank does not foresee any event, commitment, or demand that might have a significant impact on its liquidity and funding risk position. For additional information, see the table entitled Residual Contractual Maturities of Balance Sheet Items and Off-Balance-Sheet Commitments in Note 29 to the consolidated financial statements.

Credit Ratings

The credit ratings assigned by ratings agencies represent their assessment of the Bank's credit quality based on qualitative and quantitative information provided to them. Credit ratings may be revised at any time based on various factors, including macroeconomic factors, the methodologies used by ratings agencies, or the current and projected financial condition of the Bank. Credit ratings are one of the main factors that influence the Bank's ability to access financial markets at a reasonable cost. A downgrade in the Bank's credit ratings could adversely affect the cost, size, and term of future funding and could also result in increased requirement to pledge collateral or decreased capacity to engage in certain collateralized business activities at a reasonable cost, including hedging and derivative transactions.

Liquidity and funding levels remain sound and robust, and the Bank continues to enjoy excellent access to the market for its funding needs. The Bank received favourable credit ratings from all the agencies, reflecting the high quality of its debt instruments, and the Bank's objective is to maintain these strong credit ratings. On April 29, 2022, DBRS Morningstar (DBRS) raised the ratings of the Bank and its related entities, including the rating for long-term deposits and for long-term non-bail-inable senior debt to AA from AA(low), and it raised the rating for short-term senior debt to R-1(high) from R-1(mid). In addition, DBRS changed the trends of all the ratings to "Stable" from "Positive". This change reflects DBRS's recognition of the Bank's solid performance in recent years. For Moody's, S&P, and Fitch, the outlook remains unchanged at "Stable." The following table presents the Bank's credit ratings according to four rating agencies as at October 31, 2022.

The Bank's Credit Ratings

	As at October 31, 2022			
	Moody's	S&P	DBRS	Fitch
Short-term senior debt	P-1	A-1	R-1 (high)	F1+
Canadian commercial paper		A-1 (mid)		
Long-term deposits	Aa3		AA	AA-
Long-term non-bail-inable senior debt ⁽¹⁾	Aa3	A	AA	AA-
Long term senior debt ⁽²⁾	A3	BBB+	AA (low)	A+
NVCC subordinated debt	Baa2 (hyb)	BBB	A (low)	
NVCC limited recourse capital notes	Ba1 (hyb)	BB+	BBB (high)	
NVCC preferred shares	Ba1 (hyb)	P-3 (high)	Pfd-2	
Counterparty risk ⁽³⁾	Aa3/P-1			AA-
Covered bonds program	Aaa		AAA	AAA
Rating outlook	Stable	Stable	Stable	Stable

- (1) Includes senior debt issued before September 23, 2018 and senior debt issued on or after September 23, 2018, which is excluded from the Bank Recapitalization (Bail-In) Regime.
(2) Subject to conversion under the Bank Recapitalization (Bail-In) Regime.
(3) Moody's uses the term Counterparty Risk Rating while Fitch uses the term Derivative Counterparty Rating.

Guarantees

As part of a comprehensive liquidity management framework, the Bank regularly reviews its contracts that stipulate that additional collateral could be required in the event of a downgrade of the Bank's credit rating. The Bank's liquidity position management approach already incorporates additional collateral requirements in the event of a one-notch to three-notch downgrade. These additional collateral requirements are presented in the table below.

(millions of Canadian dollars)	As at October 31, 2022	
	One-notch downgrade	Three-notch downgrade
Derivatives ⁽¹⁾	30	98

(1) Contractual requirements related to agreements known as Credit Support Annexes.

Funding Strategy

The main objective of the funding strategy is to support the Bank's organic growth while also enabling it to survive potentially severe and prolonged crises and to meet its regulatory obligations and financial targets.

The Bank's funding framework is summarized as follows:

- pursue a diversified deposit strategy to fund core banking activities through stable deposits coming from the networks of each of the Bank's major business segments;
- maintain sound liquidity risk management through centralized expertise and management of liquidity metrics within a predefined risk appetite;
- maintain active access to various markets to ensure a diversification of institutional funding in terms of source, geographic location, currency, instrument, and maturity, whether or not funding is secured.

The funding strategy is implemented in support of the Bank's overall objectives of strengthening its franchise among market participants and reinforcing its excellent reputation. The Bank continuously monitors and analyzes market trends as well as possibilities for accessing less expensive and more flexible funding, considering both the risks and opportunities observed. The deposit strategy remains a priority for the Bank, which continues to prefer deposits to institutional funding.

The Bank actively monitors and controls liquidity risk exposures and funding needs within and across entities, business segments, and currencies. The process involves evaluating the liquidity position of individual business segments in addition to that of the Bank as a whole as well as the liquidity risk from raising unsecured and secured funding in foreign currencies. The funding strategy is implemented through the funding plan and deposit strategy, which are monitored, updated to reflect actual results, and regularly evaluated.

Diversified Funding Sources

The primary purpose of diversifying by source, geographic location, currency, instrument, maturity, and depositor is to mitigate liquidity and funding risk by ensuring that the Bank maintains alternative sources of funds that strengthen its capacity to withstand a variety of severe yet plausible institution-specific and market-wide shocks. To meet this objective, the Bank:

- takes funding diversification into account in the business planning process;
- maintains a variety of funding programs to access different markets;
- sets limits on funding concentration;
- maintains strong relationships with fund providers;
- is active in various funding markets of all tenors and for various instruments;
- identifies and monitors the main factors that affect the ability to raise funds.

The Bank is active in the following funding and securitization platforms:

- Canadian dollar Senior Unsecured Debt;
- U.S. dollar Senior Unsecured Debt programs;
- Canadian Medium-Term Note Shelf;
- U.S. dollar Commercial Paper programs;
- U.S. dollar Certificates of Deposit;
- Euro Medium-Term Note program;
- Canada Mortgage and Housing Corporation securitization programs;
- Canadian Credit Card Trust II;
- Legislative Covered Bond program.

The table below presents the residual contractual maturities of the Bank's wholesale funding. The information has been presented in accordance with the categories recommended by the EDTF for comparison purposes with other banks.

Residual Contractual Maturities of Wholesale Funding⁽¹⁾

(millions of Canadian dollars)	As at October 31, 2022							
	1 month or less	Over 1 month to 3 months	Over 3 months to 6 months	Over 6 months to 12 months	Subtotal 1 year or less	Over 1 year to 2 years	Over 2 years	Total
Deposits from banks ⁽²⁾	484	–	–	–	484	–	–	484
Certificates of deposit and commercial paper ⁽³⁾	5,560	4,230	4,788	793	15,371	–	–	15,371
Senior unsecured medium-term notes ⁽⁴⁾⁽⁵⁾	78	1,348	3,000	587	5,013	3,771	6,423	15,207
Senior unsecured structured notes	–	140	183	70	393	–	2,387	2,780
Covered bonds and asset-backed securities								
Mortgage securitization	–	2,672	422	3,617	6,711	4,558	15,008	26,277
Covered bonds	–	–	–	2,017	2,017	1,009	7,386	10,412
Securitization of credit card receivables	–	–	–	29	29	–	49	78
Subordinated liabilities ⁽⁶⁾	–	–	–	–	–	–	1,499	1,499
	6,122	8,390	8,393	7,113	30,018	9,338	32,752	72,108
Secured funding	–	2,672	422	5,663	8,757	5,567	22,443	36,767
Unsecured funding	6,122	5,718	7,971	1,450	21,261	3,771	10,309	35,341
	6,122	8,390	8,393	7,113	30,018	9,338	32,752	72,108
As at October 31, 2021	2,643	8,872	9,802	7,390	28,707	10,400	29,331	68,438

(1) Bankers' acceptances are not included in this table.

(2) Deposits from banks include all non-negotiable term deposits from banks.

(3) Includes bearer deposit notes.

(4) Certificates of deposit denominated in euros are included in senior unsecured medium-term notes.

(5) Includes deposits subject to bank recapitalization (Bail-In) conversion regulations.

(6) Subordinated debt is presented in this table, but the Bank does not consider it as part of its wholesale funding.

Operational Risk

Operational risk is the risk of loss resulting from an inadequacy or a failure ascribable to human resources, equipment, processes, technology, or external events. Operational risk exists for every Bank activity. Theft, fraud, cyberattacks, unauthorized transactions, system errors, human error, amendments to or misinterpretation of laws and regulations, litigation or disputes with clients, inappropriate sales practice behaviour, or property damage are just a few examples of events likely to cause financial loss, harm the Bank's reputation, or lead to regulatory penalties or sanctions.

Although operational risk cannot be eliminated entirely, it can be managed in a thorough and transparent manner to keep it at an acceptable level. The Bank's operational risk management framework is built on the concept of three lines of defence and provides a clear allocation of responsibilities to all levels of the organization, as mentioned below.

Operational Risk Management Framework

The operational risk management framework is described in the Operational Risk Management Policy, which is derived from the Risk Management Policy. The operational risk management framework is aligned with the Bank's risk appetite and is made up of policies, standards, and procedures specific to each operational risk, which fall under the responsibility of specialized groups.

The Operational Risk Management Committee (ORMC), a subcommittee of the GRC, is the main governance committee overseeing operational risk matters. Its mission is to provide oversight of the operational risk level across the organization to ensure it aligns with the Bank's risk appetite targets. It implements effective frameworks for managing operational risk, including policies and standards, and monitors the application thereof.

The segments use several operational risk management tools and methods to identify, assess, and manage their operational risks and control measures. With these tools and methods, the segments can:

- recognize and understand the inherent and residual risks to which their activities and operations are exposed;
- identify how to manage and monitor the identified risks to keep them at an acceptable level;
- proactively and continuously manage risks.

Operational Risk Management Tools and Methods

Collection and Analysis of Data on Operational Events

The Operational Risk Unit applies a process, across the Bank and its subsidiaries, for identifying, collecting, and analyzing data on internal operational events. This process helps determine the Bank's exposure to the operational risks and operational losses incurred and assess the effectiveness of internal controls. It also helps limit operational events, keep losses at an acceptable level and, as a result, reduce potential capital charges and lower the likelihood of damage to the Bank's reputation. These data are processed and saved in a centralized database and are periodically the subject of a quality assurance exercise.

Analysis and Lessons Learned From Operational Incidents Observed in Other Large Businesses

By collecting and analyzing media-reported information about significant operational incidents, in particular incidents related to fraud, information security, and theft of personal information experienced by other organizations, the Bank can assess the effectiveness of its own operational risk management practices and reinforce them, if necessary.

Operational Risk Self-Assessment Program

The operational risk self-assessment program gives each business unit and corporate unit the means to proactively identify and assess the new or major operational risks to which they are exposed, evaluate the effectiveness of mitigating controls, and develop action plans to keep such risks at acceptable levels. As such, the program helps in anticipating factors that could hinder performance or the achievement of objectives.

Key Risk Indicators

Key risk indicators are used to monitor the main operational risk exposure factors and track how risks are evolving in order to proactively manage them. The business units and corporate units define the key indicators associated with their main operational risks and assign tolerance thresholds to them. These indicators are monitored periodically and, when they show a significant increase in risk or when a tolerance threshold is exceeded, they are sent to an appropriate level in the hierarchy and action plans are implemented as required.

Scenario Analysis

Scenario analysis, which is part of a Bank-wide stress testing program, is an important and useful tool for assessing the impacts related to potentially serious events. It is used to define the risk appetite, set risk exposure limits, and engage in business planning. More specifically, scenario analysis provides management with a better understanding of the risks faced by the Bank and helps it make appropriate management decisions to mitigate potential operational risks that are inconsistent with the Bank's risk appetite.

Insurance Program

To protect itself against any material losses arising from unforeseeable operational risk exposure, the Bank also has adequate insurance, the nature and amount of which meet its coverage requirements.

Operational Risk Reports and Disclosures

Operational events for which the financial impact exceeds tolerance thresholds or that have a significant regulatory or reputation impact are submitted to appropriate decision-making levels. Management is obligated to report on its management process and to remain alert to current and future issues. Reports on the Bank's risk profile, highlights, and emerging risks are periodically submitted, on a timely basis, to the ORMC, the GRC, and the RMC. This reporting enhances the transparency and proactive management of the main operational risk factors.

