Note 8: Derivative Instruments

Derivative instruments are financial contracts that derive their value from underlying changes in interest rates, foreign exchange rates or other financial or commodity prices or indices.

Derivative instruments are either regulated exchange-traded contracts or negotiated over-the-counter contracts. We use these instruments for trading purposes, as well as to manage our exposures, mainly to foreign currency and interest rate fluctuations, as part of our asset/liability management program.

Types of Derivatives

Swaps

Swaps are contractual agreements between two parties to exchange a series of cash flows. The various swap agreements that we enter into are as follows:

- Interest rate swaps – counterparties generally exchange fixed and floating rate interest payments based on the notional value in a single currency.
- Cross-currency swaps – fixed rate interest payments and principal amounts are exchanged in different currencies.
- Cross-currency interest rate swaps – fixed and/or floating rate interest payments and principal amounts are exchanged in different currencies.
- Commodity swaps – counterparties generally exchange fixed and floating rate payments based on a notional value of a single commodity.
- Equity swaps – counterparties exchange the return on an equity security or a group of equity securities for a return based on a fixed or floating interest rate or the return on another equity security or group of equity securities.
- Credit default swaps – one counterparty pays the other a fee in exchange for that other counterparty agreeing to make a payment if a credit event occurs, such as bankruptcy or failure to pay.
- Total return swaps – one counterparty agrees to pay or receive from the other cash amounts based on changes in the value of a reference asset or group of assets, including any returns such as interest earned on these assets, in exchange for amounts that are based on prevailing market funding rates.

Forwards and Futures

Forwards and futures are contractual agreements to either buy or sell a specified amount of a currency, commodity, interest-rate-sensitive financial instrument or security at a specified price and date in the future.

Forwards are customized contracts transacted in the over-the-counter market. Futures are transacted in standardized amounts on regulated exchanges and are subject to daily cash margining.

Options

Options are contractual agreements that convey to the purchaser the right but not the obligation to either buy or sell a specified amount of a currency, commodity, interest-rate-sensitive financial instrument or security at a fixed future date or at any time within a fixed future period.

For options written by us, we receive a premium from the purchaser for accepting market risk.

For options purchased by us, we pay a premium for the right to exercise the option. Since we have no obligation to exercise the option, our primary exposure to risk is the potential credit risk if the writer of an over-the-counter contract fails to meet the terms of the contract.

Caps, collars and floors are specialized types of written and purchased options. They are contractual agreements in which the writer agrees to pay the purchaser, based on a specified notional amount, the difference between the market rate and the prescribed rate of the cap, collar or floor. The writer receives a premium for selling this instrument.

A swaption is an option that conveys to the purchaser the right but not the obligation to enter into an underlying swap.

A future option is an option contract in which the underlying instrument is a single futures contract.

The main risks associated with these derivative instruments are related to exposure to movements in interest rates, foreign exchange rates, credit quality, value of the underlying financial instrument or commodity, as applicable, and the possible inability of counterparties to meet the terms of the contracts.

Risks Hedged

Interest Rate Risk

We manage interest rate risk through bonds, interest rate futures, interest rate swaps and options, which are linked to and adjust the interest rate sensitivity of a specific asset, liability, forecasted transaction or firm commitment, or a specific pool of transactions with similar risk characteristics.

Foreign Currency Risk

We manage foreign currency risk through currency futures, foreign currency options, cross-currency swaps, spot foreign exchange and forward contracts.

Trading Derivatives

Trading derivatives include derivatives entered into with customers to accommodate their risk management needs, market-making to facilitate customer-driven demand for derivatives, derivatives transacted on a limited basis to generate trading income from our principal trading positions and certain derivatives that are executed as part of our risk management strategy that do not qualify as hedges for accounting purposes ("economic hedges").

We structure and market derivative products to enable customers to transfer, modify or reduce current or expected risks.

Principal trading activities include market-making and positioning activities. Market-making involves quoting bid and offer prices to other market participants with the intention of generating revenues based on spread and volume. Positioning activities involve managing market risk positions with the expectation of profiting from favourable movements in prices, rates or indices.

