

Manulife Financial Corporation Management's Discussion & Analysis

For the year ended December 31, 2016

Caution Regarding Forward-Looking Statements

From time to time, Manulife Financial Corporation (“MFC”) makes written and/or oral forward-looking statements, including in this document. In addition, our representatives may make forward-looking statements orally to analysts, investors, the media and others. All such statements are made pursuant to the “safe harbour” provisions of Canadian provincial securities laws and the U.S. Private Securities Litigation Reform Act of 1995.

The forward-looking statements in this document include, but are not limited to, statements with respect to core ROE expansion over the medium term and the drivers of such expansion, the contribution of recent major acquisitions and partnerships to annual core earnings over the medium term, the anticipated benefits and costs of the acquisition of Standard Life, and Manulife’s expected capital position under the new LICAT guideline and also relate to, among other things, our objectives, goals, strategies, intentions, plans, beliefs, expectations and estimates, and can generally be identified by the use of words such as “may”, “will”, “could”, “should”, “would”, “likely”, “suspect”, “outlook”, “expect”, “intend”, “estimate”, “anticipate”, “believe”, “plan”, “forecast”, “objective”, “seek”, “aim”, “continue”, “goal”, “restore”, “embark” and “endeavour” (or the negative thereof) and words and expressions of similar import, and include statements concerning possible or assumed future results. Although we believe that the expectations reflected in such forward-looking statements are reasonable, such statements involve risks and uncertainties, and undue reliance should not be placed on such statements and they should not be interpreted as confirming market or analysts’ expectations in any way.

Certain material factors or assumptions are applied in making forward-looking statements and actual results may differ materially from those expressed or implied in such statements. Important factors that could cause actual results to differ materially from expectations include but are not limited to: general business and economic conditions (including but not limited to the performance, volatility and correlation of equity markets, interest rates, credit and swap spreads, currency rates, investment losses and defaults, market liquidity and creditworthiness of guarantors, reinsurers and counterparties); changes in laws and regulations; changes in accounting standards applicable in any of the territories in which we operate; changes in regulatory capital requirements; our ability to execute strategic plans and changes to strategic plans; downgrades in our financial strength or credit ratings; our ability to maintain our reputation; impairments of goodwill or intangible assets or the establishment of provisions against future tax assets; the accuracy of estimates relating to morbidity, mortality and policyholder behaviour; the accuracy of other estimates used in applying accounting policies, actuarial methods and embedded value methods; our ability to implement effective hedging strategies and unforeseen consequences arising from such strategies; our ability to source appropriate assets to back our long-dated liabilities; level of competition and consolidation; our ability to market and distribute products through current and future distribution channels, including through our collaboration arrangements with Standard Life plc, bancassurance partnership with DBS Bank Ltd and distribution agreement with Standard Chartered; unforeseen liabilities or asset impairments arising from acquisitions and dispositions of businesses, including with respect to the acquisitions of Standard Life, New York Life’s Retirement Plan Services business and Standard Chartered’s MPF and Occupational and Retirement Schemes Ordinance (“ORSO”) businesses; the realization of losses arising from the sale of investments classified as available-for-sale; our liquidity, including the availability of financing to satisfy existing financial liabilities on expected maturity dates when required; obligations to pledge additional collateral; the availability of letters of credit to provide capital management flexibility; accuracy of information received from counterparties and the ability of counterparties to meet their obligations; the availability, affordability and adequacy of reinsurance; legal and regulatory proceedings, including tax audits, tax litigation or similar proceedings; our ability to adapt products and services to the changing market; our ability to attract and retain key executives, employees and agents; the appropriate use and interpretation of complex models or deficiencies in models used; political, legal, operational and other risks associated with our non-North American operations; acquisitions and our ability to complete acquisitions including the availability of equity and debt financing for this purpose; the failure to realize some or all of the expected benefits of the acquisitions of Standard Life, New York Life’s Retirement Plan Services business and Standard Chartered’s MPF and ORSO businesses; the disruption of or changes to key elements of the Company’s or public infrastructure systems; environmental concerns; our ability to protect our intellectual property and exposure to claims of infringement; and our inability to withdraw cash from subsidiaries.

Additional information about material risk factors that could cause actual results to differ materially from expectations and about material factors or assumptions applied in making forward-looking statements may be found in this document under “Risk Management”, “Risk Factors” and “Critical Accounting and Actuarial Policies” and in the “Risk Management” note to the consolidated financial statements as well as elsewhere in our filings with Canadian and U.S. securities regulators. The forward-looking statements in this document are, unless otherwise indicated, stated as of the date hereof and are presented for the purpose of assisting investors and others in understanding our financial position and results of operations, our future operations, as well as our objectives and strategic priorities, and may not be appropriate for other purposes. We do not undertake to update any forward-looking statements, except as required by law.

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Management's Discussion and Analysis

This Management's Discussion and Analysis ("MD&A") is current as of February 9, 2017.

Overview

Manulife Financial Corporation is a leading international financial services group that helps people achieve their dreams and aspirations by putting customers' needs first and providing the right advice and solutions. We operate as John Hancock in the United States and Manulife elsewhere. We provide financial advice, insurance, as well as wealth and asset management solutions for individuals, groups and institutions. At the end of 2016, we had approximately 35,000 employees, 70,000 agents, and thousands of distribution partners, serving more than 22 million customers. At the end of 2016, we had \$977 billion (US\$728 billion) in assets under management and administration, and in the previous 12 months we made almost \$26 billion in payments to our customers. Our principal operations are in Asia, Canada and the United States where we have served customers for more than 100 years. With our global headquarters in Toronto, Canada, we trade as 'MFC' on the Toronto, New York, and the Philippine stock exchanges and under '945' in Hong Kong.

In this document, the terms "Company", "Manulife", "we" and "our" mean Manulife Financial Corporation ("MFC") and its subsidiaries. The term "MLI" means The Manufacturers Life Insurance Company and its subsidiaries.

Manulife's net income attributed to shareholders was \$2.9 billion in 2016 compared with \$2.2 billion in 2015. Net income attributed to shareholders is comprised of core earnings¹ (consisting of items we believe reflect the underlying earnings capacity of the business), which amounted to \$4.0 billion in 2016 compared with \$3.4 billion in 2015, and items excluded from core earnings of \$1.1 billion of charges in 2016 compared with \$1.2 billion of charges in 2015.

While the overall impact of higher interest rates is highly positive over the long term for our Company, net income attributed to shareholders was negatively impacted by market movements in the fourth quarter of 2016. For the full year, net income attributed to shareholders was \$2.9 billion, an increase of 34% over the prior year. The increase in net income attributed to shareholders reflected growth in core earnings, and a turnaround in investment-related experience partially offset by an increase in charges related to the direct impact of markets.

Fully diluted earnings per common share was \$1.41 in 2016, compared with \$1.05 in 2015 and return on common shareholders' equity ("ROE") was 7.3% in 2016, compared with 5.8% for 2015. Fully diluted core earnings per common share¹ was \$1.96 in 2016 compared with \$1.68 in 2015 and core return on shareholders' equity ("core ROE")¹ was 10.1% in 2016 compared with 9.2% in 2015.

Manulife achieved particularly strong operating results in 2016, ending the year with \$4.0 billion in core earnings, an increase of 17% over the prior year; and achieving the target we set back in 2012. The increase in core earnings was driven by core investment gains of \$197 million (compared with nil in 2015), strong new business and in-force growth in Asia, and the release of tax and related provisions in the U.S. and Corporate and Other segments as a result of the closure of multiple tax years in the U.S., partially offset by higher equity hedging costs and higher interest expense due to recent debt issuances. The strengthening of the U.S. dollar and the Japanese Yen compared with the Canadian dollar also contributed \$149 million to the increase in core earnings. Core earnings in 2016 included net policyholder experience charges of \$162 million post-tax (\$276 million pre-tax) compared with charges of \$205 million post-tax (\$362 million pre-tax) in 2015.

Core earnings excludes the direct impact of changes in equity markets and interest rates and changes in actuarial methods and assumptions as well as a number of other items that are considered material and that we do not believe reflect the underlying earnings capacity of the business. Items excluded from core earnings are:

**For the years ended December 31,
(\$ millions)**

	2016	2015	2014
Investment-related experience outside of core earnings ⁽¹⁾	\$ -	\$ (530)	\$ 359
Direct impact of equity markets and interest rates and variable annuity guarantee liabilities ⁽²⁾	(484)	(93)	412
Changes in actuarial methods and assumptions ⁽³⁾	(453)	(451)	(198)
Integration and acquisition costs ⁽⁴⁾	(81)	(149)	-
Other items ⁽⁵⁾	(74)	(14)	40
Total	\$ (1,092)	\$ (1,237)	\$ 613

⁽¹⁾ In 2016, we generated investment-related experience gains of \$197 million which were included in core earnings in accordance with our definition of core earnings. The gains were driven by the favourable impact of fixed income reinvestment activities on the measurement of our policy liabilities and credit experience. While we reported lower returns on our alternative long-duration portfolio than expected in the valuation of our policy liabilities, we reported gains in the second half of the year that partially offset the charges reported in the first half of the year. The \$530 million charge reported in 2015 included a charge of \$876 million due to the sharp decline in oil and gas prices partially offset by a \$346 million gain related to higher than expected returns on other asset classes as well as fixed income reinvestment activities. In accordance with our definition of core earnings, we included \$197 million of investment-related experience gains in core earnings in 2016 and nil in 2015. (See "Performance and Non-GAAP Measures" below.)

⁽²⁾ The direct impact of equity markets and interest rates is relative to our policy liability valuation assumptions and includes changes to interest rate assumptions, as well as experience gains and losses on derivatives associated with our macro equity hedges. We also include gains and losses on the sale of available-for-sale ("AFS") debt securities as management may have the ability to partially offset the direct impacts of changes in interest rates reported in the liability segments. Additional information related to the \$484 million charge in 2016 is included in the "Analysis of Net Income" and the "Fourth Quarter Financial Highlights" below.

⁽³⁾ As noted in the Critical Accounting and Actuarial Policies section below, a comprehensive review of actuarial methods and assumptions is performed annually. In 2016 we strengthened our reserves to update morbidity, mortality, lapse, future premium and tax cash flow assumptions on our Long Term Care business and to proactively reduce our ultimate reinvestment rate assumptions ahead of an expected update by the Actuarial Standards Board in 2017, partially offset by reserve releases related to other updates including policyholder experience assumptions in our U.S. Variable Annuity business.

¹ This item is a non-GAAP measure. See "Performance and Non-GAAP Measures" below.

(4) The 2016 charge of \$81 million included costs to integrate businesses acquired from Standard Life plc, NYL and Standard Chartered. The 2015 charge of \$149 million included integration and acquisition costs of \$99 million for the Standard Life transaction and \$50 million for the NYL RPS acquisition and closed block reinsurance transaction ("Closed Block").

(5) The 2016 charge of \$74 million primarily relates to restructuring and impairment charges related to the discontinuance of new sales of our stand-alone individual long-term care product in the U.S., restructuring costs related to our Indonesia operations and the closure of our technology shared service centre in Malaysia. These items were partially offset by a gain with respect to one of the Company's pension plans. In addition, a gain related to the release of tax-related contingencies was largely offset by an update to tax timing assumptions related to the valuation of policy liabilities was included. The 2015 charge of \$14 million relates to the settlement cost from the buy-out of the U.K. pension plan and the recapture of a reinsurance treaty in Canada mostly offset by tax rate changes in Canada and Japan.

Insurance sales¹ were \$4.0 billion in 2016, an increase of 11%² compared with 2015. In 2016, we achieved record Asia insurance sales, which increased 27% compared with 2015, driven by broad-based sales growth across the region and strong sales through the bank channel, including the successful launch of our partnership with DBS Bank Ltd. ("DBS"). Canadian insurance sales declined 16% as 2015 included two exceptionally large group benefits sales. U.S. insurance sales declined 6% as a result of an industry trend to guaranteed products which we have intentionally de-emphasized.

Wealth and Asset Management ("WAM") net flows¹ were \$15.3 billion in 2016, compared with \$34.4 billion in 2015. 2016 marked the 7th year of consecutive positive quarterly net flows in our WAM businesses. The continued positive net flows in 2016 were driven by strong inflows in our institutional advisory business, and mutual funds businesses in Asia and Canada. This was partially offset by outflows in our North American pension and U.S. mutual fund businesses. U.S. mutual fund outflows were impacted by a challenging sales environment and the underperformance of a few key funds earlier in the year. Net flows were \$19.1 billion lower than in 2015, driven by outflows in U.S. mutual funds compared with strong prior year inflows and lower institutional sales.

WAM gross flows¹ were \$120.5 billion in 2016, an increase of 3% compared with 2015. Gross flows in the U.S. increased 5% to record levels, due to strong mid-market pension sales reflecting a full year of sales from the acquired New York Life business, partially offset by lower mutual fund sales. Gross flows in Canada increased 3%, driven by continued strong growth in mutual fund sales, partially offset by lower sales in the large case pension segment compared to our record year in 2015. In Asia, gross flows increased 26% driven by mutual fund sales, including money market, and new fund launches in mainland China. These were partially offset by lower institutional gross flows.

Other Wealth sales¹ were \$8.2 billion in 2016, an increase of 3% compared with 2015. In 2016, Other Wealth sales in Asia increased 14%, driven by new product launches and increased sales in the bank channel, which more than offset an 11% decline in Canada due to changes to our higher risk segregated fund products earlier this year.³

Assets under management and administration¹ ("AUMA") were \$977 billion as at December 31, 2016, an increase of 6% compared with December 31, 2015, driven by investment returns and continued positive customer inflows. Wealth and Asset Management AUMA increased 8% from December 31, 2015 to \$544 billion, driven by similar reasons.

The Minimum Continuing Capital and Surplus Requirements ("MCCSR") ratio for The Manufacturers Life Insurance Company ("MLI") was 230% as at December 31, 2016, compared with 223% at the end of 2015. The increase in the MCCSR ratio is primarily due to net capital issuances and net income, partially offset by an increase in required capital and the funding of MFC shareholder dividends.

MFC's financial leverage ratio was 29.5% at December 31, 2016 compared with 23.8% at the end of 2015. The increase is primarily related to net funding issuances in 2016 of \$4.3 billion which addressed higher regulatory capital requirements through issuances in several markets as we execute on our global funding diversification strategy.

The operating divisions delivered \$1.8 billion in **remittances⁴** to the Group in 2016, compared with \$2.2 billion in 2015. Robust remittances from our Canadian and U.S. subsidiaries were offset by net injections in Asian entities, as capital was needed largely to address the impact of lower interest rates on local capital requirements.

Strategic Direction

Our strategy is aligned with our Corporate Purpose – to help people achieve their dreams and aspirations, by putting customers' needs first and providing the right advice and solutions. Delivery of our strategy will provide exceptional experiences for our customers and sustainable, long-term growth for our shareholders. We have three key themes to our strategy:

- Developing more holistic and long-lasting customer relationships;
- Continuing to build and integrate our global wealth and asset management businesses; and
- Leveraging skills and experiences across our international operations.

We continue to see significant opportunities inside our Asia and global Wealth and Asset Management businesses. In Asia, new business value has grown at a rapid pace, helped by the exclusive partnerships we have signed with other financial institutions in the region. In addition, our Wealth and Asset Management businesses are strongly positioned to grow with sizeable scale, thanks to strong organic growth and a number of acquisitions.

¹ This item is a non-GAAP measure. See "Performance and Non-GAAP Measures" below.

² Growth (declines) in sales, gross flows, premiums and deposits and assets under management and administration are stated on a constant currency basis. Constant currency basis is a non-GAAP measure. See "Performance and Non-GAAP Measures" below.

³ The U.S. Division does not have any products for sale in this category.

⁴ Remittances are defined as the cash remitted or payable to the Group from operating subsidiaries and excess capital generated by stand-alone Canadian operations.

Technology is transforming our customers' lives and our industry and successfully investing in innovation is critical to our success. We use a shareholder value lens to view the investments we make and continue to focus on expense management initiatives to help fund investments. We have invested across the Company to re-engineer our business and dramatically improve the customer experience. Highlights include:

- Across Canada, the U.S. and parts of Asia, our life insurance offerings now include wearable devices to help our customers live healthier lives and save money;
- In Canada, we are using advanced, predictive analytics to simplify insurance underwriting and eliminate unnecessary medical testing;
- In the U.S., we have launched the first phase of our new digital buying platform and made our first foray into digital advice; and
- In mainland China, we are using the WeChat messaging platform to process claims, reducing processing time from more than one week to as little as one day.

Core ROE was 10.1% in 2016 and we expect core ROE to expand toward 13% or more over the medium term as we execute on our strategy and investment-related experience normalizes.¹ We expect the primary driver of core ROE expansion to be organic growth of our less capital intensive/higher ROE businesses, particularly our Asia and Wealth and Asset Management businesses, augmented by contributions from recent major acquisitions and by long-term strategic partnerships in Asia.