Regulatory Compliance Risk

Regulatory compliance risk is the risk of the Bank or of one of its employees or business partners failing to comply with the regulatory requirements in effect where it does business, both in Canada and internationally. Regulatory compliance risk is present in all of the daily operations of each Bank segment. A situation of regulatory non-compliance can adversely affect the Bank's reputation and result in penalties and sanctions or increased oversight by regulators.

Organizational Structure of Compliance

Compliance is an independent oversight function within the Bank. The Senior Vice-President, Chief Compliance Officer and Chief Anti-Money Laundering Officer serves as both chief compliance officer (CCO) and chief anti-money laundering officer (CAMLO) for the Bank and its subsidiaries and foreign centres. She is responsible for implementing and updating the Bank's programs for regulatory compliance management, regulatory requirements related to AML/ATF, international sanctions, and the fight against corruption. The CCO and CAMLO has a direct relationship with the Chair of the RMC and meets with him at least once every quarter. She can also communicate directly with senior management, officers, and directors of the Bank and of its subsidiaries and foreign centres.

Regulatory Compliance Framework

The Bank operates in a highly regulated industry. To ensure sound management of regulatory compliance, the Bank favours proactive approaches and incorporates regulatory requirements into its day-to-day operations.

Such proactive management also provides reasonable assurance that the Bank is in compliance, in all material respects, with the regulatory requirements in effect where it does business, both in Canada and internationally.

The implementation of a regulatory compliance risk management framework across the Bank is entrusted to the Compliance Service, which has the following mandate:

- implement policies and standards that ensure compliance with current regulatory requirements, including those related to AML/ATF, to international sanctions, and to the fight against corruption;
- develop compliance and AML/ATF training programs for Bank employees, officers, and directors;
- exercise independent oversight and monitoring of the programs, policies, and procedures implemented by the management of the Bank, its subsidiaries, and its foreign centres to ensure that the control mechanisms are sufficient, respected, and effective;
- report relevant compliance and AML/ATF matters to the Bank's Board and inform it of any significant changes in the effectiveness of the risk management framework.

The Bank holds itself to high regulatory compliance risk management standards in order to earn the trust of its clients, its shareholders, the market, and the general public.

Described below are the main regulatory developments that have been monitored over the past year.

Reform of the *Official Languages Act* (federal law)

Bill C-13, *An Act to amend the Official Languages Act, to enact the Use of French in Federally Regulated Private Businesses Act and to make related amendments to other Acts*, proposes to modernize the *Official Languages Act* by granting new powers to the Commissioner of Official Languages (entering into compliance agreements, issuing orders, and imposing penalties). The bill also proposes enactment of a new act, namely, the *Use of French in Federally Regulated Private Businesses Act*, which addresses the language of service for consumers and the language of work in Quebec and in regions with a strong francophone presence.

Bill 96: *An Act respecting French, the official and common language of Quebec* (Quebec law)

Bill 96 makes amendments to the *Charter of the French Language* and other laws. The objectives are to strengthen the presence and use of the French language in Quebec, to establish a new *Charter of the French Language*, and to affirm that French is the only official language of Quebec. Key aspects of Bill 96 notably include francization committees, work and employment rights, contracts and consumer rights, litigation and the publication of rights, and public signs and commercial advertising. Bill 96 was assented to on June 1, 2022.

Bill 18 – Protection of Vulnerable Persons

Bill 18, *An Act to amend the Civil Code, the Code of Civil Procedure, the Public Curator Act and various provisions as regards the protection of persons*, has abolished curatorships and adviserships to persons of full age. Tutorships to persons of full age will remain in place, but it will be possible to modulate them based on the incapacity level of the person of full age. The new law will create temporary representation of persons of full age and assistants to persons of full age. The effective date, initially expected in June, was postponed to November 2022.

Consumer Protection (*Bank Act*)

A new *Financial Consumer Protection Framework* (C-86) took effect on June 30, 2022. It modernized certain provisions of the *Bank Act* and related regulations in order to strengthen consumer protections, notably through additional communications to customers, assessments of product and service appropriateness, employee training, reporting of wrongdoings (whistleblowing), and complaint handling processes.

Bill C-30 Addressing Unclaimed Bank Balances, Among Other Matters

Bill C-30 makes an amendment to the *Bank Act*. Unclaimed balances refer in particular to a deposit in an inactive bank account and will now include deposits and instruments in foreign currencies. This plan requires financial institutions to send letters to clients to inform them of the existence of unclaimed balances. An electronic notice must also be sent when the financial institution possesses the electronic contact information of the clients. Additional information regarding clients who have an unclaimed balance will also have to be sent to the Bank of Canada. The effective date of the bill is anticipated to be June 30, 2023.

Anti-Money Laundering and Anti-Terrorist Financing (AML/ATF) Activities

Amendments made to the regulations set out in the *Proceeds of Crime (Money Laundering) and Terrorist Financing Act* took effect on June 1, 2021. The new reporting requirements are expected to take effect in 2023-2024 such that the Financial Transactions and Reports Analysis Centre of Canada (FINTRAC) can prepare the new reporting forms.

Protection of Personal Information

Given changing technologies and societal behaviours, privacy and the protection of personal information is a topical issue in Canada. Recent regulatory measures (such as the *General Data Protection Regulation* (GDPR) in Europe in 2018 and the *California Consumer Privacy Act* in the United States in 2020) reflect a desire to implement a stronger legislative framework in the areas of confidentiality and use of personal information. In Quebec, in September 2021, the government adopted Bill 64, *An Act to modernize legislative provisions as regards the protection of personal information*, which has introduced substantial changes regarding the protection of personal information. Essentially, the Act promotes transparency, raises the confidentiality level of data, and provides a framework for the collection, use, and sharing of personal information. At the federal level, Bill C-27, tabled in June 2022, enacts three new laws: the *Consumer Privacy Protection Act*, the *Personal Information and Data Protection Tribunal Act*, the *Artificial Intelligence and Data Act*. The latter act is the first bill designed to regulate artificial intelligence in Canada. Members of industry, regulatory agencies, and consumer advocates were consulted to help design and establish the pillars of an open banking system, which enable consumers to transfer their financial data between financial institutions and accredited third parties in a secure and user-friendly manner.

Canada Deposit Insurance Corporation (CDIC)

On April 30, 2022, separate coverage for registered education savings plans and registered disability savings plans was granted as part of changes to the *Canada Deposit Insurance Corporation Act*. New requirements were established for the coverage of deposits in trust, particularly nominee-brokered deposits and those of professional trustees.

Recovery and Resolution Planning

As part of the regulatory measures used to manage systemic risks, D-SIBs are required to prepare recovery and resolution plans. A recovery plan is essentially a roadmap that guides the recovery of a bank in the event of severe financial stress; conversely, a resolution plan guides its orderly wind-down in the event of failure when recovery is no longer an option. The Bank improves and periodically updates its recovery and resolution plans to prepare for these high-risk, but low-probability, events. In addition, the Bank and other D-SIBs continue to work with the CDIC to maintain a comprehensive settlement plan that would ensure an orderly winding down of the Bank's operations. These plans are approved by the Board and submitted to the national regulatory agencies.

Section 871(m) – Dividend Equivalent Payments

Section 871(m) of the U.S. *Internal Revenue Code* (IRC) aims to ensure that non-U.S. persons pay tax on payments that can be considered dividends on U.S. shares, when these payments are made on certain derivative instruments. The derivative instruments for which the underlyings are U.S. shares (including U.S. exchange-traded funds) or "non-qualified indices" concluded as of January 1, 2017 are subject to the withholding and reporting requirements. The effective date for certain components of this regulation has been deferred to January 1, 2023. Some of the obligations of a qualified derivatives dealer, established under section 871(m) of the IRC and the qualified intermediary agreement, have also been deferred to January 1, 2023. However, the U.S. Internal Revenue Service has informed market participants that it is working on a new notice that would again postpone these obligations beyond 2023.

Foreign Account Tax Compliance Act and the Common Reporting Standard

The U.S. law addressing foreign account tax compliance (*Foreign Account Tax Compliance Act* or FATCA), and the *Common Reporting Standard* (CRS), an international standard, the principles of which have been incorporated into the *Income Tax Act* (Canada), are intended to counter tax evasion by taxpayers through the international exchange of tax information through financial institutions. On March 10, 2022, clarifications were provided on the application of some of the guidelines in these regulations.

Client-Centred Reforms – Amendments to Regulation 31-103

Pursuant to *Regulation 31-103 respecting Registration Requirements, Exemptions and Ongoing Registrant Obligations*, regulatory changes were made to the process for declaring conflicts of interest and external activities and to the following topics: KYC (know-your-client) and KYP (know-your-product), suitability determination, misleading communications, relationship disclosure, and training. The Bank is ensuring that it is compliant with these changes as they are published.

Reform of Interest Rate Benchmarks

The reform of interest rate benchmarks is a global initiative that is being coordinated and led by central banks and governments around the world, including Canada. The objective is to improve benchmarks by ensuring that they meet robust international standards. LIBOR (London Interbank Offered Rates) in particular is in the process of being discontinued, and risk-free rates such as SOFR (Secured Overnight Financing Rate), ESTR (Euro Short-Term Rate), SONIA (Sterling Over Night Index Average), SARON (Swiss Average Rate Overnight), and TONAR (Tokyo Overnight Average Rate) are recommended as replacements for LIBOR. On December 31, 2021, all LIBOR rates in European, British, Swiss, and Japanese currency as well as the one-week and two-month USD LIBOR rates were discontinued, whereas the other USD LIBOR rates will be discontinued after June 30, 2023. In Canada, publication of the CDOR (Canadian Dollar Offered Rate) will be discontinued on June 28, 2024 and be replaced by the risk-free rate CORRA (Canadian Overnight Repo Rate Average). For additional information, see the Basis of Presentation section in Note 1 to the consolidated financial statements.

One-Day Settlement Cycle

In February 2022, the CSA staff published a notice to inform Canadian securities stakeholders about an initiative to shorten the standard settlement cycle for most trades in securities from two days to one day. This notice follows a report published in the U.S. securities sector indicating that it has set March 31, 2024 as the date for transitioning the standard settlement cycle in the U.S. to one day from the current settlement time of two days. Aligning the Canadian and U.S. settlement cycles is critical so as to avoid inefficiencies and prevent any prejudicial impact on Canadian investors and capital markets. The move towards a shortened settlement cycle will result in changes to systems, regulations, and procedures.

New Self-Regulatory Organization (SRO)

The CSA will create a new self-regulatory organization that will, among other things, combine the functions of the Investment Industry Regulatory Organization of Canada and the Mutual Fund Dealers Association of Canada. This new organization is expected to be operational by the end of 2022. A working committee was created to assess the potential impacts and benefits of this new structure for Wealth Management and the National Bank Investments subsidiary.

Reputation Risk

Reputation risk is the risk that the Bank's operations or practices will be judged negatively by the public, whether that judgment is with or without basis, thereby adversely affecting the perception, image, or trademarks of the Bank and potentially resulting in costly litigation or loss of income. Reputation risk generally arises from a deficiency in managing another risk. The Bank's reputation may, for example, be adversely affected by non-compliance with laws and regulations or by process failures. All risks must therefore be managed effectively in order to protect the Bank's reputation.

The Bank's corporate culture continually promotes the behaviours and values to be adopted by employees. It creates an awareness among all employees about the potential consequences of their actions on the Bank's reputation and brand. In addition to the above-mentioned operational risk management initiatives, the Bank uses a variety of mechanisms to support sound management of reputation risk. Our *Code of Conduct* outlines what is expected from each employee in terms of ethical behaviour and rules to be followed as they carry out their duties. Also supporting our corporate culture are policies specifically addressing ethics and corporate governance as well as appropriate training programs. The Bank also has a crisis management framework featuring effective intervention, communication, and behavioural parameters that help to minimize any impact on business activities, clients, and employees.

The Bank also has a reputation risk policy, approved by the RMC, that covers all of the Bank's practices and activities. The policy sets the reputation risk management principles and rules for clients, employees, and communities, all of which are stakeholders of the Bank. The policy is complemented by the special provisions of the new products and activities policy, which determines the approvals required by the various committees that assess risk whenever new products or activities are introduced within the business units. These provisions are intended, among other things, to provide oversight for the management of reputation risk, which may be material for such products or activities. The new products and activities policy requires that any new product or activity for which reputation risk is determined to be high be submitted to the GRC for approval. The activities of the Compliance Service, Legal Affairs Department, Communications and Corporate Social Responsibility Department and Investor Relations Department complete the reputation risk management framework.