Trading derivatives are recorded at fair value. Realized and unrealized gains and losses are recorded in trading revenues in our Consolidated Statement of Income. Unrealized gains on trading derivatives are recorded as derivative instrument assets and unrealized losses are recorded as derivative instrument liabilities in our Consolidated Balance Sheet.

We may also economically hedge a portion of our U.S. dollar earnings through forward foreign exchange contracts and/or options to minimize fluctuations in our consolidated net income due to the translation of our U.S. dollar earnings. These contracts are recorded at fair value, with changes in fair value recorded in non-interest revenue, trading revenues, in our Consolidated Statement of Income.

Hedging Derivatives

In accordance with our risk management strategy, we enter into various derivative contracts to hedge our interest rate and foreign currency exposures. To the extent these derivative instruments qualify for hedge accounting requirements, we designate them in accounting hedge relationships.

In order for a derivative instrument to qualify as an accounting hedge, the hedging relationship must be designated and formally documented at its inception, detailing the particular risk management objective and strategy for the hedge and the specific asset, liability or cash flow being hedged, as well as how its effectiveness is being assessed. Changes in the fair value of the derivative must be highly effective in offsetting changes either in the fair value or changes in the amount of future cash flows of the hedged item.

Hedge effectiveness is evaluated at the inception of the hedging relationship and on an ongoing basis, retrospectively and prospectively, primarily using quantitative statistical measures of correlation. Any ineffectiveness in the hedging relationship is recognized as it arises in non-interest revenue, other, in our Consolidated Statement of Income.

Cash Flow Hedges

Cash flow hedges modify exposure to variability in cash flows for variable interest rate bearing instruments, foreign currency denominated assets and liabilities and certain cash-settled share-based payment grants subject to equity price risk. Variable interest rate bearing instruments include floating rate loans and deposits. Our cash flow hedges have a maximum remaining term to maturity of 18 years.

We record interest that we pay or receive on these cash flow hedge derivatives as an adjustment to net interest income in our Consolidated Statement of Income over the life of the hedge.

To the extent that changes in the fair value of the derivative offset changes in the fair value of the hedged item, they are recorded in other comprehensive income. The excess of the change in fair value of the derivative that does not offset changes in the fair value of the hedged item is recorded directly in non-interest revenue, other, in our Consolidated Statement of Income.

For cash flow hedges that are discontinued before the end of the original hedge term, the cumulative unrealized gain or loss recorded in other comprehensive income is amortized to our Consolidated Statement of Income in net interest income for interest rate swaps and in employee compensation for total return swaps as the hedged item is recorded in earnings. If the hedged item is sold or settled, the entire unrealized gain or loss is recognized immediately in net interest income in our Consolidated Statement of Income.

The amount of unrealized gains that we expect to reclassify to our Consolidated Statement of Income over the next 12 months is $84 million ($62 million after tax). This will adjust the interest income and interest expense recorded on assets and liabilities and employee compensation expense that were hedged.

The following table presents the impact of cash flow hedges on our financial results:

(Canadian $ in millions)

Contract type	Fair value gains (losses) recorded in other comprehensive income	Pre-tax gains (losses) recorded in income: Fair value change recorded in non-interest revenue – other	Pre-tax gains (losses) recorded in income: Reclassification of gains on designated hedges from other comprehensive income to net income
2017			
Interest rate	**(1,158)**	**(7)**	**124**
Foreign exchange (1)	**(100)**	**–**	**na**
Share-based payment awards	**97**	**–**	**64**
Total	**(1,161)**	**(7)**	**188**
2016			
Interest rate	39	(4)	127
Foreign exchange (1)	(124)	(2)	na
Share-based payment awards	63	–	18
Total	(22)	(6)	145
2015			
Interest rate	697	2	119
Foreign exchange (1)	33	1	na
Share-based payment awards	(14)	–	(8)
Total	716	3	111

(1) Amortization of spot forward differential on foreign exchange contracts of $270 million loss for the year ended October 31, 2017 ($161 million loss in 2016 and $40 million loss in 2015) was transferred from other comprehensive income to interest expense in our Consolidated Statement of Income.

na – not applicable

Fair Value Hedges

Fair value hedges modify exposure to changes in a fixed rate instrument's fair value caused by changes in interest rates. These hedges economically convert fixed rate assets and liabilities to floating rate. Our fair value hedges include hedges of fixed rate securities, loans, deposits, subordinated debt and other liabilities.