Financial Performance

As at and for the years ended December 31,
(\$ millions, unless otherwise stated)

	2016	2015	2014
Net income attributed to shareholders	\$ 2,929	\$ 2,191	\$ 3,501
Preferred share dividends	(133)	(116)	(126)
Common shareholders' net income	\$ 2,796	\$ 2,075	\$ 3,375
Reconciliation of core earnings to net income attributed to shareholders:			
Core earnings⁽¹⁾	\$ 4,021	\$ 3,428	\$ 2,888
Investment-related experience outside of core earnings	–	(530)	359
Core earnings and investment-related experience outside of core earnings	\$ 4,021	\$ 2,898	\$ 3,247
Other items to reconcile core earnings to net income attributed to shareholders:			
Direct impact of equity markets and interest rates and variable annuity guarantee liabilities	(484)	(93)	412
Changes in actuarial methods and assumptions	(453)	(451)	(198)
Integration and acquisition costs	(81)	(149)	–
Other items	(74)	(14)	40
Net income attributed to shareholders	\$ 2,929	\$ 2,191	\$ 3,501
Basic earnings per common share (\$)	\$ 1.42	\$ 1.06	\$ 1.82
Diluted earnings per common share (\$)	\$ 1.41	\$ 1.05	\$ 1.80
Diluted core earnings per common share (\$) ⁽¹⁾	\$ 1.96	\$ 1.68	\$ 1.48
Return on common shareholders' equity ("ROE") (%)	7.3%	5.8%	11.9%
Core ROE (%) ⁽¹⁾	10.1%	9.2%	9.8%
Sales ⁽¹⁾			
Insurance products	\$ 3,952	\$ 3,380	\$ 2,544
Wealth and Asset Management gross flows ⁽¹⁾	\$ 120,450	\$ 114,686	\$ 69,164
Wealth and Asset Management net flows ⁽¹⁾	\$ 15,265	\$ 34,387	\$ 18,335
Other Wealth products	\$ 8,159	\$ 7,494	\$ 3,866
Premiums and deposits ⁽¹⁾			
Insurance products	\$ 33,594	\$ 29,509	\$ 24,938
Wealth and Asset Management products	\$ 120,450	\$ 114,686	\$ 69,164
Other Wealth products	\$ 6,034	\$ 6,718	\$ 3,752
Corporate and Other	\$ 88	\$ 90	\$ 77
Assets under management and administration (\$ billions) ⁽¹⁾	\$ 977	\$ 935	\$ 691
Capital (\$ billions) ⁽¹⁾	\$ 50.2	\$ 49.9	\$ 39.6
MLI's MCCR ratio	230%	223%	248%

⁽¹⁾ This item is a non-GAAP measure. For a discussion of our use of non-GAAP measures, see "Performance and Non-GAAP Measures" below.

Analysis of Net Income

Manulife's full year 2016 net income attributed to shareholders was \$2.9 billion compared with \$2.2 billion for full year 2015. Net income attributed to shareholders is comprised of core earnings (consisting of items we believe reflect the underlying earnings capacity of the business), which amounted to \$4.0 billion in 2016 compared with \$3.4 billion in 2015, and items excluded from core earnings, which amounted to a net charge of \$1.1 billion in 2016 compared with a net charge of \$1.2 billion in 2015. The increase in net income attributed to shareholders reflected strong growth in core earnings, and a turnaround in investment-related experience partially offset by an increase in charges related to the direct impact of markets.

The increase in core earnings was driven by core investment gains of \$197 million (compared with nil in 2015), strong new business and in-force growth in Asia, and the release of tax and related provisions in the U.S. and Corporate and Other segments as a result of the closure of multiple tax years in the U.S., partially offset by higher equity hedging costs and higher interest expense due to recent

¹ See "Caution regarding forward-looking statements" above.

debt issuances. The strengthening of the U.S. dollar and the Japanese Yen compared with the Canadian dollar also contributed \$149 million to the increase in core earnings. Core earnings in 2016 included net policyholder experience charges of \$162 million post-tax (\$276 million pre-tax) compared with net charges of \$205 million post-tax (\$362 million pre-tax) in 2015.

We evaluate our divisions operating performance based on core earnings.

- Asia core earnings was \$1,495 million in 2016 compared with \$1,234 million in 2015. This represented a 15% increase after adjusting for costs arising from the expansion of our dynamic hedging program (there is a corresponding decrease in macro hedging costs in the Corporate and Other segment) and the impact of changes in foreign currency rates. The increase in core earnings was driven by solid growth from in-force business and continued strong growth in new business volumes, partially offset by less favourable policyholder experience and the impact of declining interest rates.
- Canada core earnings was \$1,384 million compared with \$1,252 million in 2015. The 11% increase was primarily due to improved policy holder experience, and higher fee income on the Company's wealth and asset management business due to higher asset levels.
- U.S. core earnings was \$1,615 million compared with \$1,466 million in 2015. This represented a 6% increase after adjusting for the impact of currency rates. The increase in core earnings was driven by a US\$52 million release of tax provision as a result of closing certain tax years and the improved policyholder experience in the second half of 2016 as a result of changes to long-term care assumptions (see below in "2016 Review of Actuarial Methods and Assumptions"). In addition, lower amortization of deferred acquisition costs on in-force variable annuity business were offset by the impact of lower insurance sales and lower fee income in WAM businesses due to fee compression in our pension business and changes in business mix.
- Corporate and Other core loss excluding the expected cost of macro hedges and core investment gains was \$409 million in 2016 compared with \$298 million in 2015. The unfavourable variance of \$111 million was due to higher interest expense on debt issuances and lower realized gains on available-for-sale equities, higher interest allocated to the divisions, and higher expenses in Corporate and Other and strategic investments in our Manulife Asset Management business, partially offset by the release of provisions and interest on uncertain tax positions in the U.S.
- The expected cost of macro hedges was \$261 million in 2016 compared with \$226 million in 2015, an increase of \$35 million. The charges were higher in the first half of 2016, and reduced in the second half related to actions to reduce equity risk.
- Investment-related experience in core earnings in 2016 of \$197 million reflected the favourable impact of fixed income reinvestment activities on the measurement of our policy liabilities and credit experience. While we reported lower returns on our alternative long-duration portfolio than expected in the valuation of our policy liabilities, we reported gains in the second half of 2016 that partially offset the charges reported in the first half of the year. Total investment-related experience in 2015 was a loss and therefore, in accordance with our definition of core earnings, we did not report any investment-related experience in core earnings in 2015. (See section "Performance and Non-GAAP Measures" below)

Items excluded from core earnings amounted to net charges of \$1.1 billion in 2016 and to \$1.2 billion in 2015. Additional information is included in the footnotes to the table in the "Overview" section above. Further information with respect to the direct impact of equity markets and interest rates is described below as well as in the "Fourth Quarter Financial Highlights" below.

For the years ended December 31, (\$ millions)	2016	2015	2014
Investment-related experience outside of core earnings	\$ –	\$ (530)	\$ 359
Direct impact of equity markets and interest rates and variable annuity guarantee liabilities	(484)	(93)	412
Changes in actuarial methods and assumptions	(453)	(451)	(198)
Integration and acquisition costs	(81)	(149)	–
Other items	(74)	(14)	40
Total	\$ (1,092)	\$ (1,237)	\$ 613

The net gain (loss) related to the direct impact of equity markets and interest rates and variable annuity guarantee liabilities in the table above is attributable to:

For the years ended December 31, (\$ millions)	2016⁽¹⁾	2015	2014
Direct impact of equity markets and variable annuity guarantee liabilities ⁽²⁾	\$ (364)	\$ (299)	\$ (182)
Fixed income reinvestment rates assumed in the valuation of policy liabilities ⁽³⁾	(335)	201	729
Sale of AFS bonds and derivative positions in the Corporate and Other segment	370	5	(40)
Risk reduction items ⁽⁴⁾	(155)	–	–
Other	–	–	(95)
Direct impact of equity markets and interest rates and variable annuity guarantee liabilities	\$ (484)	\$ (93)	\$ 412

⁽¹⁾ See "Fourth Quarter Financial Highlights" below for additional information with respect to 2016 net charges.

⁽²⁾ In 2016, the net charge of \$364 million included charges of \$205 million from gross equity exposure, \$120 million from macro hedge experience and \$39 million from dynamic hedging experience. As at December 31, 2016, the net notional value of shorted equity futures contracts in our macro hedge program was \$1.5 billion (2015 – \$5.6 billion).

⁽³⁾ The \$335 million charge in 2016 for fixed income reinvestment assumptions was largely driven by the decrease in corporate spreads which resulted in a decline in the reinvestment yields on future fixed income purchases assumed in the measurement of policy liabilities and a charge to net income attributed to shareholders. This was partially offset by falling swap spreads at the 30-year point, the point in the curve where we have a large number of our interest rate hedges. The fall in swap rates resulted in an increase in the fair value of our swaps and a gain to net income attributed to shareholders. The \$201 million gain 2015 was due to a decrease in swap spreads partially offset by a decrease in risk-free rates.

(4) The risk reduction actions in 2016 included selling equity investments supporting our products with guarantee features and increasing the amount of interest rate hedges. The sale of equity investments resulted in a decrease in our underlying earnings sensitivity before hedging and also reduced the amount of hedging instruments used in the macro hedging program.

The table below reconciles 2016, 2015 and 2014 net income attributed to shareholders to core earnings.

For the years ended December 31, (\$ millions)	2016	2015	2014
Core earnings⁽¹⁾			
Asia Division	\$ 1,495	\$ 1,234	\$ 1,008
Canadian Division	1,384	1,252	927
U.S. Division	1,615	1,466	1,383
Corporate and Other (excluding expected cost of macro hedges and core investment gains)	(409)	(298)	(446)
Expected cost of macro hedges ⁽²⁾	(261)	(226)	(184)
Investment-related experience in core earnings ⁽³⁾	197	–	200
Total core earnings	4,021	3,428	2,888
Investment-related experience outside of core earnings ⁽³⁾	–	(530)	359
Core earnings and investment-related experience outside of core earnings	4,021	2,898	3,247
Changes in actuarial methods and assumptions ⁽⁴⁾	(453)	(451)	(198)
Direct impact of equity markets and interest rates and variable annuity guarantee liabilities ^{(3),(5)} (see table below)	(484)	(93)	412
Integration and acquisition costs ⁽⁶⁾	(81)	(149)	–
Other items ⁽⁷⁾	(74)	(14)	40
Net income attributed to shareholders	\$ 2,929	\$ 2,191	\$ 3,501

(1) This item is a non-GAAP measure. See “Performance and Non-GAAP Measures” below.

(2) The 2016 net charge from macro equity hedges was \$381 million and consisted of a \$261 million charge related to the estimated expected cost of the macro equity hedges relative to our long-term valuation assumptions and a charge of \$120 million because actual markets outperformed our valuation assumptions (included in the direct impact of equity markets and interest rates and variable annuity guarantee liabilities above).

(3) As outlined under “Critical Accounting and Actuarial Policies” below, net insurance contract liabilities under International Financial Reporting Standards (“IFRS”) for Canadian insurers are determined using the Canadian Asset Liability Method (“CALM”). Under CALM, the measurement of policy liabilities includes estimates regarding future expected investment income on assets supporting the policies. Experience gains and losses are reported when current period activity differs from what was assumed in the policy liabilities at the beginning of the period. These gains and losses can relate to both the investment returns earned in the period, as well as to the change in our policy liabilities driven by the impact of current period investing activities on future expected investment income assumptions. Our definition of core earnings in 2016 and 2015 (see “Performance and Non-GAAP Measures”) includes up to \$400 million (2014 – up to \$200 million) of favourable investment-related experience reported in a single year.

(4) See “Critical Accounting and Actuarial Assumptions – Review of Actuarial Methods and Assumptions” below.

(5) The direct impact of equity markets and interest rates is relative to our policy liability valuation assumptions and includes changes to interest rate assumptions, as well as experience gains and losses on derivatives associated with our macro equity hedges. We also include gains and losses on the sale of available-for-sale (“AFS”) debt securities as management may have the ability to partially offset the direct impacts of changes in interest rates reported in the liability segments. See table above for components of this item. Additional information related to the \$484 million charge in 2016 is included in the “Fourth Quarter Financial Highlights” below.

(6) The 2016 charge of \$81 million included costs to integrate businesses acquired from Standard Life plc, NYL and Standard Chartered. The 2015 charge of \$149 million included integration and acquisition costs of \$99 million and \$50 million for the Standard Life transaction and NYL RPS acquisition and closed block reinsurance transaction (“Closed Block”), respectively.

(7) The 2016 charge of \$74 million primarily relates to restructuring and impairment charges related to the discontinuance of new sales of our stand-alone individual long-term care product in the U.S., restructuring costs related to our Indonesia operations and the closure of our technology shared service centre in Malaysia. These items were partially offset a gain with respect to one of the Company’s pension plans. In addition, a gain related to the release of tax-related contingencies was largely offset by an update to tax timing assumptions related to the valuation of policy liabilities was included.

Earnings per Common Share and Return on Common Shareholders’ Equity

Fully diluted earnings per common share for 2016 was \$1.41, compared with \$1.05 in 2015. Return on common shareholders’ equity for 2016 was 7.3%, compared with 5.8% for 2015.

Revenue

Revenues include (i) premiums received on life and health insurance policies and fixed annuity products, net of premiums ceded to reinsurers; (ii) investment income comprised of income earned on general fund assets, credit experience and realized gains and losses on assets held in the Corporate segment; (iii) fee and other income received for services provided; and (iv) realized and unrealized gains (losses) on assets supporting insurance and investment contract liabilities and on our macro hedging program. Premium equivalents from administrative services only (“ASO”), as well as deposits received by the Company on investment contracts such as segregated funds, mutual funds and managed funds are not included in revenue; however, the Company does receive fee income from these products, which is included in revenue. Fees generated from deposits and ASO premium and deposit equivalents are an important part of our business and as a result, revenue does not fully represent sales and other activity taking place during the respective periods. The premiums and deposits metric below includes these factors.

For 2016, revenue before realized and unrealized losses and premiums ceded under the Closed Block reinsurance transaction was \$52.2 billion compared with \$45.5 billion in 2015. The increase was driven by business growth as well as the impact of foreign exchange rates.

In 2016, the net realized and unrealized gains on assets supporting insurance and investment contract liabilities and on the macro hedging program were \$1.1 billion, primarily driven by gains from the general decrease in U.S. interest rates and higher equity markets, partially offset by net losses on derivatives, including the macro equity hedging program, primarily related to the losses on interest rate swaps and treasury locks. In 2015, the net realized and unrealized losses on assets supporting insurance and investment

contract liabilities and on the macro hedging program were \$3.1 billion, primarily driven by the rise in North American swap rates and interest rates, and partially offset by real estate revaluation gains, primarily in the U.S.

See "Impact of Fair Value Accounting" below.

Revenue

For the years ended December 31,
(\$ millions)

	2016	2015	2014
Gross premiums	\$ 36,659	\$ 32,020	\$ 25,156
Premiums ceded to reinsurers ⁽¹⁾	(9,027)	(8,095)	(7,343)
Net premiums excluding the impact of the Closed Block reinsurance transaction ⁽¹⁾	27,632	23,925	17,813
Investment income	13,390	11,465	10,744
Other revenue	11,181	10,098	8,739
Total revenue before items noted below	52,203	45,488	37,296
Realized and unrealized gains (losses) on assets supporting insurance and investment contract liabilities and on macro hedging program	1,134	(3,062)	17,092
Premiums ceded, net of ceded commissions and additional consideration relating to Closed Block reinsurance transaction ⁽¹⁾	–	(7,996)	–
Total revenue	\$ 53,337	\$ 34,430	\$ 54,388

⁽¹⁾ For the purpose of comparable period-over-period reporting, we exclude the \$7,996 million impact of the Closed Block reinsurance transaction, which is shown separately from premiums ceded to reinsurers, for the full year 2015. The net reinsurance premium was fully offset by an increase in the change in reinsurance assets in the Consolidated Statements of Income. For other periods, amounts in this subtotal equal the "net premiums" in the Consolidated Statements of Income.

Premiums and Deposits

Premiums and deposits¹ is an additional measure of our top line growth, as it includes all customer cash inflows. Premiums and deposits for insurance products were \$33.6 billion in 2016, up 10% compared with 2015 on a constant currency basis and excluding the impact of the Closed Block reinsurance transaction.

Premiums and deposits for Wealth and Asset Management products were \$120.5 billion in 2016, an increase of \$5.8 billion, or 3% on a constant currency basis over 2015. Premiums and deposits for Other Wealth products were \$6.0 billion in 2016, a decrease of \$0.7 billion, or 13% on a constant currency basis, from 2015.

Assets under Management and Administration ("AUMA")

AUMA¹ as at December 31, 2016 were a record for Manulife of \$977 billion, an increase of \$42 billion, or 6% on a constant currency basis, compared with December 31, 2015, driven by investment returns and continued positive customer inflows. The Wealth and Asset Management portion of AUMA as at December 31, 2016 was \$544 billion, an increase of \$34 billion, or 8% on a constant currency basis, compared with December 31, 2015, driven by similar reasons.

Assets under Management and Administration

As at December 31,
(\$ millions)

	2016	2015	2014
General fund	\$ 321,869	\$ 307,506	\$ 267,801
Segregated funds net assets ⁽¹⁾	315,177	313,249	256,532
Mutual funds, institutional advisory accounts and other ^{(1),(2)}	257,576	236,512	165,287
Total assets under management	894,622	857,267	689,620
Other assets under administration	82,433	77,909	1,509
Total assets under management and administration	\$ 977,055	\$ 935,176	\$ 691,129

⁽¹⁾ Segregated fund assets, mutual fund assets and other funds are not available to satisfy the liabilities of the Company's general fund.

⁽²⁾ Other funds represent pension funds, pooled funds, endowment funds and other institutional funds managed by the Company on behalf of others.

Capital

Total capital¹ was \$50.2 billion as at December 31, 2016 compared with \$49.9 billion as at December 31, 2015, an increase of \$0.3 billion. The increase from December 31, 2015 was primarily driven by net income attributed to shareholders net of dividends paid of \$1.4 billion and net capital issuances of \$0.4 billion (does not include the \$3.9 billion of senior debt issued net of maturities as it is not in the definition of regulatory capital), partially offset by the unfavourable impact of foreign exchange rates of \$1.0 billion and the unfavourable change in unrealized losses on AFS securities of \$0.7 billion.