Strategic Risk

Strategic risk is the risk of a financial loss or of reputational harm arising from inappropriate strategic orientations, improper execution, or ineffective response to economic, financial, or regulatory changes. The corporate strategic plan is developed by the Senior Leadership Team, in alignment with the Bank's overall risk appetite, and approved by the Board. Once approved, the initiatives of the strategic plan are monitored regularly to ensure that they are progressing. If not, strategies could be reviewed or adjusted if deemed appropriate.

In addition, the Bank has a specific Board-approved policy for strategic investments, which are defined as purchases of business assets or acquisitions of significant interests in an entity for the purposes of acquiring control or creating a long-term relationship. As such, acquisition projects and other strategic investments are analyzed through a due diligence process to ensure that these investments are aligned with the corporate strategic plan and the Bank's risk appetite.

Environmental and Social Risk

Environmental and social risk is the possibility that environmental and social matters would result in a financial loss for the Bank or affect its business activities. The Bank is directly exposed to such risk through its own activities and indirectly exposed through the activities of its clients. This risk encompasses many topics, in particular pollution and waste; the use of energy, water, and other resources; climate change; biodiversity; human rights; inclusion, diversity and equity; labour standards and human capital management practices; community health; occupational health and safety; the rights of Indigenous Peoples and consultation thereof; as well as cultural heritage. The impact of environmental and social risk could also increase exposure to strategic, reputation, and regulatory compliance risks if the Bank's response is deemed inadequate or non-compliant with commitments. As such, it is possible that the Bank's predictions, targets, projections, expectations or conclusions prove to be inaccurate, that its assumptions may not be confirmed, and that its strategic objectives and performance targets will not be achieved.

Assessing and mitigating environmental and social risk are integral parts of the Bank's risk management framework. Environmental and social issues are now central to the Bank's decision-making process and are becoming increasingly imperative to the Bank. Addressing such risk may even prove to be a considerable asset in certain financing or investment transactions, and doing so also contributes to promoting exemplary practices to the Bank's stakeholders.

The Bank has adopted environmental, social, and governance (ESG) principles that show the importance it attaches to sustainable development and to balancing the interests of societal stakeholders. These ESG principles have been incorporated into the organization's priorities, and ESG indicators have been added to various monitoring dashboards and are gradually being integrated into the Bank's risk appetite framework. Reports on these indicators and on the Bank's ESG commitments are being periodically presented to various internal committees and to Board committees. In addition, the Bank's *Code of Conduct* outlines what is expected from each employee in their professional, business, and community interactions. It also provides guidance on adhering to the Bank's values, on the day-to-day conduct of the Bank's affairs, and on relationships with third parties, employees, and clients to create an environment conducive to achieving the Bank's One Mission, namely, to have a positive impact on people's lives.

The Bank has also implemented an environmental policy that applies to all activities and decisions made across the Bank. This policy clearly sets out principles for identifying and limiting environmental risk and climate risk as well as the impacts therefrom on the community and on the Bank's business segments. The Bank is pursuing its commitment to carbon neutrality by reducing the carbon footprint of its own activities and by offsetting its greenhouse gas (GHG) emissions through various organizations. The Bank is also prioritizing energy efficiency and has demonstrated leadership in this regard by deploying an innovative system that lets it regulate the energy consumption of 260 branches using building control systems and a web interface. In addition, responsible procurement criteria have been incorporated into the purchasing and supplier selection practices for the construction of the Bank's new head office building. The new head office is, in fact, aiming to achieve LEED v4⁽¹⁾ Gold certification in addition to WELL⁽²⁾ certification. Furthermore, we are continuing to work on the implementation of a global responsible procurement strategy.

ESG factors continue to be integrated into the Bank's processes, in line with its strategy and the guiding principles approved by the Board. This integration is being conducted with due diligence, particularly in the area of credit-granting, and starting with the corporate credit portfolio. For this clientele, ESG risk is being analyzed using a collection of carbon footprint information and a climate risk classification (transition and physical risks) based on industry as well as scores assigned by ESG-rating agencies. Several other criteria are also being considered, notably waste management, labour standards, corporate governance, product liability, and human rights policies. The Bank plans to gradually extend the collection of such information to clients in other portfolios by adapting the current process.

The Bank collaborates with various industry partners to identify and implement sound management practices to support the transition to a low-carbon economy. Aware that it has a mobilizing role to play, the Bank supports the recommendations of the TCFD and continues to demonstrate its commitment to mitigating climate risk. For example, it has become a signatory to the Partnership for Carbon Accounting Financials (PCAF) as well as the United Nations' Net-Zero Banking Alliance (NZBA). This year, the Bank also began quantifying financed GHG emissions. Specifically, it quantified the emissions of oil and gas producers in its loan portfolio, and it has also set its first interim reduction targets under its PCAF and NZBA commitments. These targets consist of a 31% reduction in the intensity of the portfolio respectively for direct and indirect energy-related emissions and for other indirect emissions. In the next two years, the Bank plans to continue setting GHG emission reduction targets for other portfolios. The Bank has also started examining stress test scenarios to quantify the anticipated losses in the loan portfolio. Also during the year, the Bank joined the UNEP-FI's discussion group on biodiversity protection. This is an initiative seeking to mobilize financial system stakeholders towards biodiversity protection efforts, as the financial risk arising from biodiversity loss may take the form of both physical risk and transition risk. Given that this initiative is in its early stages, the Bank will continue to closely monitor the evolution thereof and take part in discussions. The Bank has also started taking concrete action to meet its commitments and to move its plan forward, notably by quantifying the financial impacts of environmental and social risk. Furthermore, the Bank is committed to transparently communicating information about its progress and its signatory commitments by periodically publishing its own performance reports.

To proactively ensure the strategic positioning of its entire portfolio, the Bank continues to support the transition to a low-carbon economy while closely monitoring the related developments and implications. Doing so involves ongoing and stronger adaptation efforts as well as additional mitigation measures for instances of business interruptions or disruptions caused by major incidents such as natural disasters or health crises. Such measures include the business continuity plan, the operational risk management program, and the disaster risk management program.

- (1) Criteria of the LEED (Leadership in Energy and Environmental Design) certification system. LEED certification involves satisfying climate criteria and adaptation characteristics that will help limit potential physical climate risks.
- (2) The WELL Standard, administered by the International WELL Building Institute, recognizes environments that support the health and well-being of the occupants.

Critical Accounting Policies and Estimates

A summary of the significant accounting policies used by the Bank is presented in Note 1 to the consolidated financial statements of this *Annual Report*. The accounting policies discussed below are considered critical given their importance to the presentation of the Bank's financial position and operating results and require subjective and complex judgments and estimates on matters that are inherently uncertain. Any change in these judgments and estimates could have a significant impact on the Bank's consolidated financial statements.

The impacts of COVID-19 and the geopolitical landscape, in particular supply chain disruptions and rising inflation, are persisting and creating uncertainty. As a result, establishing reliable estimates and applying judgment continue to be substantially complex. Some of the Bank's accounting policies, such as measurement of expected credit losses (ECLs), require particularly complex judgments and estimates. See Note 1 to the consolidated financial statements for a summary of the most significant estimation processes used to prepare the consolidated financial statements in accordance with IFRS and the valuation techniques used to determine carrying values and fair values of assets and liabilities. The uncertainty regarding certain key inputs used in measuring ECLs is described in Note 7 to the consolidated financial statements.

Classification of Financial Instruments

At initial recognition, all financial instruments are recorded at fair value on the Consolidated Balance Sheet. At initial recognition, financial assets must be classified as subsequently measured at fair value through other comprehensive income, at amortized cost, or at fair value through profit or loss. The Bank determines the classification based on the contractual cash flow characteristics of the financial assets and on the business model it uses to manage these financial assets. At initial recognition, financial liabilities are classified as subsequently measured at amortized cost or as at fair value through profit or loss.

For the purpose of classifying a financial asset, the Bank must determine whether the contractual cash flows associated with the financial asset are solely payments of principal and interest on the principal amount outstanding. The principal is generally the fair value of the financial asset at initial recognition. The interest consists of consideration for the time value of money, for the credit risk associated with the principal amount outstanding during a particular period, and for other basic lending risks and costs as well as of a profit margin. If the Bank determines that the contractual cash flows associated with a financial asset are not solely payments of principal and interest, the financial assets must be classified as measured at fair value through profit or loss.

When classifying financial assets, the Bank determines the business model used for each portfolio of financial assets that are managed together to achieve a same business objective. The business model reflects how the Bank manages its financial assets and the extent to which the financial asset cash flows are generated by the collection of the contractual cash flows, the sale of the financial assets, or both. The Bank determines the business model using scenarios that it reasonably expects to occur. Consequently, the business model determination is a matter of fact and requires the use of judgment and consideration of all the relevant evidence available to the Bank at the date of determination.

A financial asset portfolio falls within a "hold to collect" business model when the Bank's primary objective is to hold these financial assets in order to collect contractual cash flows from them and not to sell them. When the Bank's objective is achieved both by collecting contractual cash flows and by selling the financial assets, the financial asset portfolio falls within a "hold to collect and sell" business model. In this type of business model, collecting contractual cash flows and selling financial assets are both integral components to achieving the Bank's objective for this financial asset portfolio. Financial assets are mandatorily measured at fair value through profit or loss if they do not fall within either a "hold to collect" business model or a "hold to collect and sell" business model.

Fair Value of Financial Instruments

The fair value of a financial instrument is the price that would be received to sell a financial asset or paid to transfer a financial liability in an orderly transaction in the principal market at the measurement date under current market conditions (i.e., an exit price).

Unadjusted quoted prices in active markets, based on bid prices for financial assets and offered prices for financial liabilities, provide the best evidence of fair value. A financial instrument is considered quoted in an active market when prices in exchange, dealer, broker or principal-to-principal markets are accessible at the measurement date. An active market is one where transactions occur with sufficient frequency and volume to provide quoted prices on an ongoing basis.

When there is no quoted price in an active market, the Bank uses another valuation technique that maximizes the use of relevant observable inputs and minimizes the use of unobservable inputs. The chosen valuation technique incorporates all the factors that market participants would consider when pricing a transaction. Judgment is required when applying a large number of acceptable valuation techniques and estimates to determine fair value. The estimated fair value reflects market conditions on the measurement date and, consequently, may not be indicative of future fair value.

The best evidence of the fair value of a financial instrument at initial recognition is the transaction price, i.e., the fair value of the consideration received or paid. If there is a difference between the fair value at initial recognition and the transaction price, and the fair value is determined using a valuation technique based on observable market inputs or, in the case of a derivative, if the risks are fully offset by other contracts entered into with third parties, this difference is recognized in the Consolidated Statement of Income. In other cases, the difference between the fair value at initial recognition and the transaction price is deferred on the Consolidated Balance Sheet. The amount of the deferred gain or loss is recognized over the term of the financial instrument. The unamortized balance is immediately recognized in net income when (i) observable market inputs can be obtained and support the fair value of the transaction, (ii) the risks associated with the initial contract are substantially offset by other contracts entered into with third parties, (iii) the gain or loss is realized through a cash receipt or payment, or (iv) the transaction matures or is terminated before maturity.

In certain cases, measurement adjustments are recognized to address factors that market participants would use at the measurement date to determine fair value but that are not included in the valuation technique due to system limitations or uncertainty surrounding the measure. These factors include, but are not limited to, the unobservable nature of inputs used in the valuation model, assumptions about risk such as market risk, credit risk, or valuation model risk and future administration costs. The Bank may also consider market liquidity risk when determining the fair value of financial instruments when it believes these instruments could be disposed of for a consideration below the fair value otherwise determined due to a lack of market liquidity or an insufficient volume of transactions in a given market. The measurement adjustments also include the funding valuation adjustment applied to derivative financial instruments to reflect the market implied cost or benefits of funding collateral for uncollateralized or partly collateralized transactions.

IFRS establishes a fair value measurement hierarchy that classifies the inputs used in financial instrument fair value measurement techniques according to three levels. The fair value measurement hierarchy has the following levels:

Level 1

Inputs corresponding to unadjusted quoted prices in active markets for identical assets and liabilities and accessible to the Bank at the measurement date. These instruments consist primarily of equity securities, derivative financial instruments traded in active markets, and certain highly liquid debt securities actively traded in over-the-counter markets.