We record interest receivable or payable on these derivatives as an adjustment to net interest income in our Consolidated Statement of Income over the life of the hedge.

For fair value hedges, the hedging derivative is recorded at fair value and any fixed rate assets and liabilities that are part of a hedging relationship are adjusted for the changes in value of the risk being hedged. To the extent that a change in the fair value of the derivative does not offset changes in the fair value of the hedged item, the net amount is recorded directly in non-interest revenue, other, in our Consolidated Statement of Income.

For fair value hedges that are discontinued, we cease adjusting the hedged item to fair value. The cumulative fair value adjustment of the hedged item is then amortized to net interest income over its remaining term to maturity. If the hedged item is sold or settled, the cumulative fair value adjustment is included in the determination of the gain or loss on sale or settlement.

The following table presents the impact of fair value hedges on our financial results.

(Canadian $ in millions) — Pre-tax gains (losses) recorded in income

Contract type	Amount of gain (loss) on hedging derivatives (1)	Fair value hedge adjustment (2)	Hedge ineffectiveness recorded in non-interest revenue – other
Interest rate contracts – **2017**	**(200)**	**193**	**(7)**
2016	(77)	72	(5)
2015	225	(219)	6

(1) Unrealized gains (losses) on hedging derivatives are recorded in Other assets, derivative instruments or Other liabilities, derivative instruments, in the Consolidated Balance Sheet.

(2) Unrealized gains (losses) on hedged items are recorded in Securities, available-for-sale, Subordinated debt, Deposits and Other liabilities.

Net Investment Hedges

Net investment hedges mitigate our exposure to foreign currency exchange rate fluctuations related to our net investment in foreign operations. Deposit liabilities denominated in foreign currencies are designated as hedges for a portion of this exposure. The foreign currency translation of our net investment in foreign operations and the corresponding hedging instrument is recorded in unrealized gains (losses) on translation of net foreign operations in other comprehensive income. To the extent that the hedging instrument is not effective, amounts are included in the Consolidated Statement of Income in foreign exchange, other than trading. There was no hedge ineffectiveness associated with net investment hedges for the years ended October 31, 2017, 2016 and 2015. We use foreign currency deposits with a term to maturity of zero to six months as hedging instruments in net investment hedges, and the fair value of such deposits was $5,629 million as at October 31, 2017 ($4,795 million in 2016).

Embedded Derivatives

From time to time, we purchase or issue financial instruments containing embedded derivatives. The embedded derivative is separated from the host contract and carried at fair value if the economic characteristics of the derivative are not closely related to those of the host contract, the terms of the embedded derivative are the same as those of a stand-alone derivative, and the combined contract is not held for trading or designated at fair value. To the extent that we cannot reliably identify and measure the embedded derivative, the entire contract is carried at fair value, with changes in fair value reflected in income. Embedded derivatives in certain of our equity linked notes are accounted for separately from the host instrument.

Contingent Features

Certain over-the-counter derivative instruments contain provisions that link the amount of collateral we are required to post or pay to our credit ratings (as determined by the major credit rating agencies). If our credit ratings were to be downgraded, certain counterparties to these derivative instruments could demand immediate and ongoing collateralization on derivative liability positions or request immediate payment. The aggregate fair value of all derivative instruments with collateral posting requirements that were in a liability position on October 31, 2017 was $6,006 million ($7,495 million in 2016), for which we have posted collateral of $4,223 million ($7,529 million in 2016). If our credit rating had been downgraded to A or A- on October 31, 2017 (per Standard & Poor's Ratings Services), we would have been required to post collateral or meet payment demands of an additional $100 million or $484 million, respectively ($841 million or $984 million, respectively, in 2016).