Impact of Fair Value Accounting

Fair value accounting policies affect the measurement of both our assets and our liabilities. The difference between the reported amounts of our assets and liabilities determined as of the balance sheet date and the immediately preceding balance sheet date in accordance with the applicable mark-to-market accounting principles is reported as investment-related experience and the direct impact of equity markets and interest rates and variable annuity guarantees, each of which impacts net income (see "Analysis of Net Income" above).

¹ This item is a non-GAAP measure. See "Performance and Non-GAAP Measures" below.

We reported \$1.1 billion of net realized and unrealized gains in investment income in 2016 (2015 – losses of \$3.1 billion).

As outlined under “Critical Accounting and Actuarial Policies” below, net insurance contract liabilities under IFRS are determined using CALM, as required by the Canadian Institute of Actuaries (“CIA”). The measurement of policy liabilities includes the estimated value of future policyholder benefits and settlement obligations to be paid over the term remaining on in-force policies, including the costs of servicing the policies, reduced by the future expected policy revenues and future expected investment income on assets supporting the policies. Investment returns are projected using the current asset portfolios and projected reinvestment strategies. Experience gains and losses are reported when current period activity differs from what was assumed in the policy liabilities at the beginning of the period. We classify gains and losses by assumption type. For example, current period investing activities that increase (decrease) the future expected investment income on assets supporting the policies will result in an investment-related experience gain (loss).

Public Equity Risk and Interest Rate Risk

At December 31, 2016, the impact of a 10% decline in equity markets was estimated to be a charge of \$640 million and the impact of a 50 basis point decline in interest rates, across all durations and markets, on our earnings was estimated to be a charge of less than \$100 million. See “Risk Management” and “Risk Factors” below.

Impact of Foreign Exchange Rates

We have worldwide operations, including in Canada, the United States and various countries in Asia, and generate revenues and incur expenses in local currencies in these jurisdictions, all of which are translated into Canadian dollars. The bulk of our exposure to foreign exchange rates is to movements in the U.S. dollar.

Items impacting our Consolidated Statements of Income are translated to Canadian dollars using average exchange rates for the respective period. For items impacting our Consolidated Statements of Financial Position, period end rates are used for currency translation purpose. The following table provides the most relevant foreign exchange rates for 2016 and 2015.

Exchange rate	Quarterly					Full Year	
	4Q16	3Q16	2Q16	1Q16	4Q15	2016	2015
Average ⁽¹⁾							
U.S. dollar	1.3343	1.3050	1.2889	1.3724	1.3360	1.3252	1.2786
Japanese yen	0.0122	0.0128	0.0119	0.0119	0.0110	0.0122	0.0106
Hong Kong dollar	0.1720	0.1682	0.1661	0.1765	0.1724	0.1707	0.1649
Period end							
U.S. dollar	1.3426	1.3116	1.3009	1.2970	1.3841	1.3426	1.3841
Japanese yen	0.0115	0.0130	0.0127	0.0115	0.0115	0.0115	0.0115
Hong Kong dollar	0.1732	0.1691	0.1677	0.1672	0.1786	0.1732	0.1786

⁽¹⁾ Average rates for the quarter are from Bank of Canada which are applied against Consolidated Statements of Income items for each period. Average rate for the full year is a 4 point average of the quarterly average rates.

In general, our net income attributed to shareholders and core earnings benefit from a weakening Canadian dollar and are adversely affected by a strengthening Canadian dollar. Net income attributed to shareholders and core earnings from the Company’s foreign operations are translated to Canadian dollars. However, in a period of losses, the weakening of the Canadian dollar has the effect of increasing the losses. The relative impact of foreign exchange in any given period is driven by the movement of currency rates as well as the proportion of earnings generated in our foreign operations.

Changes in foreign exchange rates, primarily due to the strengthening of the U.S. dollar compared with the Canadian dollar, increased core earnings by \$149 million in 2016 compared with 2015. The impact of foreign currency on items excluded from core earnings does not provide relevant information given the nature of these items.

Fourth Quarter Financial Highlights

For the quarters ended December 31,
(\$ millions, except per share amounts)

	2016	2015	2014
Net income attributed to shareholders	\$ 63	\$ 246	\$ 640
Core earnings ^{(1),(2)} (see next page for reconciliation)	\$ 1,287	\$ 859	\$ 713
Diluted earnings per common share (\$)	\$ 0.01	\$ 0.11	\$ 0.33
Diluted core earnings per common share (\$) ⁽²⁾	\$ 0.63	\$ 0.42	\$ 0.36
Return on common shareholders’ equity (annualized)	0.3%	2.3%	8.1%
Sales ⁽²⁾			
Insurance products	\$ 1,074	\$ 1,027	\$ 760
Wealth and Asset Management gross flows ⁽²⁾	\$ 38,160	\$ 31,089	\$ 17,885
Wealth and Asset Management net flows ⁽²⁾	\$ 6,073	\$ 8,748	\$ 2,806
Other Wealth products	\$ 1,737	\$ 2,109	\$ 1,109
Premiums and deposits ⁽²⁾			
Insurance products	\$ 8,639	\$ 7,759	\$ 6,631
Wealth and Asset Management products	\$ 38,160	\$ 31,089	\$ 17,885
Other Wealth products	\$ 1,405	\$ 1,963	\$ 962
Corporate and Other	\$ 23	\$ 26	\$ 18

⁽¹⁾ Impact of currency movement on the fourth quarter of 2016 (“4Q16”) core earnings compared with the fourth quarter of 2015 (“4Q15”) was a \$10 million favourable variance.

⁽²⁾ This item is a non-GAAP measure. See “Performance and Non-GAAP Measures” below.

Manulife's 4Q16 net income attributed to shareholders was \$63 million compared with \$246 million in 4Q15. Net income attributed to shareholders is comprised of core earnings (consisting of items we believe reflect the underlying earnings capacity of the business), which amounted to \$1,287 million in 4Q16 compared with \$859 million in 4Q15, and items excluded from core earnings, which netted to charges of \$1,224 million in 4Q16 compared with charges of \$613 million in 4Q15 for a period-over-period decrease of \$611 million.

The \$428 million increase in core earnings included \$180 million in core investment gains (compared with nil in 4Q15). The remaining \$248 million increase was driven by in-force and new business growth in Asia, a reduction in the expected costs of macro hedges and a \$142 million release of tax and related provisions in the U.S. and Corporate and Other segments as a result of the closure of multiple tax years in the U.S. Core earnings in 4Q16 included net policyholder experience charges of \$43 million post-tax (\$65 million pre-tax) compared with \$50 million post-tax (\$97 million pre-tax) in 2015.

The charges for items excluded from core earnings in 4Q16 primarily related to the direct impact of equity markets and interest rates and variable annuity guarantee liabilities of \$1,202 million which more than offset gains of \$718 million that we reported in the first three quarters of 2016, resulting in a full year charge of \$484 million. The components of the charges for 2016 and 4Q16 are outlined in the table below, while the footnotes to the table provide additional information on each of these components:

For the year and quarter ended December 31, (\$ millions)	2016	4Q16
Direct impact of interest rates on fixed income reinvestment rates assumed in the valuation of policy liabilities related to:		
changes in risk-free rates ⁽¹⁾	\$ (53)	\$ (330)
decrease in corporate spreads ⁽²⁾	(553)	(275)
decrease (increase) in swap spreads ⁽³⁾	271	(242)
Gains (charges) on sale of AFS bonds and derivative positions in the Corporate and Other segment ⁽⁴⁾	(335)	(847)
Direct impact of equity markets and variable annuity guarantee liabilities ⁽⁵⁾	370	(142)
Risk reduction items ⁽⁶⁾	(364)	(213)
	(155)	-
Direct impact of equity markets and interest rates and variable annuity guarantee liabilities	\$ (484)	\$ (1,202)

⁽¹⁾ The impact of changes in risk-free rates for full year 2016 was largely driven by a fall in Japanese interest rates. The charges in 4Q16 largely came from North America where interest rates rose and the yield curve steepened, reversing the movements seen in the first three quarters of 2016. The impact of the yield curve steepening resulted in an accounting mismatch between our insurance liabilities and our interest rate hedges. This occurred because our policy liabilities are valued with reference to actuarial interest rate models, whereas our interest rate hedges are valued at current market rates. This accounting mismatch can be material when there is a significant change in the shape of the interest rate curve as was the case in 4Q16.

⁽²⁾ The decrease in corporate spreads in 4Q16 and the full year of 2016 resulted in a decline in the reinvestment yields on future fixed income purchases assumed in the measurement of policy liabilities and a charge to net income attributed to shareholders.

⁽³⁾ Swap spreads at the 30-year point, the point on the curve where we have a large number of our interest rate hedges, rose in 4Q16 and fell for the full year of 2016. The 4Q16 rise in swap spreads resulted in a decrease in the fair value of our swaps and a charge to net income attributed to shareholders. The full year fall in swap spreads resulted in an increase in the fair value of our swaps and a gain to net income attributed to shareholders.

⁽⁴⁾ Gains (charges) on sale of AFS bonds and derivative positions in the Corporate and Other segment was a result of realizing gains (charges) at the time of sale. As at December 31, 2016, the AFS fixed income assets held in the surplus segment were in a net after-tax unrealized loss position of \$683 million.

⁽⁵⁾ The direct impact of equity markets was primarily driven by losses in the dynamic hedging program due to basis risk losses in fund manager and hedge asset performance which was exacerbated by the large change in interest rates during the fourth quarter.

⁽⁶⁾ Risk reduction activities: In 3Q16, we reported a charge of \$155 million related to actions to reduce our exposure to equity markets and interest rates. The risk reduction actions in 2016 included selling equity investments supporting our products with guarantee features and increasing the amount of interest rate hedges. The sale of equity investments resulted in a decrease in our underlying earnings sensitivity before hedging and also reduced the amount of hedging instruments used in the macro hedging program.

The charges for items excluded from core earnings in 4Q15 included a \$361 million charge for investment-related experience, primarily due to the impact of sharply lower oil and gas prices on our investment portfolio, along with a number of smaller items totaling \$252 million.

We evaluate our divisions operating performance based on core earnings.

- In Asia, core earnings in 4Q16 was \$388 million compared with \$334 million in 4Q15. This was a 16% increase compared with 4Q15 after adjusting for costs arising from the expansion of our dynamic hedging program (there is a corresponding decrease in macro hedging costs in the Corporate and Other segment) and the impact of changes in foreign currency rates. The growth in core earnings was driven by solid growth of in-force business and continued strong growth in new business volumes, partially offset by less favourable policyholder experience and the impact of declining interest rates.
- In Canada, core earnings was \$359 million in 4Q16 compared with \$352 million in 4Q15, an increase of \$7 million.
- In the U.S., core earnings was \$471 million in 4Q16 and \$332 million in 4Q15. The \$139 million increase in core earnings over the prior year includes a US\$52 million release of tax provisions as a result of closing certain tax years, improved policyholder experience in 4Q16 as a result of changes to long-term care assumptions in 3Q16 and lower amortization of deferred acquisition costs on in-force variable annuity business partially offset by lower fee income in WAM businesses driven by fee compression in our pension business and changes in business mix.
- Corporate and Other core loss excluding expected cost of macro hedges and core investment gains was \$75 million in 4Q16 compared with \$85 million in 4Q15. The \$10 million favourable variance in core earnings reflected a \$73 million release of provisions and interest on uncertain tax positions in the U.S. partially offset by higher expenses in Corporate and Other and strategic investments in our Manulife Asset Management business.

Analysis of Net Income

The table below reconciles net income attributed to shareholders to core earnings for the periods presented.

For the quarters ended December 31, (\$ millions)	4Q16	4Q15
Core earnings⁽¹⁾		
Asia Division	\$ 388	\$ 334
Canadian Division	359	352
U.S. Division	471	332
Corporate and Other (excluding expected cost of macro hedges and core investment gains)	(75)	(85)
Expected cost of macro hedges ⁽²⁾	(36)	(74)
Investment-related experience in core earnings ⁽³⁾	180	–
Core earnings	1,287	859
Investment-related experience outside of core earnings ⁽³⁾	–	(361)
Core earnings and investment-related experience outside of core earnings	1,287	498
Other items to reconcile core earnings to net income attributed to shareholders:		
Direct impact of equity markets and interest rates and variable annuity guarantee liabilities (see table below) ^{(3),(4)}	(1,202)	(29)
Changes in actuarial methods and assumptions	(10)	(97)
Integration and acquisition costs ⁽⁵⁾	(25)	(39)
Other items excluded from core earnings ⁽⁶⁾	13	(87)
Net income attributed to shareholders	\$ 63	\$ 246

⁽¹⁾ This item is a non-GAAP measure. See “Performance and Non-GAAP Measures” below.

⁽²⁾ The 4Q16 net charge from macro equity hedges was \$110 million and consisted of a \$36 million charge related to the estimated expected cost of the macro equity hedges relative to our long-term valuation assumptions and a charge of \$74 million because actual markets outperformed our valuation assumptions (included in direct impact of equity markets and interest rates and variable annuity guarantee liabilities below).

⁽³⁾ As outlined under “Critical Accounting and Actuarial Policies” below, net insurance contract liabilities under IFRS for Canadian insurers are determined using CALM. Under CALM, the measurement of policy liabilities includes estimates regarding future expected investment income on assets supporting the policies. Experience gains and losses are reported when current period activity differs from what was assumed in the policy liabilities at the beginning of the period. These gains and losses can relate to both the investment returns earned in the period, as well as to the change in our policy liabilities driven by the impact of current period investing activities on future expected investment income assumptions. The direct impact of equity markets and interest rates is separately reported. Our definition of core earnings (see “Performance and Non-GAAP Measures”) includes up to \$400 million of favourable investment-related experience reported in a single year.

⁽⁴⁾ The direct impact of equity markets and interest rates is relative to our policy liability valuation assumptions and includes changes to interest rate assumptions, including experience gains and losses on derivatives associated with our macro equity hedges. We also include gains and losses on derivative positions and the sale of AFS bonds in the Corporate and Other segment. See table below for components of this item.

⁽⁵⁾ The 4Q16 charge of \$25 million included costs to integrate businesses acquired from Standard Life, New York Life and Standard Chartered.

⁽⁶⁾ The 4Q16 gain of \$13 million included a gain with respect to one of the Company’s pension plans, partially offset by charges related to restructuring and impairment charges related to the discontinuance of new sales of our stand-alone individual long-term care product in the U.S. and restructuring costs related to our Indonesia operations and the closure of our technology shared service centre in Malaysia.

The gain (charge) related to the direct impact of equity markets and interest rates and variable annuity guarantee liabilities in the table above is attributable to:

For the quarters ended December 31, (\$ millions)	4Q16	4Q15
Direct impact of equity markets and variable annuity guarantee liabilities ⁽¹⁾	\$ (213)	\$ 77
Fixed income reinvestment rates assumed in the valuation of policy liabilities ⁽²⁾	(847)	(97)
Sale of AFS bonds and derivative positions in the Corporate and Other segment	(142)	(9)
Direct impact of equity markets and interest rates and variable annuity guarantee liabilities	\$ (1,202)	\$ (29)

⁽¹⁾ In 4Q16, charges of \$2,366 million from dynamic hedging experience and \$74 million from macro hedge experience were partially offset by gains of \$2,227 million from gross equity exposure, which resulted in charge of \$213 million.

⁽²⁾ The loss in 4Q16 for fixed income reinvestment assumptions was driven by interest rate movements in North America, where interest rates rose and the yield curve steepened, decreases in corporate spreads and increases in swap spreads at the 30-year point.

Sales

Insurance sales were \$1.1 billion in 4Q16, an increase of 3% compared with 4Q15. In 4Q16, Asia insurance sales increased 18%, driven by strong double digit growth in Asia Other and strong contributions from the bancassurance partnership with DBS. This increase was partially offset by the impact of earlier pricing actions in Japan in response to lower interest rates. Canadian insurance sales declined by 22% as group benefits sales in 4Q15 included an exceptionally large sale. U.S. insurance sales declined 6% due to an industry trend towards products with guarantee features which we have de-emphasized.

Wealth and Asset Management net flows were \$6.1 billion in 4Q16, a decrease of \$2.7 billion compared with 4Q15. 4Q16 marked the 28th consecutive quarter of positive net flows in our WAM businesses. Positive net flows were driven by strong inflows in our institutional advisory business, as well as in our Asia and Canadian mutual fund businesses, partially offset by outflows in our North American pension businesses and U.S. mutual funds. The less favourable net flows compared with 4Q15 is a result of outflows in the U.S. which more than offset higher inflows in our institutional advisory business.

Other Wealth sales were \$1.7 billion in 4Q16, a decrease of 22% compared with 4Q15. In 4Q16, Other Wealth sales in Asia decreased by 26% reflecting strong sales in 4Q15 from successful new product launches as well as a slowing of sales momentum in 4Q16. In Canada, sales declined due to product actions to de-emphasize our higher risk segregated fund products.

Update on Efficiency and Effectiveness Initiative

Our Efficiency and Effectiveness (“E&E”) initiative, announced November 2012, is aimed at leveraging our global scale and capabilities to achieve operational excellence and cost efficiencies throughout the organization. The annual net pre-tax savings from the 4-year program of our E&E initiative reached over \$500 million in 2016, exceeding our target of \$400 million. These savings have enabled us to fund other new initiatives such as those outlined in the “Strategic Direction” section above. Efforts are continuing to identify and execute on additional opportunities to make our operations more efficient and effective and to fund new investments.