Level 2

Valuation techniques based on inputs, other than the quoted prices included in Level 1 inputs, that are directly or indirectly observable in the market for the asset or liability. These inputs are quoted prices of similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active; inputs other than quoted prices used in a valuation model that are observable for that instrument; and inputs that are derived principally from or corroborated by observable market inputs by correlation or other means. These instruments consist primarily of certain loans, certain deposits, derivative financial instruments traded in over-the-counter markets, certain debt securities, certain equity securities whose value is not directly observable in an active market, liabilities related to transferred receivables, and certain other liabilities.

Level 3

Valuation techniques based on one or more significant inputs that are not observable in the market for the asset or liability. The Bank classifies financial instruments in Level 3 when the valuation technique is based on at least one significant input that is not observable in the markets. The valuation technique may also be partly based on observable market inputs. Financial instruments whose fair values are classified in Level 3 consist of investments in hedge funds, certain derivative financial instruments, equity and debt securities of private companies, certain loans, certain deposits (structured deposit notes), and certain other assets.

Establishing fair value is an accounting estimate and has an impact on the following items: *Securities at fair value through profit or loss*, certain *Loans*, *Securities at fair value through other comprehensive income*, *Obligations related to securities sold short*, *Derivative financial instruments*, financial instruments designated at fair value through profit or loss, and financial instruments designated at fair value through other comprehensive income on the Consolidated Balance Sheet. This estimate also has an impact on *Non-interest income* in the Consolidated Statement of Income of the Financial Markets segment and of the *Other* heading. Lastly, this estimate has an impact on *Other comprehensive income* in the Consolidated Statement of Comprehensive Income. For additional information on the fair value determination of financial instruments, see Notes 3 and 6 to the consolidated financial statements.

Impairment of Financial Assets

At the end of each reporting period, the Bank applies a three-stage impairment approach to measure the expected credit losses (ECL) on all debt instruments measured at amortized cost or at fair value through other comprehensive income and on loan commitments and financial guarantees that are not measured at fair value. ECLs are a probability-weighted estimate of credit losses over the remaining expected life of the financial instrument. The ECL model is forward looking. Measurement of ECLs at each reporting period reflects reasonable and supportable information about past events, current conditions, and forecasts of future events and economic conditions. Judgment is required in making assumptions and estimates, determining movements between the three stages, and applying forward-looking information. Any changes in assumptions and estimates, as well as the use of different, but equally reasonable, estimates and assumptions, could have an impact on the allowances for credit losses and the provisions for credit losses for the year. All business segments are affected by this accounting estimate. For additional information, see Note 7 to the consolidated financial statements.

Determining the Stage

The ECL three-stage impairment approach is based on the change in the credit quality of financial assets since initial recognition. If, at the reporting date, the credit risk of non-impaired financial instruments has not increased significantly since initial recognition, these financial instruments are classified in Stage 1, and an allowance for credit losses that is measured, at each reporting date, in an amount equal to 12-month expected credit losses, is recorded. When there is a significant increase in credit risk since initial recognition, these non-impaired financial instruments are migrated to Stage 2, and an allowance for credit losses that is measured, at each reporting date, in an amount equal to lifetime expected credit losses, is recorded. In subsequent reporting periods, if the credit risk of a financial instrument improves such that there is no longer a significant increase in credit risk since initial recognition, the ECL model requires reverting to Stage 1, i.e., recognition of 12-month expected credit losses. When one or more events that have a detrimental impact on the estimated future cash flows of a financial asset occurs, the financial asset is considered credit-impaired and is migrated to Stage 3, and an allowance for credit losses equal to lifetime expected credit losses continues to be recorded or the financial asset is written off. Interest income is calculated on the gross carrying amount for financial assets in Stages 1 and 2 and on the net carrying amount for financial assets in Stage 3.

Assessment of Significant Increase in Credit Risk

In determining whether credit risk has increased significantly, the Bank uses an internal credit risk grading system, external risk ratings, and forward-looking information to assess deterioration in the credit quality of a financial instrument. To assess whether or not the credit risk of a financial instrument has increased significantly, the Bank compares the probability of default (PD) occurring over its expected life as at the reporting date with the PD occurring over its expected life on the date of initial recognition and considers reasonable and supportable information indicative of a significant increase in credit risk since initial recognition. The Bank includes relative and absolute thresholds in the definition of significant increase in credit risk and a backstop of 30 days past due. All financial instruments that are 30 days past due are migrated to Stage 2 even if other metrics do not indicate that a significant increase in credit risk has occurred. The assessment of a significant increase in credit risk requires significant judgment.

Measurement of Expected Credit Losses

ECLs are measured as the probability-weighted present value of all expected cash shortfalls over the remaining expected life of the financial instrument, and reasonable and supportable information about past events, current conditions, and forecasts of future events and economic conditions is considered. The estimation and application of forward-looking information requires significant judgment. Cash shortfalls represent the difference between all contractual cash flows owed to the Bank and all cash flows that the Bank expects to receive.

The measurement of ECLs is primarily based on the product of the financial instrument's PD, loss given default (LGD) and exposure at default (EAD). Forward-looking macroeconomic factors such as unemployment rates, housing price indices, interest rates, and gross domestic product (GDP) are incorporated into the risk parameters. The estimate of expected credit losses reflects an unbiased and probability-weighted amount that is determined by evaluating a range of possible outcomes. The Bank incorporates three forward-looking macroeconomic scenarios in its ECL calculation process: a base scenario, an upside scenario, and a downside scenario. Probability weights are assigned to each scenario. The scenarios and probability weights are reassessed quarterly and are subject to management review. The Bank applies experienced credit judgment to adjust the modelled ECL results when it becomes evident that known or expected risk factors and information were not considered in the credit risk rating and modelling process.

ECLs for all financial instruments are recognized in *Provisions for credit losses* in the Consolidated Statement of Income. In the case of debt instruments measured at fair value through other comprehensive income, ECLs are recognized in *Provisions for credit losses* in the Consolidated Statement of Income, and a corresponding amount is recognized in *Other comprehensive income* with no reduction in the carrying amount of the asset on the Consolidated Balance Sheet. As for debt instruments measured at amortized cost, they are presented net of the related allowances for credit losses on the Consolidated Balance Sheet. Allowances for credit losses for off-balance-sheet credit exposures that are not measured at fair value are included in *Other liabilities* on the Consolidated Balance Sheet.

Purchased or Originated Credit-Impaired Financial Assets

On initial recognition of a financial asset, the Bank determines whether the asset is credit-impaired. For financial assets that are credit-impaired upon purchase or origination, the lifetime expected credit losses are reflected in the initial fair value. In subsequent reporting periods, the Bank recognizes only the cumulative changes in these lifetime ECLs since initial recognition as an allowance for credit losses. The Bank recognizes changes in ECLs in *Provisions for credit losses* in the Consolidated Statement of Income, even if the lifetime ECLs are less than the ECLs that were included in the estimated cash flows on initial recognition.

Definition of Default

The definition of default used by the Bank to measure ECLs and transfer financial instruments between stages is consistent with the definition of default used for internal credit risk management purposes. The Bank considers a financial asset, other than a credit card receivable, to be credit-impaired when one or more events that have a detrimental impact on the estimated future cash flows of the financial asset have occurred or when contractual payments are 90 days past due. Credit card receivables are considered credit-impaired and are fully written off at the earlier of the following dates: when a notice of bankruptcy is received, a settlement proposal is made, or contractual payments are 180 days past due.

Write-Offs

A financial asset and its related allowance for credit losses are normally written off in whole or in part when the Bank considers the probability of recovery to be non-existent and when all guarantees and other remedies available to the Bank have been exhausted or if the borrower is bankrupt or winding up and balances owing are not likely to be recovered.

Impairment of Non-Financial Assets

Premises and equipment and intangible assets with finite useful lives are tested for impairment when events or changes in circumstances indicate that their carrying value may not be recoverable. At the end of each reporting period, the Bank determines whether there is an indication that premises and equipment or intangible assets with finite useful lives may be impaired. Goodwill and intangible assets that are not available for use or that have indefinite useful lives are tested for impairment annually or more frequently if there is an indication that the asset might be impaired.

An impairment test compares the carrying amount of an asset with its recoverable amount. The recoverable amount must be estimated for the individual asset. Where it is not possible to estimate the recoverable amount of an individual asset, the recoverable amount of the cash-generating unit (CGU) to which the asset belongs will be determined. Goodwill is always tested for impairment at the level of a CGU or a group of CGUs. A CGU is the smallest identifiable group of assets that generates cash inflows that are largely independent of the cash inflows from other assets or groups of assets. The Bank uses judgment to identify CGUs.

An asset's recoverable amount is the higher of fair value less costs to sell and the value in use of the asset or CGU. Value in use is the present value of expected future cash flows from the asset or CGU. The recoverable amount of the CGU is determined using valuation models that consider various factors such as projected future cash flows, discount rates, and growth rates. The use of different estimates and assumptions in applying the impairment tests could have a significant impact on income. If the recoverable amount of an asset or a CGU is less than its carrying amount, the carrying amount is reduced to its recoverable amount and an impairment loss is recognized in *Non-interest expenses* in the Consolidated Statement of Income.

Management exercises judgment when determining whether there is objective evidence that premises and equipment or intangible assets with finite useful lives may be impaired. It also uses judgment in determining to which CGU or group of CGUs an asset or goodwill is to be allocated. Moreover, for impairment assessment purposes, management must make estimates and assumptions regarding the recoverable amount of non-financial assets, CGUs, or a group of CGUs. For additional information on the estimates and assumptions used to calculate the recoverable amount of an asset or CGU, see Note 11 to the consolidated financial statements.

Any changes to these estimates and assumptions may have an impact on the recoverable amount of a non-financial asset and, consequently, on impairment testing results. These accounting estimates have an impact on *Premises and equipment*, *Intangible assets* and *Goodwill* reported on the Consolidated Balance Sheet. The aggregate impairment loss, if any, is recognized as a non-interest expense for the corresponding segment and presented in the *Other* item.

Employee Benefits – Pension Plans and Other Post-Employment Benefit Plans

The expense and obligation of the defined benefit component of the pension plans and other post-employment benefit plans are actuarially determined using the projected benefit method prorated on service. The calculations incorporate management's best estimates of various actuarial assumptions such as discount rates, rates of compensation increase, health care cost trend rates, mortality rates, and retirement age.

Remeasurements of these plans represent the actuarial gains and losses related to the defined benefit obligation and the actual return on plan assets, excluding the net interest determined by applying a discount rate to the net asset or net liability of the plans. Remeasurements are immediately recognized in *Other comprehensive income* and are not subsequently reclassified to net income; these cumulative gains and losses are reclassified to *Retained earnings*.

The use of different assumptions could have a significant impact on the defined benefit asset (liability) presented in *Other assets (Other liabilities)* on the Consolidated Balance Sheet, on the pension plan and other post-employment benefit plan expenses presented in *Compensation and employee benefits* in the Consolidated Statement of Income, as well as on *Remeasurements of pension plans and other post-employment benefit plans* presented in *Other comprehensive income*. All business segments are affected by this accounting estimate. For additional information, including the significant assumptions used to determine the Bank's pension plan and other post-employment benefit plan expenses and the sensitivity analysis for significant plan assumptions, see Note 23 to the consolidated financial statements.

Income Taxes

The Bank makes assumptions to estimate income taxes as well as deferred tax assets and liabilities. This process involves estimating the actual amount of current taxes and evaluating tax loss carryforwards and temporary differences arising from differences between the values of items reported for accounting and for income tax purposes. Deferred tax assets and liabilities, presented in *Other assets* and *Other liabilities* on the Consolidated Balance Sheet, are calculated according to the tax rates to be applied in future periods. Previously recorded deferred tax assets and liabilities must be adjusted when the date of the future event is revised based on current information. The Bank periodically evaluates deferred tax assets to assess recoverability. In the Bank's opinion, based on the information at its disposal, it is probable that all deferred tax assets will be realized before they expire.

This accounting estimate affects *Income taxes* in the Consolidated Statement of Income for all business segments. For additional information on income taxes, see Notes 1 and 24 to the consolidated financial statements.