Fair Value

Fair value represents point-in-time estimates that may change in subsequent reporting periods due to market conditions or other factors. A discussion of the fair value measurement of derivatives is included in Note 17.

Fair values of our derivative instruments are as follows:

(Canadian $ in millions)			2017			2016
	Gross assets	**Gross liabilities**	**Net**	Gross assets	Gross liabilities	Net
Trading						
Interest Rate Contracts						
Swaps	**8,390**	**(7,027)**	**1,363**	16,678	(15,047)	1,631
Forward rate agreements	**41**	**–**	**41**	61	(2)	59
Futures	**–**	**–**	**–**	1	–	1
Purchased options	**444**	**–**	**444**	555	–	555
Written options	**–**	**(329)**	**(329)**	–	(552)	(552)
Foreign Exchange Contracts						
Cross-currency swaps	**2,687**	**(1,752)**	**935**	3,962	(3,026)	936
Cross-currency interest rate swaps	**8,103**	**(9,051)**	**(948)**	9,052	(10,996)	(1,944)
Forward foreign exchange contracts	**4,954**	**(3,178)**	**1,776**	4,905	(2,468)	2,437
Purchased options	**267**	**–**	**267**	411	–	411
Written options	**–**	**(270)**	**(270)**	–	(450)	(450)
Commodity Contracts						
Swaps	**726**	**(717)**	**9**	723	(647)	76
Purchased options	**352**	**–**	**352**	496	–	496
Written options	**–**	**(357)**	**(357)**	–	(524)	(524)
Equity Contracts	**1,388**	**(3,386)**	**(1,998)**	901	(2,388)	(1,487)
Credit Default Swaps						
Purchased	**–**	**(54)**	**(54)**	15	(31)	(16)
Written	**7**	**(1)**	**6**	8	(1)	7
Total fair value – trading derivatives	**27,359**	**(26,122)**	**1,237**	37,768	(36,132)	1,636
Hedging						
Interest Rate Contracts						
Cash flow hedges – swaps	**78**	**(558)**	**(480)**	442	(100)	342
Fair value hedges – swaps	**274**	**(402)**	**(128)**	327	(453)	(126)
Total swaps	**352**	**(960)**	**(608)**	769	(553)	216
Foreign Exchange Contracts						
Cash flow hedges	**1,202**	**(722)**	**480**	646	(1,539)	(893)
Total foreign exchange contracts	**1,202**	**(722)**	**480**	646	(1,539)	(893)
Equity Contracts						
Cash flow hedges	**38**	**–**	**38**	–	(3)	(3)
Total equity contracts	**38**	**–**	**38**	–	(3)	(3)
Total fair value – hedging derivatives (1)	**1,592**	**(1,682)**	**(90)**	1,415	(2,095)	(680)
Total fair value – trading and hedging derivatives	**28,951**	**(27,804)**	**1,147**	39,183	(38,227)	956
Less: impact of master netting agreements	**(19,909)**	**19,909**	**–**	(27,538)	27,538	–
Total	**9,042**	**(7,895)**	**1,147**	11,645	(10,689)	956

(1) The fair values of hedging derivatives wholly or partially offset the changes in fair values of the related on-balance sheet financial instruments or future cash flows.

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

Assets are shown net of liabilities to customers where we have a legally enforceable right to offset amounts and we intend to settle contracts on a net basis.