Update on 2016 Targets for Core Earnings and Core ROE

In 2012, we stated that we were targeting \$4 billion in core earnings and core ROE of 13% in 2016. We reported \$4 billion in core earnings and core ROE of 10.1% in 2016. As disclosed above, we expect core ROE to expand toward 13% or more over the medium term.¹

Update on Acquisitions and Distribution Agreements

On January 30, 2015, the Company completed its acquisition of 100% of the shares of Standard Life Financial Inc. and of Standard Life Investments Inc., collectively the Canadian-based operations of Standard Life plc (“Standard Life”). The acquisition contributes to our growth strategy, particularly in wealth and asset management. The purchase consideration of \$4 billion was paid in cash. We recognized \$1,477 million of tangible net assets, \$1,010 million of intangible assets, and \$1,513 million of goodwill. At time of acquisition we stated that we expected to achieve \$100 million of annual after-tax cost savings largely by the 3rd year² and that we expected total integration costs over the first three years would be \$150 million post-tax². We expect to achieve the cost savings target and although we anticipate integration costs to be higher than the original estimate, it will be offset by higher revenue synergies. We continue to remain on track to achieve the original earnings targets.² As stated in our 2015 MD&A, as a result of merging of the businesses it will not be possible to segregate the earnings contribution from Standard Life and therefore not possible to report on EPS accretion; however, we expect to achieve these original targets² (accretive by approximately \$0.03 to earnings per common share (“EPS”) in 2016, 2017 and 2018²) and have built them into our plans.

On April 14, 2015, the Company completed its acquisition of New York Life’s (“NYL”) Retirement Plan Services (“RPS”) business. The acquisition of the NYL RPS business supports Manulife’s global growth strategy for wealth and asset management businesses. The purchase consideration of \$787 million included conventional financial consideration of \$398 million plus \$389 million of net impact of the assumption by NYL of our in-force participating life insurance closed block (“Closed Block”) through net 60% reinsurance agreements, effective July 1, 2015. We recognized \$128 million of intangible assets and \$659 million of goodwill.

Effective January 1, 2016, the Company entered into a 15-year regional distribution agreement with DBS covering Singapore, Hong Kong, mainland China and Indonesia. The arrangement significantly expands our distribution capability in Asia. We recognized \$536 million of distribution network intangible assets on the agreement’s effective date.

On November 1, 2016, the Company completed its acquisition of Standard Chartered’s Mandatory Provident Fund (“MPF”) and Occupational Retirement Schemes Ordinance (“ORSO”) businesses in Hong Kong, and the related investment management entity. In addition, on November 1, 2016, we commenced our 15-year exclusive MPF distribution partnership with Standard Chartered. Total consideration of \$392 million was paid in cash. These arrangements significantly expand Manulife’s retirement business in Hong Kong.

¹ See “Caution regarding forward-looking statements” and “Strategic Direction” above.

² See “Caution regarding forward-looking statements” above.

Performance by Division

Asia Division

We are a leading provider of financial protection and wealth and asset management products in most of Asia's largest and fastest-growing economies, with operations in Japan, Hong Kong, Macau, mainland China, Taiwan, Indonesia, Singapore, the Philippines, Vietnam, Malaysia, Thailand and Cambodia. We are focused on helping our customers to achieve their dreams and aspirations, and that focus drives our growth strategy and underpins our commitment to the region.

We offer a broad portfolio of products and services including life and health insurance, annuities, mutual funds and retirement solutions that cater to the wealth and protection needs of individuals and corporate customers through a multi-channel distribution network, supported by a team of approximately 11,000 employees. Our distribution network includes more than 69,000 contracted agents, 100 bank partnerships and 1,000 independent agents, financial advisors and brokers selling our products. The bank partnerships include a regional partnership with DBS, which together with 5 other exclusive partnerships give us access to more than 18 million bank customers.

In 2016, Asia Division contributed 24% of the Company's total premiums and deposits and, as at December 31, 2016, accounted for 12% of the Company's assets under management and administration.

Financial Performance

Asia Division reported net income attributed to shareholders of \$1,141 million in 2016 compared with \$1,105 million in 2015. Net income attributed to shareholders is comprised of core earnings, which was \$1,495 million in 2016 compared with \$1,234 million in 2015, and items excluded from core earnings, which amounted to a net charge of \$354 million for 2016 compared with a net charge of \$129 million in 2015.

Expressed in U.S. dollars, the presentation currency of the division, net income attributed to shareholders was US\$863 million compared with US\$865 million in 2015, core earnings was US\$1,129 million in 2016 compared with US\$963 million in 2015 and items excluded from core earnings amounted to a net charge of US\$266 million in 2016 compared with a net charge of US\$98 million in 2015.

Core earnings increased 15%, compared with 2015 after adjusting for costs arising from the expansion of our dynamic hedging program (there is a corresponding decrease in macro hedging costs in the Corporate and Other segment) and the impact of changes in foreign currency rates. The increase in core earnings was driven by solid growth from in-force business, and continued strong growth in new business volumes, partially offset by less favourable policyholder experience and the impact of declining interest rates.

The change in items excluded from core earnings primarily related to the direct impact of equity markets and the changes in interest rates in 2016 and to the direct impact of the decline in equity markets in 2015.

The table below reconciles net income attributed to shareholders to core earnings for the Asia Division for 2016, 2015 and 2014.

For the years ended December 31, (\$ millions)	Canadian \$			US \$		
	2016	2015	2014	2016	2015	2014
Core earnings⁽¹⁾	\$ 1,495	\$ 1,234	\$ 1,008	\$ 1,129	\$ 963	\$ 913
Items to reconcile core earnings to net income attributed to shareholders:						
Direct impact of equity markets and interest rates and variable annuity guarantee liabilities ⁽²⁾	(433)	(174)	173	(326)	(134)	157
Investment-related experience related to fixed income trading, market value increases in excess of expected alternative assets investment returns, asset mix changes and credit experience	91	25	62	69	20	56
Other ⁽³⁾	(12)	20	4	(9)	16	3
Net income attributed to shareholders⁽¹⁾	\$ 1,141	\$ 1,105	\$ 1,247	\$ 863	\$ 865	\$ 1,129

⁽¹⁾ Core earnings is a non-GAAP measure. See "Performance and Non-GAAP Measures" below. The 2015 earnings on assets backing capital allocated to each operating segment have been restated to align with the methodology used in 2016.

⁽²⁾ The direct impact of equity markets and interest rates is relative to our policy liability valuation assumptions and includes changes to interest rate assumptions. The net charge of \$433 million in 2016 (2015 – net charge of \$174 million) consisted of a \$24 million charge (2015 – \$32 million charge) related to variable annuities that are not dynamically hedged, an \$80 million charge (2015 – \$89 million charge) on general fund equity investments supporting policy liabilities and on fee income, a \$259 million charge (2015 – \$1 million charge) related to fixed income reinvestment rates assumed in the valuation of policy liabilities and a \$70 million charge (2015 – \$52 million charge) related to variable annuity guarantee liabilities that are dynamically hedged. The amount of variable annuity guaranteed value that was dynamically hedged at the end of 2016 was 67% (2015 – 53%). Our variable annuity guarantee dynamic hedging strategy is not designed to completely offset the sensitivity of policy liabilities to all risks associated with the guarantees embedded in these products.

⁽³⁾ Other in 2016 includes the integration costs in relation to the acquisition of Standard Chartered's MPF and Occupational and Retirement Schemes Ordinance businesses in Hong Kong, which completed on November 1, 2016 and restructuring costs in Indonesia, partly offset by the impact of tax rate change on the deferred tax liabilities in Japan. Other in 2015 includes the impact of tax rate change on the deferred tax liabilities.

Sales *(all percentages quoted are on a constant currency basis)*

Insurance sales in 2016 were US\$2.0 billion, an increase of 27% compared with 2015, driven by double digit sales growth in most of the territories in which we operate. Sales in Japan of US\$632 million were 11% lower than prior year, impacted by the pricing actions in response to the lower interest rate environment. Hong Kong sales of US\$465 million increased 23% from 2015, reflecting the expansion of our bancassurance and broker channels. Asia Other (excludes Japan and Hong Kong) sales of US\$905 million increased 89%, included record high sales in all territories except for Thailand, and reflected the activation of our exclusive partnership with DBS that commenced in 2016.

Other Wealth sales in 2016 were US\$3.7 billion, an increase of 14% compared with 2015. Other Wealth sales growth was mainly driven by Japan and Hong Kong reflecting the success of new product launches and sales from DBS.

Annualized premium equivalent (“APE”)¹ sales in 2016 were a record for Asia Division of US\$2,498 million, an increase of 29%. We achieved double digit growth in all territories except for Japan and Thailand. APE sales included insurance sales of US\$2,002 million and other wealth APE sales of US\$496 million, up 27% and 38%, respectively. Japan APE sales in 2016 were US\$1,019 million, an increase of 2%. Strong sales of other wealth products through both bank and independent broker channels were mostly offset by the impact of pricing actions on insurance products in response to the lower interest rate environment. Hong Kong APE sales in 2016 were US\$496 million, an increase of 27%, driven by distribution expansion across all core channels (bancassurance, broker and agency). Asia Other (excludes Japan and Hong Kong) APE sales in 2016 were US\$983 million, an increase of 84%. This was driven by record sales in all territories we operate in, except Thailand.

Wealth and Asset Management (“WAM”) gross flows in 2016 were US\$14.9 billion, an increase of 26% and WAM net flows in 2016 were US\$3.9 billion, an increase of US\$2.1 billion. Mutual fund sales in mainland China was the most significant driver for the growth in both gross and net flows. Japan WAM gross flows in 2016 were US\$271 million, a decrease of 34% as equity market volatility impacted consumer confidence, resulting in weaker mutual fund sales. Hong Kong WAM gross flows in 2016 were US\$2.6 billion, a slight increase over last year. The continued success and growth of our pension business was largely offset by lower mutual fund sales due to negative market sentiment. Asia Other (excludes Japan and Hong Kong) WAM gross flows in 2016 were US\$12.0 billion, an increase of 36%. The growth was driven by mainland China, primarily from money market flows and the launch of new funds as well as pension sales in Indonesia and the launch of the first U.S. property REIT in Singapore.

For the years ended December 31, (\$ millions)	Canadian \$			US \$		
	2016	2015	2014	2016	2015	2014
Insurance sales	\$ 2,651	\$ 1,930	\$ 1,412	\$ 2,002	\$ 1,507	\$ 1,278
Other wealth sales	4,940	3,885	1,818	3,726	3,022	1,644
Annualized premium equivalent (“APE”) sales	3,305	2,354	1,599	2,498	1,836	1,447
Wealth and asset management gross flows	19,679	15,495	9,014	14,875	12,240	8,149

Revenue

Total revenue in 2016 of US\$14.5 billion increased US\$3.6 billion compared with 2015, primarily driven by the strong growth of new business premiums that augmented the stable growth of in-force business. Revenue before net realized and unrealized investment gains and losses increased by US\$3.1 billion driven by the same reasons as total revenue.

Revenue

For the years ended December 31, (\$ millions)	Canadian \$			US \$		
	2016	2015	2014	2016	2015	2014
Net premium income	\$ 15,585	\$ 11,495	\$ 7,275	\$ 11,757	\$ 8,953	\$ 6,583
Investment income	1,853	1,519	1,271	1,400	1,188	1,150
Other revenue	1,566	1,434	1,334	1,185	1,121	1,208
Revenue before net realized and unrealized investment gains and losses	19,004	14,448	9,880	14,342	11,262	8,941
Net realized and unrealized investment gains and losses	290	(446)	2,078	204	(365)	1,867
Total revenue	\$ 19,294	\$ 14,002	\$ 11,958	\$ 14,546	\$ 10,897	\$ 10,808

Premium and Deposits *(all percentages quoted are on a constant currency basis)*

Premium and deposits for 2016 were US\$28.3 billion, an increase of 25% compared with 2015. Premiums and deposits for insurance products in 2016 were US\$9.8 billion, an increase of 28% compared with 2015, driven by strong sales growth and robust recurring premium growth from in-force business. Wealth and Asset Management premiums and deposits in 2016 were US\$14.9 billion, an increase of 26%, compared with 2015, reflecting new fund launches, notably in mainland China, the successful launch of the first U.S. property REIT in Singapore and the growth of our pension business and mutual fund sales in Indonesia. Other Wealth premiums and deposits in 2016 were US\$3.7 billion and were 13% higher than 2015 driven by the success of new product launches coupled with expanding distribution reach.

¹ Annualized premium equivalent (“APE”) sales is a metric commonly used in Asia and is comprised of Insurance sales plus 100% of regular premiums/ deposits and 10% of single premiums/ deposits for other wealth products. APE is a non-GAAP measure. See “Performance and Non-GAAP Measures” below.

Premiums and Deposits

For the years ended December 31, (\$ millions)	Canadian \$			US \$		
	2016	2015	2014	2016	2015	2014
Insurance products	\$ 12,947	\$ 9,431	\$ 7,066	\$ 9,771	\$ 7,356	\$ 6,395
Wealth and asset management products	19,681	15,494	9,015	14,875	12,241	8,149
Other wealth products	4,883	3,875	1,816	3,683	3,015	1,641
Total premiums and deposits	\$ 37,511	\$ 28,800	\$ 17,897	\$ 28,329	\$ 22,612	\$ 16,185

Assets under Management

Asia Division assets under management were US\$90.2 billion as at December 31, 2016, an increase of 17% on a constant currency basis compared with December 31, 2015, driven by net customer inflows of US\$12.4 billion, higher investment income during 2016 and the addition of assets from the acquisition of Standard Chartered's MPF and ORSO businesses in Hong Kong.

Assets under Management

As at December 31, (\$ millions)	Canadian \$			US \$		
	2016	2015	2014	2016	2015	2014
General fund	\$ 63,332	\$ 54,206	\$ 41,991	\$ 47,159	\$ 39,162	\$ 36,198
Segregated funds	24,644	24,384	22,925	18,341	17,612	19,761
Mutual and other funds	33,236	27,848	22,167	24,755	20,121	19,108
Total assets under management	\$ 121,212	\$ 106,438	\$ 87,083	\$ 90,255	\$ 76,895	\$ 75,067

Strategic Direction

Manulife's Asia strategy focuses on providing Asia's growing mass affluent and affluent customer base with a premium and differentiated value proposition by integrating life, wealth and health solutions. Our strategy aligns with the key underlying customer trends and growth opportunities in Asia and draws upon our core strengths. We are well positioned to serve our customers through the delivery of our clearly articulated strategic agenda, including unsurpassed customer experience, holistic and integrated wealth management solutions, premium agency force, optimized bancassurance and market-leading digital customer engagement.

In 2016, we identified and commenced the roll-out of a number of key initiatives in Asia and continued to diversify our distribution channels, introduce new products and enhance our technology capabilities to build holistic and long-lasting customer relationships.

Manulife's partnership with DBS launched successfully on January 1, 2016 in Singapore, Hong Kong, Indonesia and mainland China. This partnership has accelerated Manulife's Asia growth strategy and added scale for our business. We now have a more balanced distribution mix and have advanced our capabilities in technology, operations, underwriting and digital innovation. The partnership has enhanced our ability to attract both new partners and the highest quality talent to join Manulife in Asia.

Following the successful launch in Hong Kong of our award-winning¹ ManulifeMOVE, a wellness initiative that rewards customers for living active lifestyles, we extended the roll-out to the Philippines and mainland China. In the Philippines, 70%² of enrollees are new to Manulife. In mainland China, the ManulifeMOVE launch was a high profile event with the participation of the Prime Minister of Canada, Justin Trudeau, as part of his first ever official visit to the country.

As part of our strategy to provide an unsurpassed customer experience, we introduced eClaims services in mainland China, Vietnam and Indonesia. In mainland China, the eClaims service was launched through WeChat, enabling customers to submit their claims via the popular messaging app, reducing the submission process from more than 1 week to 1 day.

In Japan, in 2016, we added a number of new bank partners to our existing bank network to further enhance our distribution reach. We also piloted our agency transformation program, which helps to enable our agents to build long lasting customer relationships as trusted advisors and deliver holistic product offerings. Building on 2015's advertising campaign featuring the Mazinger Z robot, we launched a sequel with a focus on raising awareness of the Manulife brand and our retirement solutions.

In Hong Kong, we also commenced our 15-year exclusive Mandatory Provident Fund ("MPF") distribution partnership with Standard Chartered Bank and completed the related acquisition of its existing pension businesses. This, combined with continued organic growth, strengthened our market position and in the fourth quarter Manulife became the largest MPF scheme sponsor measured by both assets under management and net cash flows³. To support our advisors and facilitate holistic sales processes we also launched our digital financial planning and electronic point of sales technology which facilitates end-to-end paperless transactions.

¹ "Best Integrated Social Campaign" at the 2016 Silver Bowl Awards from the global Life Insurance and Market Research Association (LIMRA).

² As at 3Q16.

³ The Gadbury Group MPF Market Shares Report as of December 2016.

In Singapore, in 2016, with the launch of our exclusive bancassurance partnership with DBS, which augmented growth in other channels, we achieved 21% market share¹, and became the #1 life insurer in bancassurance based on annualized premium equivalent sales¹. Our and DBS's joint focus on customer experience has been underpinned by streamlined new business processes, platform enhancements and integration of digital tools. We also launched the first pure-play U.S. office REIT listing in Singapore, which has strengthened our brand and banking distribution partnerships.

In Indonesia, in 2016, we introduced the country's first fully online end-to-end mutual fund transactions solution to deliver a market-leading customer engagement experience.

In Cambodia, in 2016, we have continued to extend our distribution reach with the signing of bancassurance agreements with ABA Bank and Foreign Trade Bank of Cambodia. With the addition of these agreements, Manulife has activated five bancassurance partnerships in the country since we began operations in 2012.

As noted in the "Capital Management Framework" section below, we also accessed the Asian capital markets for the first time, including debt issuances in Singapore and Taiwan.

¹ As at 3Q16. Source: Life Insurance Association Singapore.