Litigation

In the normal course of business, the Bank and its subsidiaries are involved in various claims relating, among other matters, to loan portfolios, investment portfolios, and supplier agreements, including court proceedings, investigations or claims of a regulatory nature, class actions, or other legal remedies of varied natures.

More specifically, the Bank is involved as a defendant in class actions instituted by consumers contesting, *inter alia*, certain transaction fees or who wish to avail themselves of certain legislative provisions relating to consumer protection. The recent developments in the main legal proceeding involving the Bank are as follows:

Defrance

On January 21, 2019, the Quebec Superior Court authorized a class action against the National Bank and several other Canadian financial institutions. The originating application was served to the Bank on April 23, 2019. The class action was initiated on behalf of consumers residing in Quebec. The plaintiffs allege that non-sufficient funds charges, billed by all of the defendants when a payment order is refused due to non-sufficient funds, are illegal and prohibited by the *Consumer Protection Act*. The plaintiffs are claiming, in the form of damages, the repayment of these charges as well as punitive damages.

It is impossible to determine the outcome of the claims instituted or which may be instituted against the Bank and its subsidiaries. The Bank estimates, based on the information at its disposal, that while the amount of contingent liabilities pertaining to these claims, taken individually or in the aggregate, could have a material impact on the Bank's consolidated results of operations for a particular period, it would not have a material adverse impact on the Bank's consolidated financial position.

Provisions are liabilities of uncertain timing and amount. A provision is recognized when the Bank has a present obligation (legal or constructive) arising from a past event, when it is probable that an outflow of economic resources will be required to settle the obligation and when the amount of the obligation can be reliably estimated. Provisions are based on the Bank's best estimates of the economic resources required to settle the present obligation, given all relevant risks and uncertainties, and, when it is significant, the effect of the time value of money.

The recognition of a litigation provision requires the Bank's management to assess the probability of loss and estimate any potential monetary impact. The Bank examines each litigation provision individually by considering the development of each case, its past experience in similar transactions and the opinion of its legal counsel. Each new piece of information can alter the Bank's assessment as to the probability and estimated amount of the loss and the extent to which it adjusts the recorded provision. Moreover, the actual settlement cost of these litigations can be significantly higher or lower than the amounts recognized.

Structured Entities

In the normal course of business, the Bank enters into arrangements and transactions with structured entities. Structured entities are entities designed so that voting or similar rights are not the dominant factor in deciding who controls the entity, such as when voting rights relate solely to administrative tasks and the relevant activities are directed by means of contractual arrangements. A structured entity is consolidated when the Bank concludes, after evaluating the substance of the relationship and its right or exposure to variable returns, that it controls that entity. Management must exercise judgment in determining whether the Bank controls an entity. Additional information is provided in the Securitization and Off-Balance-Sheet Arrangements section of this MD&A and in Note 27 to the consolidated financial statements.

Accounting Policy Changes

Cloud Computing Arrangements – Final Agenda Decision by IFRIC

In April 2021, IFRIC issued a final agenda decision on accounting for the costs of configuring or customizing a supplier's software as part of a cloud computing or SaaS (Software as a Service) arrangement. The main conclusion was that, if the incurred configuration or customization costs do not give rise to an intangible asset that is separate from the software or if the services received are distinct from the software, those costs are expensed as incurred. IFRIC decided that the relevant accounting standards (IAS 38 – *Intangible Assets* and IFRS 15 – *Revenue From Contracts With Customers*) contain sufficient guidance and that the conclusions, as indicated in the final agenda decision, are part of the interpretation of IFRS. As such, any change arising from these interpretations must be accounted for as a retrospectively applied accounting policy change in accordance with IAS 8 – *Accounting Policies, Changes in Accounting Estimates and Errors*.

During fiscal 2022, the Bank completed an assessment of the impacts of this change in accounting policy. The change was applied retrospectively and had the following impacts on the consolidated financial statements:

- As at November 1, 2020: A \$186 million decrease in *Intangible assets*, a \$49 million increase in *Other assets – Deferred tax assets*, and a \$137 million decrease in *Retained earnings*;
- As at October 31, 2021: A \$50 million decrease in *Intangible assets* and a \$13 million increase in *Other assets – Deferred tax assets*;
- For the year ended October 31, 2021: A \$50 million increase in *Non-interest expenses – Technology*, a \$13 million decrease in *Income taxes*, a \$37 million decrease in *Net income* and *Net income attributable to common shareholders*, and a \$0.11 decrease in *Earnings per share – Basic and diluted*.

For the year ended October 31, 2022, the impacts of this accounting policy change on the Consolidated Statement of Income consisted of a \$10 million increase in *Non-interest expenses – Technology* and a \$3 million decrease in *Income taxes*.

Future Accounting Policy Changes

The Bank closely monitors both new accounting standards and amendments to existing accounting standards issued by the IASB. The following standard has been issued but is not yet in effect. The Bank is currently assessing the impacts of applying this standard on the consolidated financial statements.

Effective Date – November 1, 2023

IFRS 17 – *Insurance Contracts*

In May 2017, the IASB issued IFRS 17 – *Insurance Contracts* (IFRS 17), a new standard that replaces IFRS 4, the current insurance contract accounting standard. IFRS 17 introduces a new accounting framework that will improve the comparability and quality of financial information. IFRS 17 provides guidance on the recognition, measurement, presentation and disclosure of insurance contracts. IFRS 17 will affect how an entity accounts for its insurance contracts and how it reports financial performance in the consolidated income statement, in particular the timing of revenue recognition for insurance contracts. In June 2020, the IASB issued amendments to IFRS 17 that included a two-year deferral of the effective date along with other changes aimed at addressing concerns and implementation challenges identified after IFRS 17 was published in 2017. IFRS 17, as amended, is to be applied retrospectively for annual periods beginning on or after January 1, 2023. If full retrospective application to a group of insurance contracts is impracticable, the modified retrospective approach or the fair value approach may be used.

To prepare for the application of IFRS 17, the Bank developed a project, set up a specialized team, and established a formal governance structure. It also started executing a detailed plan for the project that defines key activities and the timing of those activities. The project is progressing according to schedule. The Bank is continuing to assess all of the impacts of applying IFRS 17 on its consolidated financial statements as well as on the financial statements of its insurance subsidiary.

Additional Financial Information

Table 1 – Quarterly Results

(millions of Canadian dollars, except per share amounts)	2022 ⁽¹⁾				
	Total	Q4	Q3	Q2	Q1
Statement of income data					
Net interest income	5,271	1,207	1,419	1,313	1,332
Non-interest income ⁽²⁾	4,381	1,127	994	1,126	1,134
Total revenues	9,652	2,334	2,413	2,439	2,466
Non-interest expenses ⁽³⁾	5,230	1,346	1,305	1,299	1,280
Income before provisions for credit losses and income taxes	4,422	988	1,108	1,140	1,186
Provisions for credit losses	145	87	57	3	(2)
Income taxes	894	163	225	248	258
Net income	3,383	738	826	889	930
Non-controlling interests	(1)	–	–	(1)	–
Net income attributable to the Bank's shareholders and holders of other equity instruments	3,384	738	826	890	930
Earnings per common share					
Basic	\$ 9.72	\$ 2.10	\$ 2.38	\$ 2.56	\$ 2.67
Diluted	9.61	2.08	2.35	2.53	2.64
Dividends (per share)					
Common	\$ 3.58	\$ 0.92	\$ 0.92	\$ 0.87	\$ 0.87
Preferred					
Series 30	1.0063	0.2516	0.2516	0.2515	0.2516
Series 32	0.9598	0.2400	0.2399	0.2400	0.2399
Series 34	–	–	–	–	–
Series 36	–	–	–	–	–
Series 38	1.1125	0.2781	0.2781	0.2782	0.2781
Series 40	1.1500	0.2875	0.2875	0.2875	0.2875
Series 42	1.2375	0.3094	0.3093	0.3094	0.3094
Return on common shareholders' equity⁽⁴⁾	18.8 %	15.3 %	17.9 %	20.7 %	21.9 %
Total assets		403,740	386,833	369,570	366,680
Subordinated debt⁽⁵⁾		1,499	1,510	764	766
Net impaired loans excluding POCL loans⁽⁴⁾		479	301	293	287
Number of common shares outstanding (thousands)					
Average – Basic	337,099	336,530	336,437	337,381	338,056
Average – Diluted	340,837	339,910	339,875	341,418	342,318
End of period		336,582	336,456	336,513	338,367
Per common share					
Book value ⁽⁴⁾		\$ 55.24	\$ 54.29	\$ 52.28	\$ 49.71
Share price					
High	\$ 105.44	94.37	97.87	104.59	105.44
Low	83.12	83.12	83.33	89.33	94.37
Number of employees – Worldwide		29,509	28,903	28,189	27,804
Number of branches in Canada		378	384	385	385

(1) Certain amounts have been adjusted to reflect an accounting policy change applicable to cloud computing arrangements. For additional information, see Note 1 to the consolidated financial statements.

(2) For fiscal 2020, the *Non-interest income* item had included a foreign currency translation loss on a disposal of subsidiaries of \$24 million.

(3) For fiscal 2021, the *Non-interest expenses* item had included \$9 million in intangible asset impairment losses (2020: \$71 million impairment loss on premises and equipment and intangible assets). For fiscal 2020, the *Non-interest expenses* item had included \$48 million in severance pay and a \$13 million charge related to Maple Financial Group Inc. (Maple).

(4) See the Glossary section on pages 122 to 125 for details on the composition of these measures.

(5) Long-term financial liabilities.

					2021 ⁽¹⁾					2020 ⁽¹⁾				
Total		Q4	Q3	Q2	Q1	Total		Q4	Q3	Q2	Q1			
	4,783	1,190	1,230	1,156	1,207		4,255	1,124	1,096	1,105	930			
	4,144	1,021	1,024	1,082	1,017		3,672	876	872	931	993			
	8,927	2,211	2,254	2,238	2,224		7,927	2,000	1,968	2,036	1,923			
	4,903	1,268	1,224	1,217	1,194		4,616	1,267	1,096	1,144	1,109			
	4,024	943	1,030	1,021	1,030		3,311	733	872	892	814			
	2	(41)	(43)	5	81		846	110	143	504	89			
	882	215	240	228	199		434	136	144	25	129			
	3,140	769	833	788	750		2,031	487	585	363	596			
	-	-	-	-	-		42	2	13	11	16			
	3,140	769	833	788	750		1,989	485	572	352	580			
	\$ 8.95	\$ 2.20	\$ 2.38	\$ 2.24	\$ 2.13		\$ 5.57	\$ 1.35	\$ 1.62	\$ 0.96	\$ 1.65			
	8.85	2.17	2.35	2.21	2.12		5.54	1.34	1.61	0.96	1.63			
	\$ 2.84	\$ 0.71	\$ 0.71	\$ 0.71	\$ 0.71		\$ 2.84	\$ 0.71	\$ 0.71	\$ 0.71	\$ 0.71			
	1.0063	0.2516	0.2516	0.2515	0.2516		1.0063	0.2516	0.2516	0.2515	0.2516			
	0.9598	0.2400	0.2399	0.2400	0.2399		0.9636	0.2400	0.2399	0.2399	0.2438			
	0.7000	-	-	0.3500	0.3500		1.4000	0.3500	0.3500	0.3500	0.3500			
	1.0125	-	0.3375	0.3375	0.3375		1.3500	0.3375	0.3375	0.3375	0.3375			
	1.1125	0.2781	0.2781	0.2782	0.2781		1.1125	0.2781	0.2781	0.2782	0.2781			
	1.1500	0.2875	0.2875	0.2875	0.2875		1.1500	0.2875	0.2875	0.2875	0.2875			
	1.2375	0.3094	0.3093	0.3094	0.3094		1.2375	0.3094	0.3093	0.3094	0.3094			
	20.7 %	18.7 %	21.4 %	21.8 %	21.1 %		14.6 %	13.7 %	16.7 %	10.3 %	17.7 %			
	355,621	353,873	350,581	343,489			331,488	322,321	316,835	289,092				
	768	769	771	773			775	777	779	774				
	283	312	349	400			465	453	479	436				
	337,212	337,779	337,517	337,142	336,408		335,508	335,859	335,552	335,603	335,020			
	340,861	342,400	341,818	340,614	338,617		337,580	338,264	337,231	337,317	338,111			
		337,912	337,587	337,372	336,770			335,998	335,666	335,400	335,818			
	\$ 47.44	\$ 45.51	\$ 43.11	\$ 41.04			\$ 39.56	\$ 38.51	\$ 38.40	\$ 37.29				
	\$ 104.32	104.32	96.97	89.42	73.81		\$ 74.79	72.85	65.54	74.79	74.22			
	65.54	95.00	89.47	72.30	65.54		38.73	62.99	51.38	38.73	68.25			
		26,920	26,428	26,211	26,231			26,517	26,544	26,589	26,314			
		384	389	401	402			403	409	413	416			