Notional Amounts

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

(Canadian $ in millions)				2017				2016
		Hedging				Hedging		
	Trading	Cash flow	Fair value	Total	Trading	Cash flow	Fair value	Total
Interest Rate Contracts								
Over-the-counter								
Swaps	**3,073,490**	**61,730**	**67,145**	**3,202,365**	2,596,259	60,793	69,649	2,726,701
Forward rate agreements	**195,142**	**–**	**–**	**195,142**	430,507	–	–	430,507
Purchased options	**29,107**	**–**	**–**	**29,107**	29,508	–	–	29,508
Written options	**37,247**	**–**	**–**	**37,247**	43,921	–	–	43,921
	3,334,986	**61,730**	**67,145**	**3,463,861**	3,100,195	60,793	69,649	3,230,637
Exchange-traded								
Futures	**89,053**	**–**	**–**	**89,053**	133,864	–	–	133,864
Purchased options	**10,407**	**–**	**–**	**10,407**	30,849	–	–	30,849
Written options	**9,284**	**–**	**–**	**9,284**	30,821	–	–	30,821
	108,744	**–**	**–**	**108,744**	195,534	–	–	195,534
Total interest rate contracts	**3,443,730**	**61,730**	**67,145**	**3,572,605**	3,295,729	60,793	69,649	3,426,171
Foreign Exchange Contracts								
Over-the-counter								
Cross-currency swaps	**50,534**	**35,052**	**–**	**85,586**	58,488	30,866	–	89,354
Cross-currency interest rate swaps	**430,808**	**3,402**	**–**	**434,210**	382,525	141	–	382,666
Forward foreign exchange contracts	**392,924**	**9,784**	**–**	**402,708**	397,272	11,917	–	409,189
Purchased options	**23,812**	**–**	**–**	**23,812**	29,876	–	–	29,876
Written options	**29,101**	**–**	**–**	**29,101**	30,405	–	–	30,405
	927,179	**48,238**	**–**	**975,417**	898,566	42,924	–	941,490
Exchange-traded								
Futures	**794**	**–**	**–**	**794**	356	–	–	356
Purchased options	**6,001**	**–**	**–**	**6,001**	2,846	–	–	2,846
Written options	**1,249**	**–**	**–**	**1,249**	1,441	–	–	1,441
	8,044	**–**	**–**	**8,044**	4,643	–	–	4,643
Total foreign exchange contracts	**935,223**	**48,238**	**–**	**983,461**	903,209	42,924	–	946,133
Commodity Contracts								
Over-the-counter								
Swaps	**18,713**	**–**	**–**	**18,713**	13,603	–	–	13,603
Purchased options	**7,080**	**–**	**–**	**7,080**	6,828	–	–	6,828
Written options	**4,905**	**–**	**–**	**4,905**	4,672	–	–	4,672
	30,698	**–**	**–**	**30,698**	25,103	–	–	25,103
Exchange-traded								
Futures	**28,139**	**–**	**–**	**28,139**	24,232	–	–	24,232
Purchased options	**5,031**	**–**	**–**	**5,031**	6,048	–	–	6,048
Written options	**6,896**	**–**	**–**	**6,896**	8,159	–	–	8,159
	40,066	**–**	**–**	**40,066**	38,439	–	–	38,439
Total commodity contracts	**70,764**	**–**	**–**	**70,764**	63,542	–	–	63,542
Equity Contracts								
Over-the-counter	**63,184**	**344**	**–**	**63,528**	57,994	319	–	58,313
Exchange-traded	**14,253**	**–**	**–**	**14,253**	7,835	–	–	7,835
Total equity contracts	**77,437**	**344**	**–**	**77,781**	65,829	319	–	66,148
Credit Default Swaps								
Over-the-counter purchased	**2,658**	**–**	**–**	**2,658**	3,033	–	–	3,033
Over-the-counter written	**448**	**–**	**–**	**448**	981	–	–	981
Total credit default swaps	**3,106**	**–**	**–**	**3,106**	4,014	–	–	4,014
Total	**4,530,260**	**110,312**	**67,145**	**4,707,717**	4,332,323	104,036	69,649	4,506,008

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

Derivative-Related Market Risk

Derivative instruments are subject to market risk. Market risk arises from the potential for a negative impact on the balance sheet and/or statement of income due to adverse changes in the value of derivative instruments as a result of changes in certain market variables. These variables include interest rates, foreign exchange rates, equity and commodity prices and their implied volatilities, as well as credit spreads, credit migration and default. We strive to limit market risk by employing comprehensive governance and management processes for all market risk-taking activities.