Canadian Division

Serving one in three adult Canadians, we are a leading financial services organization in Canada. We offer a diverse range of protection, estate planning, investment and banking solutions through a diversified multi-channel distribution network, meeting the needs of a broad marketplace, supported by a team of more than 10,000 employees.

In our Insurance business, we offer broad-based insurance solutions to middle- and upper-income individuals, families, and business owners through a combination of competitive products, professional advice and quality customer service. Products include universal life, term life, whole life and living benefits products. We also provide group life, health and disability insurance solutions to Canadian employers; more than 21,000 Canadian businesses and organizations entrust their employee benefit programs to Manulife's Group Benefits. Life, health and specialty products, such as travel insurance, are also offered through alternative distribution channels, including sponsor groups and associations, as well as direct-to-customer marketing.

Our Wealth business offers a range of investment products and services to customers that span the investor spectrum, from those just starting to build their financial portfolio to individuals and families with complex retirement and estate planning needs. We provide personalized investment management, private banking and estate solutions to affluent clients. Manulife Bank offers flexible debt and cash flow management solutions as part of a customer's financial plan. We also provide Group Retirement solutions to more than 9,000 Canadian employers, through defined contribution plans, deferred profit sharing plans, non-registered savings plans and employee share ownership plans.

In 2016, Canadian Division contributed 19% of the Company's total premiums and deposits and, as at December 31, 2016, accounted for 24% of the Company's assets under management and administration.

Financial Performance

Canadian Division's net income attributed to shareholders was \$1,486 million in 2016 compared with \$480 million in 2015. Net income attributed to shareholders is comprised of core earnings, which was \$1,384 million for 2016 compared with \$1,252 million for 2015, and items excluded from core earnings, which amounted to a net gain of \$102 million for 2016 compared with a net charge of \$772 million in 2015.

The \$132 million increase in core earnings over the prior year is primarily due to improved policy holder experience, and higher fee income on the Company's wealth and asset management business from higher asset levels. The year-over-year increase of \$874 million in items excluded from core earnings was primarily driven by the improved impact of market-related factors including interest rates and equity markets, as well as higher oil and gas prices.

The table below reconciles net income attributed to shareholders to core earnings for the Canadian Division for 2016, 2015 and 2014.

For the years ended December 31,
(\$ millions)

	2016	2015	2014
Core earnings⁽¹⁾	\$ 1,384	\$ 1,252	\$ 927
Items to reconcile core earnings to net income attributed to shareholders:			
Investment-related experience related to fixed income trading, market value increases in excess of expected alternative assets investment returns, asset mix changes and credit experience	(114)	(391)	1
Direct impact of equity markets and interest rates and variable annuity guarantee liabilities ⁽²⁾	270	(283)	51
Impact of a recapture of a reinsurance treaty and in-force product changes ⁽³⁾	–	(40)	24
Net impact of acquisitions and divestitures	(54)	(59)	–
Tax items	–	1	–
Net income attributed to shareholders	\$ 1,486	\$ 480	\$ 1,003

⁽¹⁾ Core earnings is a non-GAAP measure. See "Performance and Non-GAAP Measures" below. The 2015 earnings on assets backing capital allocated to each operating segment have been restated to align with the methodology used in 2016.

⁽²⁾ The direct impact of equity markets and interest rates is relative to our policy liability valuation assumptions and includes changes to interest rate assumptions. The gain of \$270 million in 2016 (2015 – \$283 million charge) consisted of a \$97 million gain (2015 – \$81 million charge) on general fund equity investments supporting policy liabilities, a \$277 million gain (2015 – \$148 million charge) related to fixed income reinvestment rates assumed in the valuation of policy liabilities, nil (2015 – \$1 million gain) related to unhedged variable annuities and a \$104 million charge (2015 – \$55 million charge) related to variable annuity guarantee liabilities that are dynamically hedged. The amount of variable annuity guaranteed value that was dynamically hedged at the end of 2016 was 85% (2015 – 88%). Our variable annuity guarantee dynamic hedging strategy is not designed to completely offset the sensitivity of policy liabilities to all risks associated with the guarantees embedded in these products.

⁽³⁾ The \$40 million charge in 2015 relates to the recapture of reinsurance treaties.

Sales

Insurance sales were \$693 million in 2016, 16% lower than 2015 levels. Retail Insurance sales in 2016 of \$235 million increased by 30% compared with 2015 driven by higher universal life sales in anticipation of regulatory changes. Institutional Markets sales for the full year 2016 of \$458 million decreased 29% compared with 2015 primarily due to fewer sales at the large end of the group benefits market. Market activity was down in 2016 whereas there were two very large sales in 2015. We also experienced lower sales at the small end of the market due to pricing actions we took to address deteriorating claims experience.

Wealth and Asset Management gross flows in 2016 were \$17.0 billion, an increase of \$0.5 billion or 3% compared with 2015 reflecting continued strong growth in mutual funds. We reported net flows in 2016 of \$3.8 billion, down from \$5.5 billion in 2015 due to lower group retirement gross flows and increased mutual fund and group retirement redemptions. Assets under management for our WAM businesses at December 31, 2016 were \$110 billion, an increase of 9% compared with December 31, 2015, driven by

positive net flows and investment returns over the past year in our mutual fund and Group Retirement Solutions (“GRS”) businesses. Mutual Funds’ full year gross flows of \$9.8 billion in 2016 increased \$1.1 billion or 13% compared with 2015, driven by successful sales campaigns and positive fund performance. GRS gross flows of \$7.2 billion in 2016 decreased 8% or \$0.6 billion compared with 2015 due to lower sales in the large case segment compared with our record year in 2015.

Other Wealth sales were \$3.2 billion in 2016, a decrease of \$0.4 billion or 11% over 2015, driven by changes in our higher risk segregated fund products earlier this year. As a result of these changes, segregated fund product¹ sales in 2016 were \$2.5 billion, a decrease of 15% compared with 2015. Fixed product sales in 2016 were \$716 million, an increase of 10% compared with 2015, primarily due to higher structured settlement sales.

Manulife Bank net lending assets were \$19.5 billion as at December 31, 2016, in line with December 31, 2015, as growth continued to be challenged by competitive pressures in the residential mortgage market.

Sales

For the years ended December 31,
(\$ millions)

	2016	2015	2014
Retail markets	\$ 235	\$ 181	\$ 167
Institutional markets	458	644	411
Insurance products	\$ 693	\$ 825	\$ 578
Wealth and asset management gross flows	\$ 17,023	\$ 16,474	\$ 10,477
Other wealth products	3,219	3,609	2,048

Revenue

Revenue of \$12.7 billion in 2016 increased \$2.6 billion from \$10.1 billion in 2015. Revenue before net realized and unrealized gains and losses of \$12.4 billion in 2016 increased \$1.6 billion from \$10.8 billion in 2015 due to higher premium income. Other income was \$3.5 billion, up \$0.4 billion from \$3.1 billion in 2015, reflecting higher reinsurance treaty revenue.

Revenue

As at December 31,
(\$ millions)

	2016	2015	2014
Net premium income	\$ 4,972	\$ 4,430	\$ 3,728
Investment income	3,938	3,247	3,298
Other revenue	3,480	3,124	2,611
Revenue before net realized and unrealized gains (losses)	12,390	10,801	9,637
Net realized and unrealized gains (losses) ⁽¹⁾	317	(736)	4,136
Total revenue	\$ 12,707	\$ 10,065	\$ 13,773

⁽¹⁾ See “Financial Performance – Impact of Fair Value Accounting” above.

Premiums and Deposits

Premiums and deposits of \$30.0 billion in 2016 were 2% higher than the 2015 level of \$29.3 billion, reflecting strong mutual fund deposits and Retail Insurance sales. Insurance products’ premiums and deposits in 2016 were \$12.4 billion, or 7%, above the prior year due to higher Retail Insurance sales and Group Benefits single premium deposits. Premiums and deposits for wealth and asset management businesses and other wealth products were \$17.0 billion and \$3.2 billion, respectively, compared with \$16.5 billion and \$3.6 billion, respectively, in 2015.

Premiums and Deposits

For the years ended December 31,
(\$ millions)

	2016	2015	2014
Insurance products	\$ 12,380	\$ 11,551	\$ 10,508
Wealth and asset management products	17,023	16,474	10,477
Other wealth products	3,219	3,609	2,052
Less: mutual funds held by segregated funds	(2,626)	(2,290)	(1,418)
Total premiums and deposits	\$ 29,996	\$ 29,344	\$ 21,619

¹ Segregated fund products include guarantees. These products are also referred to as variable annuities.

Assets under Management

Assets under management of \$234.8 billion as at December 31, 2016 grew by \$15.6 billion or 7% from \$219.2 billion at December 31, 2015, driven by strong growth in wealth and asset management businesses.

Assets under Management

As at December 31,
(\$ millions)

	2016	2015	2014
General fund	\$ 110,343	\$ 103,496	\$ 85,070
Segregated funds	97,220	92,447	57,028
Mutual and other funds	50,177	44,884	33,411
Less: mutual funds held by segregated funds	(22,983)	(21,587)	(16,605)
Total assets under management	\$ 234,757	\$ 219,240	\$ 158,904

Strategic Direction

Manulife Canada is focused on building holistic and long-lasting customer relationships to meet customer needs by offering comprehensive solutions. We do this by expanding and integrating our wealth, insurance and banking solutions and by leveraging the strength of our group business franchise and the breadth of our product portfolio in order to meet consumers' needs. Through data-driven marketing and predictive analytics, we will further enhance our understanding of customers' needs to deliver an optimized customer experience.

Shifting demographics, increasing use of technology and growing trends toward wellness programs are redefining the Canadian financial services landscape. We continue to focus on improving customer experience by increasingly engaging customers on digital platforms and simplifying processes.

In 2016, we launched a number of customer-focused initiatives:

- Manulife Vitality, an innovative approach to life insurance, encourages and supports our customers to live healthy lives. Garmin and Goodlife Fitness have partnered with us to deliver this rewards-based program;
- Initiatives to modernize insurance, such as being the first insurance company to offer insurance to Canadians with human immunodeficiency virus (HIV); reducing the number of medical tests required for Term policy applications, and significantly reducing the proportion of applicants tested for nicotine;
- Financial Wellness Assessment, an interactive online experience to help group retirement plan members ensure their finances are ready today and for the future;
- Retirement Redefined supports future retirees in planning for a long and healthy retirement by providing an engaging, interactive digital solution and resources to plan for their insurance and savings needs;
- Our Customer 360 View program was introduced to Manulife Bank, Manulife Securities and Manulife Private Wealth businesses to enhance the single view of our customers, allowing us to provide more holistic service to our customers based on their needs;
- Manulife Group Benefits DrugWatch™ program was integrated with our Specialty Drug Care and Prior Authorization programs to better manage higher cost specialty drugs and to help plan sponsors offer them to members at a lower cost;
- Manulife Ideal Signature Select, a new segregated fund solution, addresses client needs for asset accumulation and preservation through diversification and capital and estate protection;
- Manulife Securities' Advisor Managed Program, a structured investment money management platform available to approved advisors with Manulife Securities, where all investments can be held in the same account and there is no need for the client to sign off on trades, so there is significant time savings for clients and advisors; and
- Manulife Bank's Touch ID (finger print authentication) and Interac Flash® access cards allow bank customers easy and convenient access to information and their money.

Our purpose is to help people achieve their dreams and aspirations, by putting the customers' needs first and providing the right advice and solutions. To accomplish this, we continue to develop customer focused initiatives that allow us to deliver on building holistic and long-lasting customer relationships to meet customer needs.

U.S. Division

Operating under the John Hancock brand in the U.S., our product suite includes wealth management and insurance products and is distributed primarily through affiliated and non-affiliated licensed financial advisors. We have a team of approximately 6,700 employees and our affiliated broker/dealer, Signator Investors, Inc., is comprised of a national network of independent firms with close to 2,200 registered representatives.

John Hancock Wealth Management offers a broad range of products and services focused on individuals and business markets, as well as institutional oriented products. John Hancock Investments ("JH Investments") offers a variety of mutual funds, Undertakings for Collective Investment in Transferrable Securities ("UCITS"), exchange traded funds ("ETF"), and 529 College Savings plans. John Hancock Retirement Plan Services ("JH RPS") provides employer sponsored retirement plans for companies ranging from start-ups to some of the largest corporations in America as well as servicing personal retirement accounts for former client employees. We also manage an in-force block of fixed deferred, variable deferred, and payout annuity products.

John Hancock Insurance ("JH Insurance") offers a broad portfolio of insurance products, including universal, variable, whole, and term life insurance designed to provide estate, business, income protection and retirement solutions for high net worth and emerging affluent markets. We also manage an in-force block of long-term care insurance which is designed to cover the cost of long-term services and support, including personal and custodial care in a variety of settings such as the home, a community organization, or other facility in the event of an illness, accident, or through the normal effects of aging. Effective December 2, 2016, we discontinued new sales of our stand-alone retail individual long-term care product.

In 2016, U.S. Division contributed 46% of the Company's total premiums and deposits and, as at December 31, 2016, accounted for 56% of the Company's assets under management and administration.

Financial Performance

U.S. Division reported net income attributed to shareholders of \$1,134 million in 2016 compared with \$1,460 million in 2015. Net income attributed to shareholders is comprised of core earnings, which was \$1,615 million in 2016 compared with \$1,466 million in 2015, and items excluded from core earnings, which amounted to a net charge of \$481 million in 2016 compared with a net charge of \$6 million in 2015. The strengthening of the U.S. dollar compared with the Canadian dollar accounted for \$52 million of the increase in full year core earnings.

Expressed in U.S. dollars, the functional currency of the division, 2016 net income attributed to shareholders was US\$865 million compared with US\$1,138 million in 2015, core earnings was US\$1,218 million compared with US\$1,149 million in 2015, and items excluded from core earnings were a net charge of US\$353 million compared with a net charge of US\$11 million in 2015.

Core earnings increased by US\$69 million or 6% compared with 2015, primarily driven by a US\$52 million release of tax provisions as a result of closing certain tax years and the improved policyholder experience in the second half of 2016 as a result of changes to long-term care assumptions (see below in "2016 Review of Actuarial Methods and Assumptions"). In addition, lower amortization of deferred acquisition costs on in-force variable annuity business were partially offset by the impact of lower insurance sales and lower fee income in WAM businesses from fee compression in our pension business and changes in business mix. The unfavourable variance of US\$342 million in items excluded from core earnings related to investment-related experience losses compared with gains in 2015 as well as the write-off of a distribution network intangible asset in JH LTC.

The table below reconciles net income attributed to shareholders to core earnings for the U.S. Division for 2016, 2015 and 2014.

For the years ended December 31, (\$ millions)	Canadian \$			US \$		
	2016	2015	2014	2016	2015	2014
Core earnings⁽¹⁾	\$ 1,615	\$ 1,466	\$ 1,383	\$1,218	\$ 1,149	\$ 1,252
Items to reconcile core earnings to net income attributed to shareholders:						
Investment-related experience related to fixed income trading, market value increases in excess of expected alternative assets investment returns, asset mix changes and credit experience	149	(125)	482	122	(91)	447
Direct impact of equity markets and interest rates and variable annuity guarantee liabilities ⁽²⁾	(516)	164	282	(388)	117	247
Integration costs and intangible distribution network write-off ⁽³⁾	(114)	(45)	–	(87)	(37)	–
Net income attributed to shareholders	\$ 1,134	\$ 1,460	\$ 2,147	\$ 865	\$ 1,138	\$ 1,946

⁽¹⁾ Core earnings is a non-GAAP measure. See "Performance and Non-GAAP Measures" below. The 2015 earnings on assets backing capital allocated to each operating segment have been restated to align with the methodology used in 2016.

⁽²⁾ The direct impact of equity markets and interest rates is relative to our policy liability valuation assumptions and includes changes to interest rate assumptions. Our variable annuity guarantee dynamic hedging strategy is not designed to completely offset the sensitivity of policy liabilities to all risks associated with the guarantees embedded in these products. The US\$388 million charge in 2016 (2015 – US\$117 million gain) consisted of a US\$86 million charge (2015 – US\$17 million charge) related to variable annuities that are dynamically hedged, a US\$5 million gain (2015 – US\$71 million charge) on general fund equity investments supporting policy liabilities, a

US\$16 million charge (2015 – US\$76 million charge) related to variable annuities that are not dynamically hedged, and a US\$291 million charge (2015 – US\$281 million gain) related to fixed income reinvestment rates assumed in the valuation of policy liabilities. The amount of variable annuity guaranteed value that was dynamically hedged or reinsured at the end of 2016 was 94% (2015 – 94%).

(3) The 2016 charge of \$87 million relates primarily to the intangible asset distribution network write-off in the JH Long Term Care business. The 2015 charge of US\$37 million related to one-time integration costs associated with the acquisition of NYL RPS business.

Sales and Gross Flows

Insurance sales in 2016 of US\$459 million declined 6% compared with 2015 reflecting continued headwinds from the industry trend back towards products with guaranteed features which we have purposely de-emphasized in our product portfolio. We recorded strong double digit growth in sales of term and international products, two of our key products emphasized for growth. JH Life sales of US\$417 million in 2016 decreased 7% from the prior year as the competitive pressures highlighted above more than offset growth in term and international sales and the positive trends emerging in Vitality, our innovative health engagement rider. JH Long Term Care 2016 sales of US\$42 million increased 2% from the prior year as sales benefited from the biennial inflation buy-up activity in the U.S. Federal program offset by lower group and retail sales. Effective December 2, 2016, we discontinued new sales of our stand-alone retail individual long-term care product.