Table 2 – Overview of Results

Year ended October 31⁽¹⁾

(millions of Canadian dollars)	2022	2021	2020	2019	2018
Net interest income	5,271	4,783	4,255	3,596	3,382
Non-interest income ⁽²⁾	4,381	4,144	3,672	3,836	3,784
Total revenues	9,652	8,927	7,927	7,432	7,166
Non-interest expenses ⁽³⁾	5,230	4,903	4,616	4,375	4,100
Income before provisions for credit losses and income taxes	4,422	4,024	3,311	3,057	3,066
Provisions for credit losses	145	2	846	347	327
Income before income taxes	4,277	4,022	2,465	2,710	2,739
Income taxes	894	882	434	443	534
Net income	3,383	3,140	2,031	2,267	2,205
Non-controlling interests	(1)	–	42	66	87
Net income attributable to the Bank's shareholders and holders of other equity instruments	3,384	3,140	1,989	2,201	2,118

- (1) Certain amounts have been adjusted to reflect an accounting policy change applicable to cloud computing arrangements. For additional information, see Note 1 to the consolidated financial statements.
- (2) For fiscal 2021, *Non-interest income* had included a \$33 million gain following a remeasurement of the previously held equity interest in Flinks and a \$30 million loss related to the fair value measurement of the Bank's equity interest in AfrAsia (2020: \$24 million foreign currency translation loss on a disposal of subsidiaries; 2019: \$79 million gain on disposal of Fiera Capital Corporation shares, \$50 million gain on disposal of premises and equipment, and \$33 million loss resulting from the fair value measurement of an investment).
- (3) For fiscal 2021, *Non-interest expenses* had included \$9 million in intangible asset impairment losses (2020: \$71 million in impairment losses on premises and equipment and intangible assets; 2019: \$57 million). For fiscal 2020, *Non-interest expenses* had included \$48 million in severance pay (2019: \$10 million) and a \$13 million charge related to Maple (2019: \$11 million). An amount of \$45 million in provisions for onerous contracts had been recorded in 2019.

Table 3 – Changes in Net Interest Income

Year ended October 31

(millions of Canadian dollars)	2022	2021	2020	2019	2018
Personal and Commercial⁽¹⁾					
Net interest income	2,865	2,547	2,420	2,360	2,256
Average assets ⁽²⁾	140,514	126,637	115,716	111,140	105,460
Average interest-bearing assets ⁽²⁾⁽³⁾	133,754	120,956	110,544	106,995	101,446
Net interest margin ⁽³⁾	2.14 %	2.11 %	2.19 %	2.21 %	2.22 %
Wealth Management					
Net interest income on a taxable equivalent basis ⁽⁴⁾	594	446	442	455	426
Average assets ⁽²⁾	8,226	7,146	5,917	6,219	6,167
Financial Markets⁽¹⁾					
Net interest income on a taxable equivalent basis ⁽⁴⁾	1,258	1,262	971	498	429
Average assets ⁽²⁾	154,349	151,240	125,565	114,151	102,118
USSF&I					
Net interest income	1,090	907	807	656	584
Average assets ⁽²⁾	18,890	16,150	14,336	10,985	9,270
Other					
Net interest income ⁽⁴⁾	(536)	(379)	(385)	(373)	(313)
Average assets ⁽²⁾⁽⁵⁾	71,868	62,333	56,553	43,667	42,925
Total					
Net interest income	5,271	4,783	4,255	3,596	3,382
Average assets ⁽²⁾⁽⁵⁾	393,847	363,506	318,087	286,162	265,940

- (1) For fiscal years prior to 2022, certain amounts have been reclassified, in particular amounts of the loan portfolio of borrowers in the "Oil and gas" and "Pipelines" sectors as well as related activities, which were transferred from the Personal and Commercial segment to the Financial Markets segment.
- (2) Represents an average of the daily balances for the period.
- (3) See the Glossary section on pages 122 to 125 for details on the composition of these measures.
- (4) For fiscal 2022, the *Net interest income* of the Financial Markets segment was grossed up by \$229 million (2021: \$175 million; 2020: \$202 million; 2019: \$191 million; 2018: \$141 million), the *Net interest income* of the *Other* heading was grossed up by \$5 million (2021: \$6 million; 2020: \$6 million; 2019: \$3 million; 2018: \$3 million), the *Net interest income* of the Wealth Management segment was grossed up by \$1 million in 2019. The effect of these adjustments is reversed under the *Other* heading.
- (5) The amounts have been adjusted to reflect an accounting policy change applicable to cloud computing arrangements (for additional information, see Note 1 to the consolidated financial statements), except for the fiscal 2019 and 2018 figures.

Table 4 – Non-Interest Income

Year ended October 31 (millions of Canadian dollars)	2022	2021	2020	2019	2018
Underwriting and advisory fees	324	415	314	246	322
Securities brokerage commissions	204	238	204	166	169
Mutual fund revenues	587	563	477	449	438
Investment management and trust service fees	997	900	735	677	665
Credit fees	155	164	147	134	126
Revenues from acceptances, letters of credit and guarantee	335	342	320	283	277
Card revenues	186	148	138	175	159
Deposit and payment service charges	298	274	262	271	280
Trading revenues (losses)	543	268	544	788	801
Gains (losses) on non-trading securities, net	113	151	93	77	77
Insurance revenues, net	158	131	128	136	121
Foreign exchange revenues, other than trading	211	202	164	137	134
Share in the net income of associates and joint ventures	28	23	28	34	28
Other ⁽¹⁾	242	325	118	263	187
	4,381	4,144	3,672	3,836	3,784
Canada	4,299	3,992	3,574	3,645	3,488
United States	18	106	5	85	108
Other countries	64	46	93	106	188
Non-interest income as a % of total revenues	45.4 %	46.4 %	46.3 %	51.6 %	52.8 %

(1) For fiscal 2021, *Other* revenues had included a \$33 million gain following a remeasurement of the previously held equity interest in Flinks and a \$30 million loss related to the fair value measurement of the Bank's equity interest in AfrAsia (2020: \$24 million foreign currency translation loss on a disposal of subsidiaries; 2019: \$79 million gain on disposal of Fiera Capital Corporation shares, \$50 million gain on disposal of premises and equipment, and \$33 million loss resulting from the fair value measurement of an investment).

Table 5 – Trading Activity Revenues

Year ended October 31 (millions of Canadian dollars)	2022	2021	2020	2019	2018
Net interest income related to trading activity ⁽¹⁾	682	777	522	28	44
Taxable equivalent basis ⁽²⁾	229	171	202	188	138
Net interest income related to trading activity on a taxable equivalent basis⁽²⁾	911	948	724	216	182
Non-interest income related to trading activity ⁽¹⁾	548	282	625	800	822
Taxable equivalent basis ⁽²⁾	48	8	57	135	101
Non-interest income related to trading activity on a taxable equivalent basis⁽²⁾	596	290	682	935	923
Trading activity revenues ⁽¹⁾	1,230	1,059	1,147	828	866
Taxable equivalent basis ⁽²⁾	277	179	259	323	239
Trading activity revenues on a taxable equivalent basis⁽²⁾	1,507	1,238	1,406	1,151	1,105
Trading activity revenues by segment on a taxable equivalent basis⁽²⁾					
Financial Markets					
Equities	979	685	706	621	575
Fixed-income	367	357	430	285	263
Commodities and foreign exchange	156	128	132	126	130
	1,502	1,170	1,268	1,032	968
Other segments	5	68	138	119	137
	1,507	1,238	1,406	1,151	1,105

(1) See the Glossary section on pages 122 to 125 for details on the composition of these measures.

(2) See the Financial Reporting Method section on pages 16 to 21 for additional information on non-GAAP financial measures. The taxable equivalent basis presented in this table is related to trading portfolios. The Bank also uses the taxable equivalent basis for certain investment portfolios, and the amounts stood at \$5 million for fiscal 2022 (2021: \$10 million; 2020: \$6 million; 2019: \$7 million; 2018: \$6 million).

Table 6 – Non-Interest Expenses

Year ended October 31⁽¹⁾

(millions of Canadian dollars)	2022	2021	2020	2019	2018
Compensation and employee benefits ⁽²⁾	3,284	3,027	2,713	2,532	2,466
Occupancy ⁽³⁾	157	147	151	254	193
Amortization – Premises and equipment	155	152	140	44	43
Technology	589	557	510	446	412
Amortization – Technology ⁽⁴⁾	326	314	366	332	245
Communications	57	53	58	62	63
Professional fees	249	246	244	249	244
Travel and business development	144	109	103	128	128
Capital and payroll taxes	32	52	73	70	79
Other ⁽⁵⁾	237	246	258	258	227
Total	5,230	4,903	4,616	4,375	4,100
Canada	4,760	4,478	4,195	4,005	3,787
United States	209	203	209	210	205
Other countries	261	222	212	160	108
Efficiency ratio ⁽⁶⁾	54.2 %	54.9 %	58.2 %	58.9 %	57.2 %

(1) Certain amounts have been adjusted to reflect an accounting policy change applicable to cloud computing arrangements. For additional information, see Note 1 to the consolidated financial statements.

(2) For fiscal 2020, *Compensation and employee benefits* had included \$48 million in severance pay (2019: \$10 million).

(3) For fiscal 2019, *Occupancy* expense had included \$45 million in provisions for onerous contracts.

(4) For fiscal 2021, the *Amortization – Technology* expense had included \$9 million in intangible asset impairment losses (2020: \$71 million in impairment losses on premises and equipment and intangible assets; 2019: \$57 million).

(5) For fiscal 2020, *Other* expenses had included a \$13 million charge related to Maple (2019: \$11 million).

(6) See the Glossary section on pages 122 to 125 for details on the composition of these measures.

Table 7 – Provisions for Credit Losses⁽¹⁾

Year ended October 31

(millions of Canadian dollars)

	2022	2021	2020	2019	2018
Personal Banking⁽²⁾					
Impaired loans – Stage 3	75	65	147	166	158
Non-impaired loans – Stages 1 and 2	9	(77)	121	8	9
	84	(12)	268	174	167
Commercial Banking⁽³⁾					
Impaired loans – Stage 3	13	26	76	31	28
Non-impaired loans – Stages 1 and 2	–	26	103	19	14
	13	52	179	50	42
Wealth Management					
Impaired loans – Stage 3	1	1	4	–	–
Non-impaired loans – Stages 1 and 2	2	–	3	–	1
	3	1	7	–	1
Financial Markets⁽³⁾					
Impaired loans – Stage 3	1	78	99	22	12
Non-impaired loans – Stages 1 and 2	(24)	(102)	210	21	11
	(23)	(24)	309	43	23
USSF&I					
Impaired loans – Stage 3	48	13	46	94	126
Non-impaired loans – Stages 1 and 2	12	(2)	41	(24)	(3)
POCI loans	6	(26)	(7)	10	(29)
	66	(15)	80	80	94
Other					
Impaired loans – Stage 3	–	–	–	–	–
Non-impaired loans – Stages 1 and 2	2	–	3	–	–
	2	–	3	–	–
Total provisions for credit losses					
Impaired loans – Stage 3	138	183	372	313	324
Non-impaired loans – Stages 1 and 2	1	(155)	481	24	32
POCI loans	6	(26)	(7)	10	(29)
	145	2	846	347	327
Average loans and acceptances	194,340	172,323	159,275	148,765	139,603
Provisions for credit losses on impaired loans excluding POCI loans as a % of average loans and acceptances ⁽⁴⁾	0.07 %	0.11 %	0.23 %	0.21 %	0.23 %
Provisions for credit losses as a % of average loans and acceptances ⁽⁴⁾	0.07 %	– %	0.53 %	0.23 %	0.23 %

(1) The *Impaired loans – Stage 3* category presented in this table reflects provisions for credit losses on loans classified in Stage 3 of the expected credit loss model and excludes POCI loans.