Derivative-Related Credit Risk

Over-the-counter derivative instruments are subject to credit risk arising from the possibility that counterparties may default on their obligations. The credit risk associated with a derivative is normally a small fraction of the notional amount of the derivative instrument. Derivative contracts generally expose us to potential credit loss if changes in market rates affect a counterparty's position unfavourably and the counterparty defaults on payment. The credit risk is represented by the positive fair value of the derivative instrument. We strive to limit credit risk by dealing with counterparties that we believe are creditworthy, and we manage our credit risk for derivatives using the same credit risk process that is applied to loans and other credit assets.

We also pursue opportunities to reduce our exposure to credit losses on derivative instruments, including through collateral and by entering into master netting agreements with counterparties. The credit risk associated with favourable contracts is mitigated by legally enforceable master netting agreements to the extent that unfavourable contracts with the same counterparty must be settled concurrently with favourable contracts.

Exchange-traded derivatives have limited potential for credit exposure, as they are settled net daily with each exchange.

Terms used in the credit risk table below are as follows:

Replacement cost represents the cost of replacing all contracts that have a positive fair value, determined using current market rates. It represents in effect the unrealized gains on our derivative instruments. Replacement costs disclosed below represent the net of the asset and liability to a specific counterparty where we have a legally enforceable right to offset the amount owed to us with the amount owed by us and we intend either to settle on a net basis or to realize the asset and settle the liability simultaneously.

Credit risk equivalent represents the total replacement cost plus an amount representing the potential future credit exposure, as outlined in OSFI's Capital Adequacy Guideline.

Risk-weighted assets represent the credit risk equivalent, weighted on the basis of the creditworthiness of the counterparty, and considering collateral, netting and other credit risk mitigants, as prescribed by OSFI.

(Canadian $ in millions)			**2017**			2016
	Replacement cost	**Credit risk equivalent**	**Risk-weighted assets**	Replacement cost	Credit risk equivalent	Risk-weighted assets
Interest Rate Contracts						
Swaps	**8,742**	**11,603**	**–**	17,447	20,506	–
Forward rate agreements	**41**	**42**	**–**	61	61	–
Purchased options	**440**	**381**	**–**	551	589	–
Total interest rate contracts	**9,223**	**12,026**	**1,537**	18,059	21,156	1,345
Foreign Exchange Contracts						
Cross-currency swaps	**3,727**	**8,345**	**–**	4,351	8,959	–
Cross-currency interest rate swaps	**8,157**	**17,210**	**–**	9,054	17,386	–
Forward foreign exchange contracts	**5,062**	**8,389**	**–**	5,160	8,806	–
Purchased options	**250**	**420**	**–**	380	586	–
Total foreign exchange contracts	**17,196**	**34,364**	**2,701**	18,945	35,737	2,444
Commodity Contracts						
Swaps	**726**	**2,971**	**–**	723	2,389	–
Purchased options	**120**	**1,034**	**–**	91	1,135	–
Total commodity contracts	**846**	**4,005**	**971**	814	3,524	670
Equity Contracts	**1,322**	**4,750**	**461**	713	4,180	347
Credit Default Swaps	**7**	**46**	**27**	23	92	13
Total derivatives	**28,594**	**55,191**	**5,697**	38,554	64,689	4,819
Less: impact of master netting agreements	**(19,909)**	**(33,025)**	**–**	(27,538)	(42,248)	–
Total	**8,685**	**22,166**	**5,697**	11,016	22,441	4,819

The total derivatives and the impact of master netting agreements for replacement cost do not include exchange-traded derivatives with a fair value of $357 million as at October 31, 2017 ($629 million in 2016).