Wealth and Asset Management gross flows in 2016 were US\$49.4 billion, an increase of 5% compared with 2015, due to strong mid-market pension sales reflecting a full year of sales from the NYL RPS business acquired in April 2015 offset by lower mutual fund sales. Normalizing for the NYL RPS acquisition, annual gross flows were 1% higher than the prior year. Net outflows were US\$1.6 billion for the year, compared with net inflows of US\$9.5 billion in 2015.

JH Investments gross flows of US\$26.2 billion in 2016 decreased 7% compared with 2015. While fund performance improved in 4Q16, our overall sales environment was challenged throughout 2016 by the underperformance of a few key funds earlier in the year, customers' reduced appetite for actively managed solutions, and advisors' focus on impending implementation of the Department of Labor's ("DOL") Fiduciary Rule. Net outflows were US\$1.1 billion in 2016 compared with net inflows of US\$10.4 billion in 2015 reflecting our lower gross flows and increased redemptions due to the reasons listed above. Assets under management increased 6% from December 31, 2015 to US\$88.5 billion as at December 31, 2016.

JH Retirement Plan Services gross flows of US\$23.2 billion in 2016 were up 22% compared with 2015 or 11% when normalizing for the NYL RPS acquisition. This was driven primarily by strong mid-market sales, which demonstrated the strength of our expanded capabilities. Net outflows were US\$537 million in 2016 compared with net outflows of US\$905 million in the prior year. The improvement reflects strong mid-market sales and ongoing contributions which were more than offset by higher mid-market plan terminations unrelated to the business acquired from NYL due to intense pricing and competitive pressures as well as changes in plans' trustee and/or advisor.

Sales

For the years ended December 31, (\$ millions)	Canadian \$			US \$		
	2016	2015	2014	2016	2015	2014
Insurance products	\$ 608	\$ 625	\$ 554	\$ 459	\$ 488	\$ 501
Wealth and asset management products	65,448	60,567	41,488	49,364	47,180	37,570

Revenue

Total revenue in 2016 of US\$15.5 billion increased US\$7.8 billion compared with 2015 primarily driven by the non-recurrence of the Closed Block reinsurance transaction as well as favourable realized and unrealized gains and losses in 2016 compared with 2015. Revenue before net realized and unrealized investment gains (losses) and the impact of the Closed Block reinsurance transaction was down US\$754 million from 2015 as reduced premium income was partially offset by higher other revenue and investment income in Insurance.

Revenue

For the years ended December 31, (\$ millions)	Canadian \$			US \$		
	2016	2015	2014	2016	2015	2014
Net premium income excluding the Closed Block reinsurance transaction ⁽¹⁾	\$ 6,987	\$ 7,910	\$ 6,733	\$ 5,287	\$ 6,183	\$ 6,092
Investment income	6,946	6,569	6,198	5,246	5,145	5,610
Other revenue	5,591	5,350	4,531	4,223	4,182	4,102
Revenue before items noted below	19,524	19,829	17,462	14,756	15,510	15,804
Net realized and unrealized gains (losses) ⁽²⁾	1,034	(1,884)	11,271	790	(1,621)	10,154
Premium ceded, net of ceded commissions and additional consideration relating to Closed Block reinsurance transaction ⁽¹⁾	–	(7,996)	–	–	(6,109)	–
Total revenue	\$ 20,558	\$ 9,949	\$ 28,733	\$ 15,546	\$ 7,780	\$ 25,958

(1) For the purpose of comparable period-over-period reporting, we exclude the \$8 billion (US\$6.1 billion) impact of the Closed Block reinsurance transaction, which is shown separately, for full year 2015. For other periods as applicable, amounts in this line equal the "net premium income" in note 19 of the Consolidated Financial Statements.

(2) See "Financial Performance – Impact of Fair Value Accounting" above.

Premiums and Deposits

U.S. Division total premiums and deposits for 2016 were US\$56 billion, an increase of 2% compared with 2015. Premiums and deposits for insurance products of US\$6.2 billion decreased 6% compared with 2015 as sales activity was dampened by competitive pressures. Premiums and deposits for wealth and asset management products were US\$49.4 billion, an increase of 5% compared with 2015, reflecting strong deposits in JH RPS from the mid-market business partially offset by lower mutual fund deposits. In other wealth products, premiums and deposits declined 63% due to our reinsuring the remaining 10% of the fixed deferred annuity block in early 2016.

Premiums and Deposits

For the years ended December 31, (\$ millions)	Canadian \$			US \$		
	2016	2015	2014	2016	2015	2014
Insurance products ⁽¹⁾	\$ 8,267	\$ 8,528	\$ 7,368	\$ 6,239	\$ 6,667	\$ 6,665
Wealth and asset management products	65,448	60,567	41,488	49,364	47,180	37,570
Other wealth products (Annuities)	557	1,523	1,297	435	1,191	1,176
Total premiums and deposits	\$ 74,272	\$ 70,618	\$ 50,153	\$ 56,038	\$ 55,038	\$ 45,411

⁽¹⁾ For the purpose of comparable period-over-period reporting, the impact of the 3Q15 Closed Block reinsurance transaction is excluded from insurance products premiums in this table. This transaction resulted in a net ceded premium (negative premium) of approximately \$8.0 billion (US\$6.1 billion) for the full year 2015.

Assets under Management and Administration

U.S. Division assets under management and administration as at December 31, 2016 were US\$406.2 billion, up 5% from December 31, 2015. The increases were driven by investment income and the impact of favourable equity markets on the valuation of mutual fund investments, partially offset by the continued runoff of our Annuities business.

Assets under Management and Administration

As at December 31, (\$ millions)	Canadian \$			US \$		
	2016	2015	2014	2016	2015	2014
General fund	\$ 152,040	\$ 149,319	\$ 135,173	\$ 113,240	\$ 107,883	\$ 116,520
Segregated funds	191,391	194,291	174,397	142,548	140,377	150,330
Mutual funds and other	119,486	116,427	87,450	88,993	84,117	75,382
Total assets under management	462,917	460,037	397,020	344,781	332,377	342,232
Other assets under administration	82,433	77,910	1,509	61,396	56,290	1,301
Total assets under management and administration	\$ 545,350	\$ 537,947	\$ 398,529	\$ 406,177	\$ 388,667	\$ 343,533

Strategic Direction

John Hancock is focused on building out our wealth products and advice services, developing a modernized insurance purchase and ownership experience that appeals to a wider demographic, and engaging with our customers in client-focused formats that incorporate our digital capabilities and customer insights.

Throughout 2016, John Hancock continued to enhance our personalized and holistic services to support our clients. This included making certain products available directly to clients, rewarding clients for making healthy decisions, and providing solutions that meet the needs of a broader demographic.

JH Investments' unique approach to asset management enables us to provide a diverse set of investments backed by some of the world's best managers, along with strong risk-adjusted returns across asset classes. Our performance is the result of our manager-of-managers model and our focus on finding and overseeing the best portfolio teams. We also offer ETFs both as a complement to the actively managed funds and in response to investors' changing preferences. In 2016, JH Investments:

- Launched 4 environmental, social and governance ("ESG") funds for investors that integrate ESG issues with fundamental stock research;
- Added 6 new strategic ETF's, bringing the total to 12 differentiated multi-factor investment strategies;
- Increased the number of platforms through which customers may buy our ETFs; and
- Started selling a suite of Undertakings for Collective Investments in Transferable Securities ("UCITS") to make our funds available to non-residents of the U.S.

JH RPS successfully expanded to the mid- and large-plan market segments in 2016, enabled by the capabilities acquired through the successful integration of the New York Life retirement plan services business purchased in 2015. We continued to maintain our focus on the small plan market.

JH Insurance continued to expand our wellness-linked life insurance program through our exclusive partnership with Vitality, the global leader in integrating wellness benefits with life insurance products. By making healthy food and activity choices in a process that encourages customer engagement with John Hancock, clients participating in the Vitality program earn rewards towards their

insurance premiums and discounts with health-based retailers. In addition, we launched a lower-cost term life insurance product, which is a direct-to-consumer insurance option for individuals who are not purchasing through an agent and a product that simplified and expedited the underwriting requirements for eligible clients.

In response to industry trends and stagnant consumer demand, in the fall of 2016 we announced that we will discontinue new sales of our stand-alone individual long-term care product. This decision does not have a material impact on our on-going earnings. We are committed to serving our existing customers and honoring our obligations to our over 1.2 million long-term care policyholders. We intend to continue to offer long-term care coverage as an accelerated benefit rider to our wide range of life insurance products, an increasingly popular alternative to stand-alone long-term care insurance policies in recent years.

John Hancock's broker-dealer, Signator Investors, Inc., successfully completed the acquisition of Transamerica Financial Advisors ("TFA") in 2016, moving Signator into the top 15 broker-dealers in the U.S. by advisor headcount, expanding its customer reach in every state in the country, and broadening its distribution opportunities through TFA's established bank-channel relationships.

Corporate and Other

Corporate and Other is comprised of investment performance on assets backing capital, net of amounts allocated to operating divisions, financing costs, Investment Division's external asset management business (Manulife Asset Management), our Property and Casualty ("P&C") Reinsurance business; and our run-off reinsurance business lines including variable annuities and accident and health.

For segment reporting purposes the impact of updates to actuarial assumptions, settlement costs for macro equity hedges and other non-operating items are included in this segment's earnings. This segment is also where we reclassify favourable investment-related experience to core earnings from items excluded from core earnings, subject to certain limits (see "Performance and Non-GAAP Measures" below). In each of the other segments, we report all investment-related experience in items excluded from core earnings.

In 2016, Corporate and Other contributed 11% of the Company's premiums and deposits and, as at December 31, 2016, accounted for 8% of the Company's assets under management and administration.

Financial Performance

Corporate and Other reported a net loss attributed to shareholders of \$832 million for 2016 compared with a net loss of \$854 million for 2015. The net loss is comprised of core loss and items excluded from core loss. The core loss was \$473 million in 2016 compared with \$524 million in 2015; items excluded from core loss amounted to net charges of \$359 million in 2016 compared with net charges of \$330 million in 2015.

The \$51 million decrease in core loss is largely due to the inclusion of \$197 million of core investment gains in 2016 compared with nil in 2015 and \$73 million in 2016 related to the release of provisions and interest on uncertain tax positions in the U.S. These gains were partially offset by \$86 million lower investment income driven by higher interest expense due to debt issuances over the year and lower realized gains on available-for-sale equities, \$75 million higher interest allocated to the divisions, \$35 million higher expected macro hedging costs and higher expenses in Corporate and Other and strategic investments in our Manulife Asset Management business.

The table below reconciles the net loss attributed to shareholders to the core loss for Corporate and Other for 2016, 2015 and 2014.

For the years ended December 31, (\$ millions)	2016	2015	2014
Core loss excluding expected cost of macro hedges and core investment gains	\$ (409)	\$ (298)	\$ (446)
Expected cost of macro hedges	(261)	(226)	(184)
Investment-related experience included in core earnings	197	–	200
Total core loss⁽¹⁾	(473)	(524)	(430)
Items to reconcile core loss to net loss attributed to shareholders:			
Direct impact of equity markets and interest rates ⁽²⁾	195	200	(94)
Changes in actuarial methods and assumptions	(453)	(451)	(198)
Investment-related experience related to mark-to-market items ⁽³⁾	71	(39)	14
Reclassification to core investment-related experience above	(197)	–	(200)
Impact of tax changes, integration and acquisition costs	(8)	(40)	–
Restructuring charges and other	33	–	12
Net loss attributed to shareholders	\$ (832)	\$ (854)	\$ (896)

⁽¹⁾ This item is a non-GAAP measure. See "Performance and Non-GAAP Measures" below. The 2015 earnings on assets backing capital allocated to each operating segment have been restated to align with the methodology used in 2016.

⁽²⁾ The direct impact of equity markets and interest rates included a loss of \$120 million (2015 – gain of \$234 million) on derivatives associated with our macro equity hedges and a gain of \$370 million (2015 – gain of \$5 million) on the sale of AFS bonds. Other items in this category netted to a charge of \$55 million (2015 – charge of \$39 million).

⁽³⁾ Investment-related experience includes mark-to-market gains or losses on assets held in the Corporate and Other segment other than gains on AFS equities and seed money investments in new segregated or mutual funds.

Revenue

Revenue was \$778 million for 2016 compared with \$414 million in 2015. The favourable variance was primarily driven by realized gains on available-for-sale bonds, the release of interest on the resolution of tax related positions, and a consolidation adjustment related to interests in structured entities, partially offset by losses on the macro hedging program.

Revenue

For the years ended December 31,
(\$ millions)

	2016	2015	2014
Net premium income	\$ 87	\$ 90	\$ 77
Investment income (loss) ⁽¹⁾	653	130	(23)
Other revenue	545	190	263
Revenue before net realized and unrealized investment gains (losses) and on the macro hedge program	1,285	410	317
Net realized and unrealized gains (losses) ⁽²⁾ and on the macro hedge program	(507)	4	(393)
Total revenue	\$ 778	\$ 414	\$ (76)

⁽¹⁾ Includes gains of \$512 million (2015 – losses of \$6 million) on the sale of AFS bonds.

⁽²⁾ See “Financial Performance – Impact of Fair Value Accounting” above.

Premiums and Deposits

Premiums and deposits were \$18.4 billion for 2016 compared with \$22.2 billion reported in 2015. These amounts primarily relate to Investment Division’s external asset management business. (See “Investment Division” below)

Premiums and Deposits

For the years ended December 31,
(\$ millions)

	2016	2015	2014
Life Retrocession	\$ 1	\$ 2	\$ 2
Property and Casualty Reinsurance	86	88	75
Institutional and other deposits	18,300	22,150	8,185
Total premiums and deposits	\$ 18,387	\$ 22,240	\$ 8,262

Assets under Management

Assets under management of \$75.7 billion as at December 31, 2016 (2015 – \$71.6 billion) included assets managed by Manulife Asset Management on behalf of institutional clients of \$79.7 billion (2015 – \$71.2 billion) and the Company’s own funds of \$3.8 billion (2015 – \$7.6 billion), partially offset by a \$7.8 billion (2015 – \$7.2 billion) total company adjustment related to the reclassification of derivative positions net of the cash received as collateral on derivative positions. The decrease in the Company’s own funds primarily reflects the impact of higher assets allocated to the operating divisions and the payment of shareholder dividends, partially offset by net issuances of subordinated debt and preferred shares during the year.

Assets under Management

As at December 31,
(\$ millions)

	2016	2015	2014
General fund	\$ (3,847)	\$ 485	\$ 5,242
Segregated funds – elimination of amounts held by the Company	(177)	(171)	(202)
Institutional advisory accounts	79,760	71,237	41,573
Total assets under management	\$ 75,736	\$ 71,551	\$ 46,613

Strategic Direction

With respect to our overall Company strategy, we have a matrix organization to ensure that we leverage our global scale and sharing of best practices. As such, we continue to add strength to our Group Functions as well as in the operating divisions in the areas of innovation, marketing and technology.

With respect to the businesses whose results are reported in the Corporate and Other results:

Our P&C Reinsurance business provides substantial retrocessional capacity for a very select clientele in the property and casualty reinsurance market. We continue to manage the risk exposures of this business in relation to the total Company balance sheet risk and volatility as well as the prevailing market pricing conditions.

The strategic direction for our Manulife Asset Management business is included in the “Investment Division” section that follows.

Investment Division

Manulife’s Investment Division manages the Company’s general fund assets and, through Manulife Asset Management (“MAM”), provides comprehensive asset management and asset allocation solutions to institutional clients and investment funds, and investment management services to retail clients through Manulife and John Hancock product offerings.

We have expertise managing a broad range of investments including public and private bonds, public and private equities, commercial mortgages, real estate, power and infrastructure, timberland, farmland, and oil and gas. With a team of more than 3,400 employees, the Investment Division has a physical presence in key markets, including the United States, Canada, the United Kingdom, Hong Kong, Japan, and Singapore. In addition, MAM has a joint venture asset management business in mainland China, Manulife TEDA Fund Management Company Ltd.

General Fund

Our investment philosophy for the General Fund is to invest in an asset mix that optimizes our risk adjusted returns and matches the characteristics of our underlying liabilities. We follow a bottom-up approach which combines our strong asset management skills with an in-depth understanding of the characteristics of each investment. We invest in a diversified mix of assets, including a variety of alternative long-duration asset classes. Our diversification strategy has historically produced superior risk adjusted returns while reducing overall risk. We use a disciplined approach across all asset classes and we do not chase yield in the riskier end of the fixed income market. This strategy has resulted in a well-diversified, high quality investment portfolio, which has historically delivered strong investment-related experience through-the-cycle. Our risk management strategy is outlined in the “Risk Management” section below.

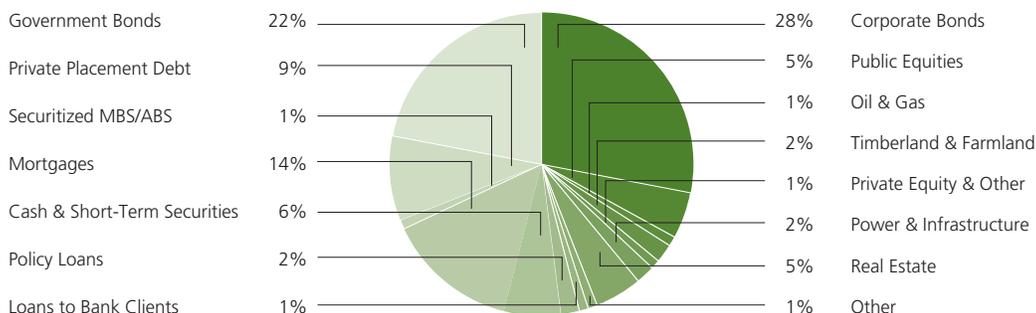
General Fund Assets

As at December 31, 2016, our General Fund invested assets totaled \$321.9 billion compared with \$307.5 billion at the end of 2015. The following charts show the asset class composition as at December 31, 2016 and December 31, 2015.