(2) Includes credit card receivables.

(3) For fiscal years prior to 2022, certain amounts have been reclassified to reflect a transfer of the loan portfolio of borrowers in the “Oil and gas” and “Pipelines” sectors from the Personal and Commercial segment to the Financial Markets segment.

(4) See the Glossary section on pages 122 to 125 for details on the composition of these measures.

Table 8 – Change in Average Volumes⁽¹⁾

Year ended October 31

(millions of Canadian dollars)

	2022		2021		2020		2019		2018	
	Average volume \$	Rate %	Average volume \$	Rate %	Average volume \$	Rate %	Average volume \$	Rate %	Average volume \$	Rate %
Assets										
Deposits with financial institutions	42,042	1.55	40,294	0.31	24,966	0.44	13,172	1.64	16,322	1.27
Securities	111,863	1.77	116,023	1.25	97,025	1.63	85,772	1.74	75,923	1.45
Securities purchased under reverse repurchase agreements and securities borrowed	16,255	2.08	11,559	0.90	16,408	1.39	22,472	1.60	20,090	1.09
Residential mortgage loans	75,712	2.90	68,297	2.93	59,801	3.13	54,493	3.30	51,509	3.07
Personal loans	42,723	3.82	38,434	3.16	36,273	3.68	35,816	4.25	35,041	3.98
Credit card receivables	2,133	12.81	1,864	13.47	1,995	14.62	2,221	14.06	2,165	13.69
Business and government loans	58,947	3.63	51,229	3.06	47,272	4.13	42,922	5.34	38,204	5.06
POCI loans	493	32.68	686	22.64	1,073	16.45	1,386	13.37	1,486	13.12
Average interest-bearing assets ⁽¹⁾	350,168	2.75	328,386	2.13	284,813	2.66	258,254	3.17	240,740	2.88
Other assets ⁽²⁾	43,679		35,120		33,274		27,908		25,200	
	393,847	2.43	363,506	1.93	318,087	2.38	286,162	2.86	265,940	2.61
Liabilities and equity										
Personal deposits	72,927	0.67	68,334	0.42	63,634	0.87	58,680	1.22	53,179	1.08
Deposit-taking institutions	5,695	0.88	6,522	0.09	6,494	0.63	5,987	1.80	5,985	1.45
Other deposits	180,307	1.28	161,373	0.68	137,253	1.26	119,793	2.06	108,012	1.66
	258,929	1.10	236,229	0.58	207,381	1.12	184,460	1.79	167,176	1.47
Subordinated debt	960	3.70	758	3.22	759	3.25	758	3.25	564	3.20
Obligations other than deposits ⁽³⁾	81,659	1.13	80,808	0.67	70,973	1.12	67,638	1.67	67,220	1.57
Average interest-bearing liabilities ⁽¹⁾	341,548	1.25	317,795	0.69	279,113	1.19	252,856	1.81	234,960	1.57
Other liabilities	30,209		28,195		23,400		18,593		17,034	
Equity ⁽²⁾	22,090		17,516		15,574		14,713		13,946	
	393,847	1.09	363,506	0.61	318,087	1.04	286,162	1.60	265,940	1.34
Net interest margin ⁽⁴⁾		1.34		1.32		1.34		1.26		1.27

(1) See the Glossary section on pages 122 to 125 for details on the composition of these measures.

(2) The amounts have been adjusted to reflect an accounting policy change applicable to cloud computing arrangements (for additional information, see Note 1 to the consolidated financial statements), except for the fiscal 2019 and 2018 figures.

(3) Average obligations other than deposits represent the average of the daily balances for the fiscal year of obligations related to securities sold short, obligations related to securities sold under repurchase agreements and securities loaned, and liabilities related to transferred receivables.

(4) Calculated by dividing net interest income by average assets.

Table 9 – Distribution of Gross Loans and Acceptances by Borrower Category Under Basel Asset Classes

As at October 31										
(millions of Canadian dollars)										
	2022		2021		2020		2019		2018	
	\$	%	\$	%	\$	%	\$	%	\$	%
Residential mortgage ⁽¹⁾	95,575	46.0	89,035	48.5	81,543	49.2	74,448	48.4	70,591	48.1
Qualifying revolving retail	3,801	1.8	3,589	2.0	3,599	2.2	4,099	2.7	4,211	2.9
Other retail	14,899	7.2	12,949	7.0	11,569	7.0	11,606	7.5	12,246	8.3
Agriculture	8,109	3.9	7,357	4.0	6,696	4.0	6,308	4.1	5,759	3.9
Oil and gas ⁽²⁾	1,435	0.7	1,807	1.0	2,506	1.5	2,742	1.8	2,506	1.7
Mining	1,049	0.5	529	0.3	756	0.5	758	0.5	1,032	0.7
Utilities ⁽²⁾	9,682	4.6	7,687	4.2	6,640	4.0	4,713	3.0	4,033	2.7
Non-real-estate construction ⁽³⁾	1,935	0.9	1,541	0.8	1,079	0.7	1,168	0.8	1,006	0.7
Manufacturing ⁽²⁾	7,374	3.6	5,720	3.1	5,803	3.5	6,549	4.3	5,535	3.8
Wholesale	3,241	1.6	2,598	1.4	2,206	1.3	2,221	1.4	2,163	1.5
Retail	3,494	1.7	2,978	1.6	2,955	1.8	3,289	2.1	3,069	2.1
Transportation	2,209	1.1	1,811	1.0	1,528	0.9	1,682	1.1	1,452	1.0
Communications	1,830	0.9	1,441	0.8	1,184	0.7	1,601	1.0	1,597	1.1
Financial services ⁽²⁾	10,777	5.2	8,870	4.8	7,476	4.4	6,115	3.9	5,482	3.7
Real estate and real-estate-construction ⁽⁴⁾	22,382	10.8	18,195	9.9	14,171	8.6	11,635	7.6	11,671	8.0
Professional services	2,338	1.1	1,872	1.0	1,490	0.9	1,845	1.2	1,582	1.1
Education and health care	3,412	1.6	4,073	2.2	3,800	2.3	3,520	2.3	3,284	2.2
Other services	6,247	3.0	5,875	3.2	5,296	3.2	4,937	3.2	4,715	3.2
Government	1,661	0.8	1,159	0.6	1,160	0.7	1,071	0.7	1,445	1.0
Other ⁽²⁾	5,790	2.8	4,137	2.3	3,586	2.1	2,456	1.6	1,785	1.2
POCI loans	459	0.2	464	0.3	855	0.5	1,166	0.8	1,576	1.1
	207,699	100.0	183,687	100.0	165,898	100.0	153,929	100.0	146,740	100.0

(1) Includes residential mortgage loans on one- to four-unit dwellings (Basel definition) and home equity lines of credit.

(2) In fiscal 2022, the presentation was changed to better align borrower categories with their definitions. Comparative figures have been reclassified.

(3) Includes civil engineering loans, public-private partnership loans, and project finance loans.

(4) Includes residential mortgages on dwellings of five or more units and SME loans.

Table 10 – Impaired Loans

As at October 31 (millions of Canadian dollars)	2022	2021	2020	2019	2018
Gross impaired loans					
Personal Banking	176	169	287	256	266
Commercial Banking ⁽¹⁾	206	244	333	294	231
Wealth Management	21	23	8	5	5
Financial Markets ⁽¹⁾	167	162	134	93	92
USSF&I	242	64	55	36	36
Gross impaired loans excluding POCI loans⁽²⁾	812	662	817	684	630
Gross POCI loans	459	464	855	1,166	1,576
	1,271	1,126	1,672	1,850	2,206
Net impaired loans⁽³⁾					
Personal Banking	104	106	206	187	199
Commercial Banking ⁽¹⁾	89	107	184	192	139
Wealth Management	15	16	2	3	3
Financial Markets ⁽¹⁾	91	14	43	53	48
USSF&I	180	40	30	15	15
Net impaired loans excluding POCI loans⁽²⁾	479	283	465	450	404
Net POCI loans	551	553	921	1,223	1,642
	1,030	836	1,386	1,673	2,046
Allowances for credit losses on impaired loans excluding POCI loans⁽²⁾	333	379	352	234	226
Allowances for credit losses on POCI loans	(92)	(89)	(66)	(57)	(66)
Allowances for credit losses on impaired loans	241	290	286	177	160
Provisioning rate excluding POCI loans⁽²⁾	41.0 %	57.3 %	43.1 %	34.2 %	35.9 %
Gross impaired loans excluding POCI loans as a % of total loans and acceptances⁽²⁾	0.39 %	0.36 %	0.49 %	0.45 %	0.43 %
Net impaired loans excluding POCI loans as a % of total loans and acceptances⁽²⁾	0.23 %	0.15 %	0.28 %	0.29 %	0.28 %

(1) For fiscal years prior to 2022, certain amounts have been reclassified to reflect a transfer of the loan portfolio of borrowers in the "Oil and gas" and "Pipelines" sectors from the Personal and Commercial segment to the Financial Markets segment.

(2) See the Glossary section on pages 122 to 125 for details on the composition of these measures.

(3) Net impaired loans are presented net of allowances for credit losses on Stage 3 loan amounts drawn and on POCI loans.

Table 11 – Allowances for Credit Losses

Year ended October 31 (millions of Canadian dollars)	2022	2021	2020	2019	2018
Balance at beginning	1,169	1,343	755	714	735
Provisions for credit losses	145	2	846	347	327
Write-offs	(233)	(192)	(294)	(351)	(367)
Disposals	–	(14)	–	(1)	(24)
Recoveries	40	44	44	52	45
Exchange and other movements	10	(14)	(8)	(6)	(2)
Balance at end	1,131	1,169	1,343	755	714
Composition of allowances:					
Allowances for credit losses on impaired loans excluding POCI loans ⁽¹⁾	333	379	352	234	226
Allowances for credit losses on POCI loans	(92)	(89)	(66)	(57)	(66)
Allowances for credit losses on non-impaired loans	714	708	872	501	498
Allowances for credit losses on off-balance-sheet commitments and other assets	176	171	185	77	56

(1) See the Glossary section on pages 122 to 125 for details on the composition of these measures.

Table 12 – Deposits

As at October 31 (millions of Canadian dollars)	2022		2021		2020		2019		2018	
	\$	%	\$	%	\$	%	\$	%	\$	%
Personal	78,811	29.6	70,076	29.1	67,499	31.3	60,065	31.7	55,688	32.6
Business and government	184,230	69.1	167,870	69.7	143,787	66.6	125,266	66.1	110,321	64.6
Deposit-taking institutions	3,353	1.3	2,992	1.2	4,592	2.1	4,235	2.2	4,821	2.8
Total	266,394	100.0	240,938	100.0	215,878	100.0	189,566	100.0	170,830	100.0
Canada	238,239	89.5	216,906	90.0	195,730	90.7	172,764	91.1	156,054	91.4
United States	9,147	3.4	9,234	3.8	8,126	3.7	6,907	3.7	6,048	3.5
Other countries	19,008	7.1	14,798	6.2	12,022	5.6	9,895	5.2	8,728	5.1
Total	266,394	100.0	240,938	100.0	215,878	100.0	189,566	100.0	170,830	100.0
Personal deposits as a % of total assets		19.5		19.7		20.4		21.3		21.2

Glossary

Acceptances

Acceptances and the customers' liability under acceptances constitute a guarantee of payment by a bank and can be traded in the money market. The Bank earns a "stamping fee" for providing this guarantee.

Allowances for credit losses

Allowances for credit losses represent management's unbiased estimate of expected credit losses as at the balance sheet date. These allowances are primarily related to loans and off-balance-sheet items such as loan commitments and financial guarantees.

Assets under administration

Assets in respect of which a financial institution provides administrative services on behalf of the clients who own the assets. Such services include custodial services, collection of investment income, settlement of purchase and sale transactions, and record-keeping. Assets under administration are not reported on the balance sheet of the institution offering such services.

Assets under management

Assets managed by a financial institution and that are beneficially owned by clients. Management services are more comprehensive than administrative services and include selecting investments or offering investment advice. Assets under management, which may also be administered by the financial institution, are not reported on the balance sheet of the institution offering such services.