Transactions are conducted with counterparties in various geographic locations and industry sectors. Set out below is the replacement cost of contracts with customers located in the following countries, based on country of ultimate risk:

(Canadian $ in millions, except as noted)	Before master netting agreements				After master netting agreements			
	2017		2016		**2017**		2016	
Canada	**15,447**	**54**	20,472	53	**5,045**	**58**	6,196	56
United States	**7,149**	**25**	8,335	22	**1,940**	**22**	2,666	24
United Kingdom	**1,079**	**4**	3,274	8	**182**	**2**	600	6
Other countries (1)	**4,919**	**17**	6,473	17	**1,518**	**18**	1,554	14
Total	**28,594**	**100%**	38,554	100%	**8,685**	**100%**	11,016	100%

(1) No other country represented 15% or more of our replacement cost in 2017 or 2016.

Transactions are conducted with various counterparties. Set out below is the replacement cost of contracts (before the impact of master netting agreements) with customers in the following industries:

As at October 31, 2017 (Canadian $ in millions)	**Interest rate contracts**	**Foreign exchange contracts**	**Commodity contracts**	**Equity contracts**	**Credit default swaps**	**Total**
Financial institutions	**6,063**	**13,898**	**227**	**1,141**	**7**	**21,336**
Governments	**1,895**	**1,202**	**66**	**–**	**–**	**3,163**
Natural resources	**–**	**22**	**74**	**–**	**–**	**96**
Energy	**155**	**479**	**226**	**–**	**–**	**860**
Other	**1,110**	**1,595**	**253**	**181**	**–**	**3,139**
Total	**9,223**	**17,196**	**846**	**1,322**	**7**	**28,594**

As at October 31, 2016 (Canadian $ in millions)	Interest rate contracts	Foreign exchange contracts	Commodity contracts	Equity contracts	Credit default swaps	Total
Financial institutions	12,453	13,319	235	631	23	26,661
Governments	3,306	3,038	51	–	–	6,395
Natural resources	2	25	70	–	–	97
Energy	261	690	128	–	–	1,079
Other	2,037	1,873	330	82	–	4,322
Total	18,059	18,945	814	713	23	38,554

Term to Maturity

Our derivative contracts have varying maturity dates. The remaining contractual terms to maturity for the notional amounts of our derivative contracts are set out below:

(Canadian $ in millions)			**Term to maturity**			**2017**	2016
	Within 1 year	**1 to 3 years**	**3 to 5 years**	**5 to 10 years**	**Over 10 years**	**Total notional amounts**	Total notional amounts
Interest Rate Contracts							
Swaps	**1,033,126**	**583,698**	**1,055,300**	**491,160**	**39,081**	**3,202,365**	2,726,701
Forward rate agreements, futures and options	**310,472**	**44,979**	**8,110**	**6,544**	**135**	**370,240**	699,470
Total interest rate contracts	**1,343,598**	**628,677**	**1,063,410**	**497,704**	**39,216**	**3,572,605**	3,426,171
Foreign Exchange Contracts							
Cross-currency swaps	**5,098**	**34,290**	**23,893**	**20,096**	**2,209**	**85,586**	89,354
Cross-currency interest rate swaps	**118,739**	**146,025**	**83,859**	**71,488**	**14,099**	**434,210**	382,666
Forward foreign exchange contracts, futures and options	**454,697**	**7,649**	**1,069**	**190**	**60**	**463,665**	474,113
Total foreign exchange contracts	**578,534**	**187,964**	**108,821**	**91,774**	**16,368**	**983,461**	946,133
Commodity Contracts							
Swaps	**3,925**	**9,121**	**4,952**	**686**	**29**	**18,713**	13,603
Futures and options	**22,087**	**25,723**	**3,482**	**759**	**–**	**52,051**	49,939
Total commodity contracts	**26,012**	**34,844**	**8,434**	**1,445**	**29**	**70,764**	63,542
Equity Contracts	**66,579**	**6,307**	**2,638**	**785**	**1,472**	**77,781**	66,148
Credit Contracts	**567**	**871**	**1,040**	**351**	**277**	**3,106**	4,014
Total notional amount	**2,015,290**	**858,663**	**1,184,343**	**592,059**	**57,362**	**4,707,717**	4,506,008