2016



2015



Investment Income

For the year ended December 31, 2016 (\$ millions, unless otherwise stated)	2016		2015	
	Income	Yield ⁽¹⁾	Income	Yield ⁽¹⁾
Interest income	\$ 10,533	3.40%	\$ 10,114	3.40%
Dividend, rental and other income	2,277	0.70%	1,893	0.60%
Impairments	(206)	(0.10%)	(633)	(0.20%)
Other, including gains (losses) on sale of AFS debt securities	786	0.20%	91	–
Investment income before realized and unrealized gains on assets supporting insurance and investment contract liabilities and on macro equity hedges	\$ 13,390		\$ 11,465	
Realized and unrealized gains (losses) on assets supporting insurance and investment contract liabilities and on macro equity hedges				
Debt securities	\$ 1,662	0.50%	\$ (3,957)	(1.30%)
Public equities	985	0.30%	(513)	(0.20%)
Mortgages and private placements	92	–	373	0.10%
Alternative long-duration assets and other investments	976	0.30%	1,335	0.40%
Derivatives, including macro equity hedging program	(2,581)	(0.80%)	(300)	(0.10%)
	\$ 1,134		\$ (3,062)	
Total investment income	\$ 14,524	4.70%	\$ 8,403	2.90%

⁽¹⁾ Yields are based on IFRS income and are calculated using the geometric average of assets held at IFRS carrying value during the reporting period.

In 2016, the \$14.5 billion of investment income (2015 – \$8.4 billion) consisted of:

- \$13.4 billion of investment income before net realized and unrealized gains (losses) on assets supporting insurance and investment contract liabilities and on macro equity hedges (2015 – \$11.5 billion), and;
- \$1.1 billion of net realized and unrealized gains on assets supporting insurance and investment contract liabilities and on macro equity hedges (2015 – loss of \$3.1 billion).

The \$1.9 billion increase in net investment income before unrealized and realized gains was due to higher income of \$0.8 billion primarily from higher interest and dividend income, \$0.7 billion higher gains on surplus assets and \$0.4 billion mainly from lower impairments on oil and gas properties in 2016.

The change in net realized and unrealized gains related to the changes in interest rates and equity markets. In 2016, the general decrease in the U.S. interest rates resulted in gains of \$1.7 billion (2015 – losses of \$4.0 billion) on debt securities. The increase in equity markets in 2016 resulted in gains of \$1.0 billion (2015 – losses of \$0.5 billion) on public equities supporting insurance and investment contract liabilities. Net losses of \$2.6 billion on derivatives in 2016, including the macro equity hedging program, primarily related to losses on short equity contracts as a result of increases in major stock indices during the year.

As the measurement of insurance and investment contract liabilities includes estimates regarding future expected investment income on assets supporting the insurance and investment contract liabilities, only the difference between the mark-to-market accounting on the measurement of both assets and liabilities impacts net income. Refer to “Financial Performance” above.

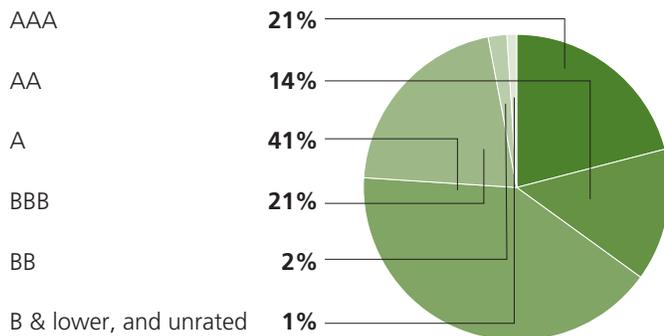
Debt Securities and Private Placement Debt

We manage our high quality fixed income portfolio to optimize yield and quality while ensuring that asset portfolios remain diversified by sector, industry, duration, issuer, and geography. As at December 31, 2016, our fixed income portfolio of \$198.4 billion (2015 – \$185.4 billion) was 97% investment grade and 76% was rated A or higher (2015 – 97% and 77%, respectively). Our private placement debt holdings provide diversification benefits (issuer, industry, and geography) and, because they often have stronger protective covenants and collateral than debt securities, they typically provide better credit protection and potentially higher recoveries in the event of default. Geographically, 29% is invested in Canada (2015 – 29%), 47% is invested in the U.S. (2015 – 48%), 3% is invested in Europe (2015 – 4%) and the remaining 21% is invested in Asia and other geographic areas (2015 – 19%).

Debt Securities and Private Placement Debt – by Credit Quality⁽¹⁾

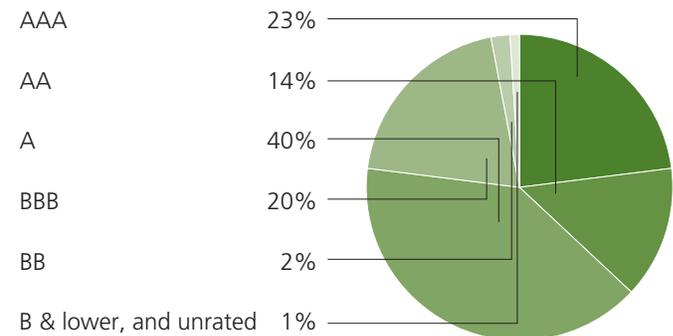
2016

\$198.4B



2015

\$185.4B



⁽¹⁾ Reflects credit quality ratings as assigned by Nationally Recognized Statistical Rating Organizations (“NRSRO”) using the following priority sequence order: Standard & Poor’s, Moody’s, Dominion Bond Rating Service, Fitch, Rating and Investment Information, and Japan Credit Rating. For those assets where ratings by NRSRO are not available, disclosures are based upon internal ratings as described in the “Risk Management” and “Risk Factors” sections below.

As at December 31, Per cent of carrying value	2016			2015		
	Debt securities	Private placement debt	Total	Debt securities	Private placement debt	Total
Government and agency	43	10	38	44	11	39
Utilities	14	49	19	14	49	19
Financial	14	5	13	14	7	13
Industrial	6	9	7	6	8	6
Consumer (non-cyclical)	5	12	6	5	9	6
Energy – Oil & Gas	5	5	5	4	5	4
Energy – Other	3	1	3	3	2	3
Basic materials	2	3	2	2	3	2
Consumer (cyclical)	2	5	2	2	6	2
Securitized (MBS/ABS)	2	1	2	2	–	2
Telecommunications	2	–	1	2	–	2
Technology	1	–	1	1	–	1
Media and internet and other	1	–	1	1	–	1
Total per cent	100	100	100	100	100	100
Total carrying value (\$ billions)	\$ 168.6	\$ 29.8	\$ 198.4	\$ 157.8	\$ 27.6	\$ 185.4

As at December 31, 2016, gross unrealized losses on our fixed income holdings were \$3.5 billion or 2% of the amortized cost of these holdings (2015 – \$3.0 billion or 2%). Of this amount, \$35 million (2015 – \$55 million) related to debt securities trading below 80% of amortized cost for more than 6 months. Securitized assets represented \$23 million of the gross unrealized losses and \$2 million of the amounts trading below 80% of amortized cost for more than 6 months (2015 – \$18 million and none, respectively). After adjusting for debt securities held in participating policyholder and pass-through segments and the provisions for credit included in the insurance and investment contract liabilities, the potential impact to shareholders’ pre-tax earnings for debt securities trading at less than 80% of amortized cost for greater than 6 months was approximately \$34 million as at December 31, 2016 (2015 – \$46 million).

Mortgages

As at December 31, 2016, mortgages represented 14% of invested assets (2015 – 14%) with 61% of the mortgage portfolio invested in Canada (2015 – 63%) and 39% in the U.S. (2015 – 37%). As shown below, the overall portfolio is also diversified by geographic region, property type, and borrower. Of the total mortgage portfolio, 19% is insured (2015 – 20%), primarily by the Canada Mortgage and Housing Corporation (“CMHC”) – Canada’s AAA rated government backed national housing agency, with 43% of residential mortgages insured (2015 – 45%) and 3% of commercial mortgages insured (2015 – 4%).

As at December 31, (\$ billions)	2016		2015	
	Carrying value	% of total	Carrying value	% of total
Commercial				
Retail	\$ 8.2	18	\$ 8.0	18
Office	7.3	17	7.1	16
Multi-family residential	4.8	11	4.6	11
Industrial	2.8	6	2.8	7
Other commercial	2.6	6	2.8	6
Other mortgages	25.7	58	25.3	58
Manulife Bank single-family residential	17.7	40	17.5	40
Agricultural	0.8	2	1.0	2
Total mortgages	\$ 44.2	100	\$ 43.8	100

Our commercial mortgage loans are originated with a hold-for-investment philosophy. They have low loan-to-value ratios, high debt-service coverage ratios, and as at December 31, 2016 there were no loans in arrears. Geographically, of the total mortgage loans, 37% are in Canada and 63% are in the U.S. (2015 – 40% and 60%, respectively). We are diversified by property type and largely avoid risky market segments such as hotels, construction loans and second liens.

Non-CMHC Insured Commercial Mortgages⁽¹⁾

As at December 31,	2016		2015	
	Canada	U.S.	Canada	U.S.
Loan-to-Value ratio ⁽²⁾	64%	56%	62%	57%
Debt-Service Coverage ratio ⁽²⁾	1.47x	1.90x	1.56x	2.01x
Average duration	4.2 years	6.4 years	3.7 years	6.2 years
Average loan size (\$ millions)	\$11.4	\$17.1	\$10.0	\$16.1
Loans in arrears ⁽³⁾	0.00%	0.00%	0.07%	0.00%

⁽¹⁾ Excludes Manulife Bank commercial mortgage loans of \$67 million (2015 – \$50 million).

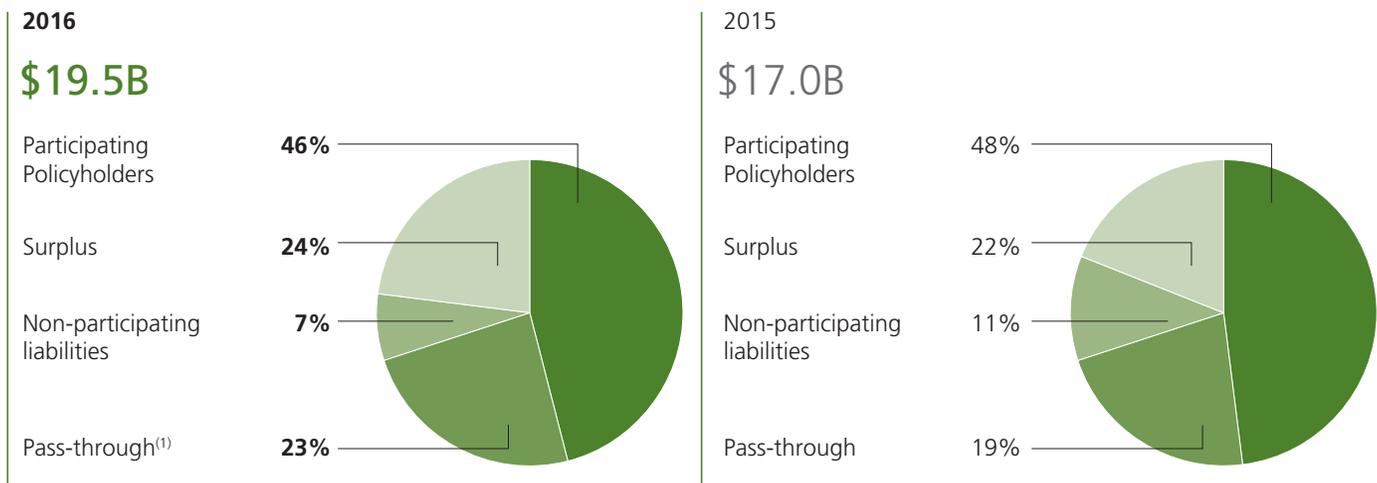
⁽²⁾ Loan-to-Value and Debt-Service Coverage are based on re-underwritten cash flows.

⁽³⁾ Arrears defined as over 90 days past due in Canada and over 60 days past due in the U.S.

Public Equities

As at December 31, 2016, public equity holdings of \$19.5 billion represented 6% (2015 – \$17.0 billion and 5%) of invested assets and, when excluding participating policyholder and pass-through segments, represented 2% (2015 – 2%) of invested assets. The portfolio is diversified by industry sector and issuer. Geographically, 33% (2015 – 33%) is held in Canada, 37% (2015 – 37%) is held in the U.S., and the remaining 30% (2015 – 30%) is held in Asia, Europe and other geographic areas.

Public Equities – by Segment



⁽¹⁾ Public equities denoted as pass-through are held by the Company to support the yield credited on equity-linked investment funds for Canadian life insurance products.

Alternative Long-Duration Assets (“ALDA”)

Our alternative long-duration asset portfolio is comprised of a diverse range of asset classes with varying degrees of correlations. The portfolio typically consists of private assets representing investments in varied sectors of the economy which act as a natural hedge against future inflation and serve as an alternative source of asset supply to long-term corporate bonds. In addition to being a suitable match for our long-duration liabilities, these assets provide enhanced long-term yields and diversification relative to traditional fixed income markets. The vast majority of our alternative long-duration assets are managed in-house.

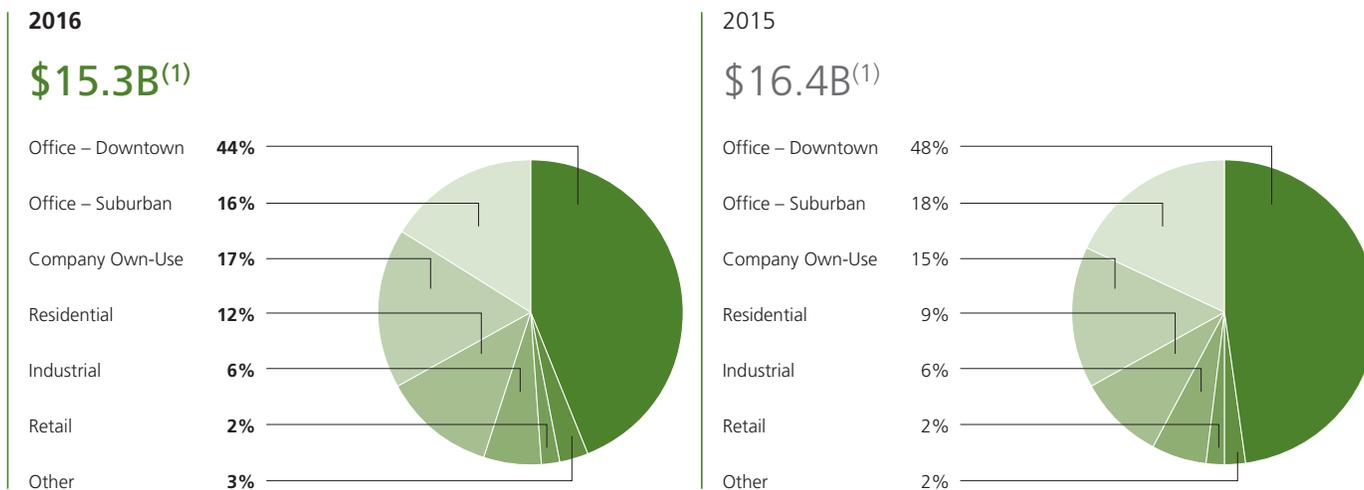
As at December 31, 2016, alternative long-duration assets of \$33.0 billion represented 10% (2015 – \$31.6 billion and 10%) of invested assets. The fair value of total ALDA was \$34.5 billion at December 31, 2016 (2015 – \$32.7 billion). The carrying value and corresponding fair value by sector and/or asset type as follows:

As at December 31, (\$ billions)	2016		2015	
	Carrying value	Fair value	Carrying value	Fair value
Real estate	\$ 14.1	\$ 15.3	\$ 15.3	\$ 16.4
Power and infrastructure	6.7	6.7	5.3	5.3
Private equity	4.6	4.6	3.8	3.8
Timberland	3.7	3.7	3.6	3.6
Oil & gas	2.1	2.1	1.7	1.7
Farmland	1.3	1.6	1.5	1.5
Other	0.5	0.5	0.4	0.4
Total ALDA	\$ 33.0	\$ 34.5	\$ 31.6	\$ 32.7

Real Estate

Our real estate portfolio is diversified by geographic region; of the total fair value of this portfolio, 59% is located in the U.S., 35% in Canada, and 6% in Asia as at December 31, 2016 (2015 – 63%, 31%, and 6%, respectively). This high quality portfolio has virtually no leverage and is primarily invested in premium urban office towers, concentrated in cities with stable growth, and highly diverse economies, in North America and Asia. The portfolio is well positioned with an average occupancy rate of 94% (2015 – 93%) and an average lease term of 6.1 years (2015 – 6.2 years). During 2016, we executed 5 acquisitions, representing \$0.4 billion market value of commercial real estate assets (2015 – 6 acquisitions and \$2.2 billion).