Available TLAC

Available TLAC includes total capital as well as certain senior unsecured debt subject to the federal government's bail-in regulations that satisfy all of the eligibility criteria in OSFI's *Total Loss Absorbing Capacity (TLAC) Guideline*.

Average interest-bearing assets

Average interest-bearing assets include interest-bearing deposits with financial institutions and certain cash items, securities, securities purchased under reverse repurchase agreements and securities borrowed, and loans, while excluding customers' liability under acceptances and other assets. The average is calculated based on the daily balances for the period.

Average interest-bearing assets, non-trading

Average interest-bearing assets, non-trading, include interest-bearing deposits with financial institutions and certain cash items, securities purchased under reverse repurchase agreements and securities borrowed, and loans, while excluding other assets and assets related to trading activities. The average is calculated based on the daily balances for the period.

Average volumes

Average volumes represent the average of the daily balances for the period of the consolidated balance sheet items.

Basic earnings per share

Basic earnings per share is calculated by dividing net income attributable to common shareholders by the weighted average basic number of common shares outstanding.

Basis point (bps)

Unit of measure equal to one one-hundredth of a percentage point (0.01%).

Book value of a common share

The book value of a common share is calculated by dividing common shareholders' equity by the number of common shares on a given date.

Common Equity Tier 1 (CET1) capital ratio

Common Equity CET1 capital consists of common shareholders' equity less goodwill, intangible assets, and other capital deductions. The CET1 capital ratio is calculated by dividing total CET1 capital by the corresponding risk-weighted assets.

Compound annual growth rate (CAGR)

CAGR is a rate of growth that shows, for a period exceeding one year, the annual change as though the growth had been constant throughout the period.

Derivative financial instruments

Derivative financial instruments are financial contracts whose value is derived from an underlying interest rate, exchange rate or equity, commodity or credit instrument or index. Examples of derivatives include swaps, options, forward rate agreements, and futures. The notional amount of the derivative is the contract amount used as a reference point to calculate the payments to be exchanged between the two parties, and the notional amount itself is generally not exchanged by the parties.

Diluted earnings per share

Diluted earnings per share is calculated by dividing net income attributable to common shareholders by the weighted average number of common shares outstanding after taking into account the dilution effect of stock options using the treasury stock method and any gain (loss) on the redemption of preferred shares.

Dividend payout ratio

The dividend payout ratio represents the dividends of common shares (per share amount) expressed as a percentage of basic earnings per share.

Economic capital

Economic capital is the internal measure used by the Bank to determine the capital required for its solvency and to pursue its business operations. Economic capital takes into consideration the credit, market, operational, business and other risks to which the Bank is exposed as well as the risk diversification effect among them and among the business segments. Economic capital thus helps the Bank to determine the capital required to protect itself against such risks and ensure its long-term viability.

Efficiency ratio

The efficiency ratio represents non-interest expenses expressed as a percentage of total revenues. It measures the efficiency of the Bank's operations.

Fair value

The fair value of a financial instrument is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction in the principal market at the measurement date under current market conditions (i.e., an exit price).

Gross impaired loans as a percentage of total loans and acceptances

This measure represents gross impaired loans expressed as a percentage of the balance of loans and acceptances.

Gross impaired loans excluding POCI loans

Gross impaired loans excluding POCI loans are all loans classified in Stage 3 of the expected credit loss model excluding POCI loans.

Gross impaired loans excluding POCI loans as a percentage of total loans and acceptances

This measure represents gross impaired loans excluding POCI loans expressed as a percentage of the balance of loans and acceptances.

Hedging

The purpose of a hedging transaction is to modify the Bank's exposure to one or more risks by creating an offset between changes in the fair value of, or the cash flows attributable to, the hedged item and the hedging instrument.

Impaired Loans

The Bank considers a financial asset, other than a credit card receivable, to be credit-impaired when one or more events that have a detrimental impact on the estimated future cash flows of the financial asset have occurred or when contractual payments are 90 days past due. Credit card receivables are considered credit-impaired and are fully written off at the earlier of the following dates: when a notice of bankruptcy is received, a settlement proposal is made, or contractual payments are 180 days past due.

Leverage ratio

The leverage ratio is calculated by dividing Tier 1 capital by total exposure. Total exposure is defined as the sum of on-balance-sheet assets (including derivative financial instruments exposures and securities financing transaction exposures) and off-balance-sheet items.

Liquidity coverage ratio (LCR)

The LCR is a measure designed to ensure that the Bank has sufficient high-quality liquid assets to cover net cash outflows given a severe, 30-day liquidity crisis.

Loans and acceptances

Loans and acceptances represent the sum of loans and of the customers' liability under acceptances.

Loan-to-value ratio

The loan-to-value ratio is calculated according to the total facility amount for residential mortgages and home equity lines of credit divided by the value of the related residential property.

Master netting agreement

Legal agreement between two parties that have multiple derivative contracts with each other that provides for the net settlement of all contracts through a single payment, in the event of default, insolvency or bankruptcy.

Net impaired loans

Net impaired loans are gross impaired loans presented net of allowances for credit losses on Stage 3 loan amounts drawn.

Net impaired loans as a percentage of total loans and acceptances

This measure represents net impaired loans as a percentage of the balance of loans and acceptances.

Net impaired loans excluding POCI loans

Net impaired loans excluding POCI loans are gross impaired loans excluding POCI loans presented net of allowances for credit losses on amounts drawn on Stage 3 loans granted by the Bank.

Net interest income from trading activities

Net interest income from trading activities comprises dividends related to financial assets and liabilities associated with trading activities, net of interest expenses and interest income related to the financing of these financial assets and liabilities.

Net interest income, non-trading

Net interest income, non-trading, comprises revenues related to financial assets and liabilities associated with non-trading activities, net of interest expenses and interest income related to the financing of these financial assets and liabilities.

Net interest margin

Net interest margin is calculated by dividing net interest income by average interest-bearing assets.

Net stable funding ratio (NSFR)

The NSFR ratio is a measure that helps guarantee that a bank is maintaining a stable funding profile to reduce the risk of funding stress.

Net write-offs as a percentage of average loans and acceptances

This measure represents the net write-offs (net of recoveries) expressed as a percentage of average loans and acceptances.

Non-interest income related to trading activities

Non-interest income related to trading activities consists of realized and unrealized gains and losses as well as interest income on securities measured at fair value through profit or loss, income from held-for-trading derivative financial instruments, changes in the fair value of loans at fair value through profit or loss, changes in the fair value of financial instruments designated at fair value through profit or loss, certain commission income, other trading activity revenues, and any applicable transaction costs.

Office of the Superintendent of Financial Institutions (Canada) (OSFI)

The mandate of OSFI is to regulate and supervise financial institutions and private pension plans subject to federal oversight, to help minimize undue losses to depositors and policyholders and, thereby, to contribute to public confidence in the Canadian financial system.

Operating leverage

Operating leverage is the difference between the growth rate for total revenues and the growth rate for non-interest expenses.

Provisioning rate

This measure represents the allowances for credit losses on impaired loans expressed as a percentage of gross impaired loans.

Provisioning rate excluding POCI loans

This measure represents the allowances for credit losses on impaired loans excluding POCI loans expressed as a percentage of gross impaired loans excluding POCI loans.

Provisions for credit losses

Amount charged to income necessary to bring the allowances for credit losses to a level deemed appropriate by management and is comprised of provisions for credit losses on impaired and non-impaired financial assets.

Provisions for credit losses as a percentage of average loans and acceptances

This measure represents the provisions for credit losses expressed as a percentage of average loans and acceptances.

Provisions for credit losses on impaired loans excluding POCI loans as a percentage of average loans and acceptances or provisions for credit losses on impaired loans excluding POCI loans ratio

This measure represents the provisions for credit losses on impaired loans excluding POCI loans expressed as a percentage of average loans and acceptances.

Provisions for credit losses on impaired loans as a percentage of average loans and acceptances

This measure represents the provisions for credit losses on impaired loans expressed as a percentage of average loans and acceptances.

Return on average assets

Return on average assets represents net income expressed as a percentage of average assets.

Return on common shareholders' equity (ROE)

ROE represents net income attributable to common shareholders expressed as a percentage of average equity attributable to common shareholders. It is a general measure of the Bank's efficiency in using equity.

Risk-weighted assets

Assets are risk weighted according to the guidelines established by the Office of the Superintendent of Financial Institutions (Canada). In the Standardized calculation approach, risk factors are applied to the face value of certain assets in order to reflect comparable risk levels. In the Advanced Internal Ratings-Based (AIRB) Approach, risk-weighted assets are derived from the Bank's internal models, which represent the Bank's own assessment of the risks it incurs. Off-balance-sheet instruments are converted to balance sheet (or credit) equivalents by adjusting the notional values before applying the appropriate risk-weighting factors.

Securities purchased under reverse repurchase agreements

Securities purchased by the Bank from a client pursuant to an agreement under which the securities will be resold to the same client on a specified date and at a specified price. Such an agreement is a form of short-term collateralized lending.

Securities sold under repurchase agreements

Financial obligations related to securities sold pursuant to an agreement under which the securities will be repurchased on a specified date and at a specified price. Such an agreement is a form of short-term funding.

Stressed VaR (SVaR)

SVaR is a statistical measure of risk that replicates the VaR calculation method but uses, instead of a two-year history of risk factor changes, a 12-month data period corresponding to a continuous period of significant financial stress that is relevant in terms of the Bank's portfolios.

Structured entity

A structured entity is an entity created to accomplish a narrow and well-defined objective and is designed so that voting or similar rights are not the dominant factor in deciding who controls the entity, such as when any voting rights relate solely to administrative tasks and the relevant activities are directed by means of contractual arrangements.

Taxable equivalent

Taxable equivalent basis is a calculation method that consists in grossing up certain tax-exempt income (particularly dividends) by the amount of income tax that would have otherwise been payable. The Bank uses the taxable equivalent basis to calculate net interest income, non-interest income and income taxes.

Tier 1 capital ratio

Tier 1 capital ratio consists of Common Equity Tier 1 capital and Additional Tier 1 instruments, namely, qualifying non-cumulative preferred shares and the eligible amount of innovative instruments. Tier 1 capital ratio is calculated by dividing Tier 1 capital, less regulatory adjustments, by the corresponding risk-weighted assets.

TLAC leverage ratio

The TLAC leverage ratio is an independent risk measure that is calculated by dividing available TLAC by total exposure, as set out in OSFI's *Total Loss Absorbing Capacity (TLAC) Guideline*.

TLAC ratio

The TLAC ratio is a measure used to assess whether a non-viable Domestic Systemically Important Bank (D-SIB) has sufficient loss-absorbing capacity to support its recapitalization. It is calculated by dividing available TLAC by risk weighted assets, as set out in OSFI's *Total Loss Absorbing Capacity (TLAC) Guideline*.

Total capital ratio

Total capital is the sum of Tier 1 and Tier 2 capital. Tier 2 capital consists of the eligible portion of subordinated debt and certain allowances for credit losses. The Total capital ratio is calculated by dividing total capital, less regulatory adjustments, by the corresponding risk-weighted assets.

Total shareholder return (TSR)

TSR represents the average total return on an investment in the Bank's common shares. The return includes changes in share price and assumes that the dividends received were reinvested in additional common shares of the Bank.

Trading activity revenues

Trading activity revenues consist of the net interest income and the non-interest income related to trading activities. Net interest income comprises dividends related to financial assets and liabilities associated with trading activities, net of interest expenses and interest income related to the financing of these financial assets and liabilities. Non-interest income consists of realized and unrealized gains and losses as well as interest income on securities measured at fair value through profit or loss, income from held-for-trading derivative financial instruments, changes in the fair value of loans at fair value through profit or loss, changes in the fair value of financial instruments designated at fair value through profit or loss, certain commission income, other trading activity revenues, and any applicable transaction costs.

Value-at-Risk (VaR)

VaR is a statistical measure of risk that is used to quantify market risks across products, per types of risks, and aggregate risk on a portfolio basis. VaR is defined as the maximum loss at a specific confidence level over a certain horizon under normal market conditions. The VaR method has the advantage of providing a uniform measurement of financial-instrument-related market risks based on a single statistical confidence level and time horizon.