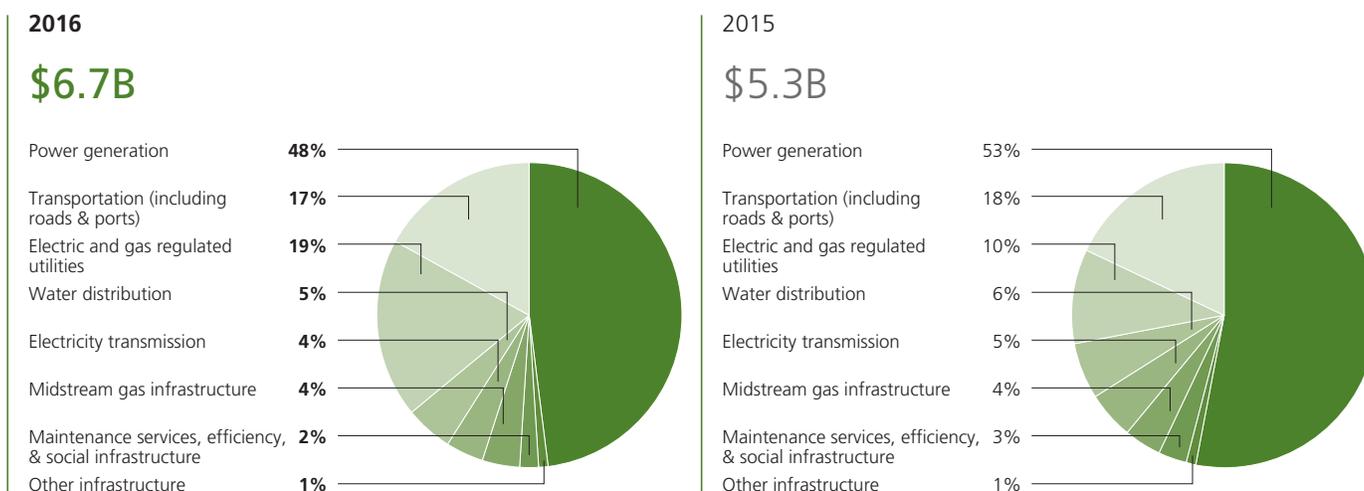
The segment composition of our real estate portfolio based on fair value is as follows:



⁽¹⁾ These figures represent the fair value of the real estate portfolio. The carrying value of the portfolio was \$14.1 billion and \$15.3 billion at December 31, 2016 and December 31, 2015, respectively.

Power & Infrastructure

We invest both directly and through funds in a variety of industry specific asset classes, listed below. The portfolio is well diversified with over 300 portfolio companies. The portfolio is predominately invested in the U.S. and Canada, but also in the United Kingdom, Europe and Australia. Our power and infrastructure holdings are as follows:



Timberland & Farmland

Our timberland and farmland assets are managed by a proprietary entity, Hancock Natural Resources Group (“HNRG”). In addition to being the world’s largest timberland investment manager for institutional investors¹, with timberland properties in the U.S., New Zealand, Australia, Chile, Canada and Brazil, HNRG also manages farmland properties in the U.S., Australia and Canada. In 2011, HNRG established a renewable energy business unit focused on investments in the bio-energy sector. The General Fund’s timberland portfolio comprised 23% of HNRG’s total timberland assets under management (“AUM”) (2015 – 19%). The farmland portfolio includes annual (row) crops, fruit crops, wine grapes, and nut crops. The General Fund’s holdings comprised 40% of HNRG’s total farmland AUM (2015 – 42%).

Private Equities

Our private equity portfolio of \$4.6 billion (2015 – \$3.8 billion) includes both directly held private equity and private equity funds. Both are diversified across vintage years and industry sectors.

Oil & Gas

This category is comprised of \$0.9 billion (2015 – \$0.8 billion) in our conventional Canadian oil and gas properties managed by our subsidiary, NAL Resources, and various other oil and gas private equity interests of \$1.2 billion (2015 – \$0.9 billion). Production mix for conventional oil and gas assets in 2016 was approximately 40% crude oil, 45% natural gas, and 15% natural gas liquids (2015 – 44%, 43%, and 13%, respectively). Private equity interests are a combination of both producing and mid-streaming assets.

In 2016, the carrying value of our oil and gas holdings, increased by \$0.4 billion and the fair value increased by \$0.4 billion, driven by the rebound in commodity prices.

In 2015, the fair value of our oil and gas investments declined by \$0.6 billion, excluding the impact of currency, and as noted in the “Financial Performance” section, we reported \$876 million of post-tax investment-related experience losses related to the sharp decline in oil and gas prices. The pre-tax investment-related experience loss in 2015 was greater than the fair value decline as the investment-related experience compares actual returns to expected returns used in the valuation of policy liabilities. Refer to “Critical Accounting and Actuarial Assumptions” below.

Manulife Asset Management

Manulife Asset Management (“MAM”) provides comprehensive asset management solutions to institutional clients (such as pension plans, foundations, endowments and financial institutions) and investment funds, and investment management services to retail clients through Manulife and John Hancock product offerings.

As at December 31, 2016, MAM had \$460.7 billion of AUM compared with \$433.9 billion at the end of 2015. This includes \$80.1 billion (2015 – \$71.5 billion) of comprehensive asset management and asset allocation solutions to institutional clients and \$303.2 billion (2015 – \$290.1 billion) of investment funds and investment management services to retail clients through Manulife and John Hancock product offerings, as well as \$77.4 billion (2015 – \$72.3 billion) related to our general fund assets.

In 2016, MAM AUM increased \$26.8 billion from 2015 driven by positive market performance, significant institutional mandate wins and growth in general fund AUM, partially offset by currency translation losses on external clients AUM.

The following charts show the movement in AUM over the year as well as by asset class.

AUM Movement

(\$ billions)	2016	2015
MAM External AUM, Beginning	\$ 361.6	\$ 277.6
Standard Life acquisition	–	26.0
Standard Chartered Bank’s MPF business acquisition	1.9	–
Gross Institutional flows	18.3	22.1
Institutional redemptions	(9.8)	(7.7)
Net Institutional flows	8.5	14.4
Net Affiliate flows ⁽¹⁾	0.5	0.8
Asset transfers	2.7	(2.8)
Market impact	15.4	0.9
Currency impact	(7.3)	44.7
MAM External AUM, Ending	383.3	361.6
General Fund AUM (managed by MAM), Beginning ⁽²⁾	72.3	54.4
Net flows, market and currency impacts	5.1	17.9
General Fund AUM (managed by MAM), Ending ⁽²⁾	77.4	72.3
Total MAM AUM	\$ 460.7	\$ 433.9

⁽¹⁾ Affiliate flows and redemptions related to activities of the three operating divisions (U.S., Canada and Asia)

⁽²⁾ 2015 beginning and ending General Fund assets have been restated to include the fair value of the real estate portfolios managed by MAM for comparative purposes.

¹ Based on the global timber investment management organization ranking in the *RISI International Timberland Ownership and Investment Database*.

Net Institutional and Affiliate Flows

In 2016, net institutional flows of \$8.5 billion were primarily driven by sales from new and existing institutional clients in Canada, Asia and the U.S. led by strategic fixed income, liability-driven investing (LDI) and Canadian fixed income strategies. Affiliate net flows of \$0.5 billion were primarily driven by strong flows from mutual funds across all regions and strong net flows from Asia retirement products and insurance, partially offset by net outflows from U.S. variable annuities and retirement products.

AUM Composition

As at December 31, (\$ billions)	2016	2015
Affiliate / Retail ⁽¹⁾ :		
Fixed income	\$ 104.1	\$ 93.2
Balanced	22.0	22.6
Equity	103.4	94.7
Asset allocation ⁽²⁾	71.2	77.5
Alternatives	2.5	2.1
	303.2	290.1
Institutional:		
Fixed income	48.3	38.7
Balanced	1.9	2.3
Equity	14.9	14.3
Asset allocation ⁽²⁾	0.1	0.1
Alternatives	14.9	16.1
	80.1	71.5
MAM External AUM	383.3	361.6
General Fund		
Fixed income	42.0	36.6
Equity	14.9	13.7
Alternative long-duration assets ⁽³⁾	20.5	22.0
General Fund AUM (managed by MAM)	77.4	72.3
Total MAM AUM	\$ 460.7	\$ 433.9

⁽¹⁾ Includes 49% of assets managed by Manulife TEDA Fund Management Company Ltd.

⁽²⁾ Internally-managed asset-allocation assets included in other asset categories to eliminate double counting: \$74.8 billion and \$66.7 billion in 2016 and 2015, respectively, in Affiliate/Retail, and \$0.04 billion and \$0.4 billion in 2016 and 2015, respectively, in Institutional Advisory.

⁽³⁾ December 2015 comparative amounts for General Fund ALDA have been restated to include the fair value of the real estate portfolios managed by MAM.

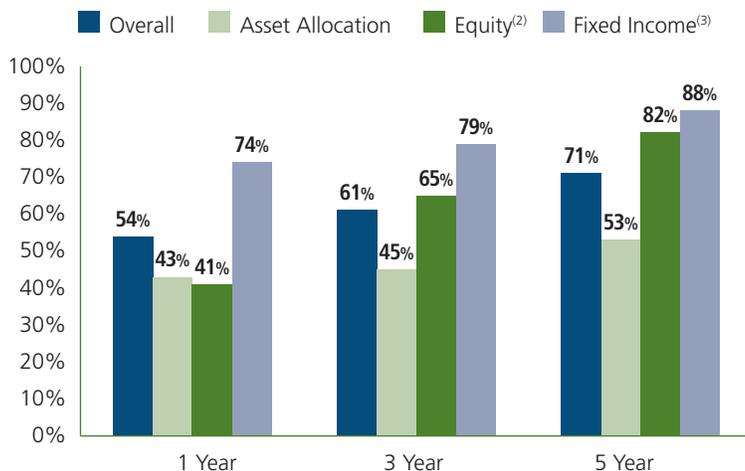
Total MAM External AUM by Client Geography

We operate from offices in 16 countries and territories, managing local and international investment products for our global client base.

As at December 31, (\$ billions)	2016	%	2015	%
U.S.	\$ 217.4	57	\$ 220.4	61
Canada	100.4	26	87.2	24
Asia region	60.6	16	50.7	14
Europe and other region	4.9	1	3.3	1
Total MAM External AUM	\$ 383.3	100	\$ 361.6	100

Investment Performance

% of AUM Outperforming Benchmarks⁽¹⁾



As at December 31, 2016, overall investment performance has consistently exceeded our benchmarks on a 1, 3 and 5-year basis.

⁽¹⁾ Investment performance is based on actively managed MAM Public Markets account-based, asset-weighted performance versus their primary internal targets, which includes accounts managed by portfolio managers of MAM. Some retail accounts are evaluated net of fees versus their respective Morningstar peer group. All institutional accounts and all other retail accounts are evaluated gross of fees versus their respective index.

⁽²⁾ Includes balanced funds.

⁽³⁾ Includes money market funds.

Long-term investment performance continued to be a differentiator for MAM, with the majority of public asset classes outperforming their benchmarks on a 1-, 3- and 5-year basis. At December 31, 2016, MAM had 112 Four- or Five-star Morningstar rated funds¹, an increase of 17 funds since December 31, 2015. In 2015, the number of Four- or Five-star Morningstar rated funds increased by 23.

Strategic Direction

The demand for multi-asset class solutions, liability-driven investing (“LDI”), real assets, global and emerging market equities, and public and private fixed income persists as institutional and retail investors continue to seek higher risk-adjusted returns. MAM’s strategic priorities are designed to continue to capitalize on this demand by closely aligning our global wealth and asset management business and leveraging our skills and expertise across our international operations to build long-lasting customer relationships. MAM increased its ranking amongst global asset managers from 32nd to 28th largest asset manager by Pension & Investments’ institutional money manager survey as of December 31, 2015. The ranking, published in its May 30, 2016 issue, covered 604 global asset management firms.²

MAM’s strategy is founded upon key differentiators: offering private and public multi-assets to holistically address client needs, providing alpha-focused active management in a boutique environment, and leveraging best-in-class global capabilities and expertise. This strategy is integral to Manulife’s overall strategy of continuing to build and integrate our global wealth and asset management businesses, as well as expand our investment and/or sales offices into key markets, not restricting ourselves to geographies where we currently have, or expect to have, insurance operations. Wealth and Asset Management is a truly global business – both in demand and supply. Customers in any given location have the desire for globally-sourced product, and customers with our global product will benefit from on-the-ground perspectives generated by our investment professionals situated in diverse parts of the world, but globally networked and supervised for quality control.

In 2016, we continued our efforts to expand our distribution footprint beyond where we have historically had insurance operations. We launched a Singapore-listed real estate investment trust (REIT), an innovative investment solution that leveraged Manulife’s global capabilities that allowed investors in Asia to access U.S.-based real estate properties. To support expansion into the European and Latin American markets, we expanded our London regional headquarters, including key hires in both the distribution and investment teams. To lead our expansion into the growing alternative asset space, we have appointed a new head of our liquid alternative investments team to broaden our range of absolute return and outcome-oriented capabilities, including stand-alone and multi-asset class strategy solutions.

See “Performance by Business Line” section below for additional information with respect to our globally diversified wealth and asset management franchise.

¹ For each fund with at least a 3-year history, Morningstar calculates a Morningstar Rating based on a Morningstar Risk-Adjusted Return that accounts for variation in a fund’s monthly performance (including effects of sales charges, loads and redemption fees), placing more emphasis on downward variations and rewarding consistent performance. The top 10% of funds in each category, the next 22.5%, 35%, 22.5% and bottom 10% receive 5, 4, 3, 2 or 1 star, respectively. The overall Morningstar Rating for a fund is derived from a weighted average of the performance associated with its 3-, 5- and 10 year (if applicable) Morningstar Rating metrics. Past performance is no guarantee of future results. The overall rating includes the effects of sales charges, loads and redemption fees, while the load-waived does not. Load-waived rating for Class A shares should only be considered by investors who are not subject to a front-end sales charge.

² Based on the institutional trade publication, *Pension & Investments*. Basis of measurement is institutional AUM.

Performance by Business Line

Additional information for Wealth and Asset Management

Manulife has a globally diversified wealth and asset management (“WAM”) franchise spanning mutual funds, group retirement and savings products, and institutional asset management capabilities across all major asset classes. We have achieved strong growth through expanding our broad-based extensive distribution platforms in the U.S., Canada, Asia, and now Europe, and leveraging our global asset management expertise. With investment professionals on the ground in 16 countries, our deep local knowledge, and expertise in sought after asset classes such as alternative long-duration assets, positions us well for continued success. In addition to mutual fund businesses in 11 markets, we have leading retirement platforms in Canada, the U.S. and Hong Kong, and increased our presence in Indonesia and Malaysia. We continue to invest in these businesses, including the Standard Life and New York Life acquisitions in 2015 and Standard Chartered’s MPF and ORSO acquisition and distribution agreement in 2016.

We provide additional financial information by line of business, to supplement our existing primary disclosure based on geographic segmentation. This information is intended to facilitate assessment of the financial performance of our WAM businesses and allows for relevant comparisons to be made with global asset management peers. The supplemental information for WAM businesses includes an income statement, core earnings, core earnings before interest, taxes, depreciation and amortization (“core EBITDA”), net flows, gross flows and assets under management and administration (“AUMA”)¹. Core EBITDA was selected as a key performance indicator for WAM businesses, as EBITDA is widely used among asset management peers, and core earnings is a primary profitability metric for the Company overall.

Wealth and Asset Management highlights

For the years ended December 31,
(\$ millions, unless otherwise stated)

	2016	2015	2014
Core earnings ⁽¹⁾	\$ 629	\$ 630	\$ 502
Core EBITDA ⁽²⁾	1,167	1,224	980
Net flows	15,265	34,387	18,335
Gross flows	120,450	114,686	69,164
Assets under management (“AUM”) (\$ billions)	461	433	315
Assets under management and administration (“AUMA”) ⁽³⁾ (\$ billions)	544	510	315

⁽¹⁾ WAM core earnings by division are outlined in the section “Core earnings by line of business by division” below.

⁽²⁾ Table below provides a reconciliation of core EBITDA to core earnings.

⁽³⁾ Table below provides a continuity of AUMA.

Financial performance

In 2016, our global WAM businesses contributed \$629 million to core earnings, in line with 2015. The core earnings contribution from higher fee income on higher asset levels as well as higher tax benefits in the U.S. were offset by changes in business mix, fee compression in the U.S. pension business and strategic investments to optimize our operational infrastructure and to expand our distribution reach in Europe and Asia.

In 2016, core EBITDA for our global WAM businesses was \$1,167 million, higher than core earnings by \$538 million. In 2015, core EBITDA was \$1,224 million, higher than core earnings by \$594 million. The decrease of \$57 million in core EBITDA primarily reflects changes in business mix, fee compression in the U.S. pension business, and strategic investments to optimize our operational infrastructure and to expand our distribution reach in Europe and Asia, partially offset by higher fee income on higher asset levels.

Core EBITDA

For the years ended December 31,
(\$ millions)

	2016	2015	2014
Core earnings	\$ 629	\$ 630	\$ 502
Amortization of deferred acquisition costs and other depreciation	336	327	237
Amortization of deferred sales commissions	103	106	90
Core income tax (expense) recovery	99	161	151
Core EBITDA	\$ 1,167	\$ 1,224	\$ 980

¹ Core earnings, core EBITDA, net flows, gross flows, assets under management, and assets under management and administration are non-GAAP measures. See “Performance and Non-GAAP Measures” below.

AUMA

In 2016, AUMA for our wealth and asset management businesses increased from \$510 billion to \$544 billion. Net flows accounted for \$15 billion of the increase and the remaining \$17 billion was related to positive market performance and the acquisition of Standard Chartered's MPS and ORSO assets in Hong Kong. 2016 marked the 7th year of consecutive positive quarterly net flows in our WAM businesses. The positive net flows in 2016 were driven by our institutional advisory business and our mutual funds businesses in Asia and Canada, partially offset by outflows in our North American pension businesses as well as a challenging U.S. mutual fund environment and the underperformance of a few key funds earlier in the year. Net flows were \$19 billion lower than in 2015, driven by outflows in U.S. mutual funds and lower institutional sales.

AUMA

For the years ended December 31,
(\$ billions)

	2016	2015	2014
Balance January 1,	\$ 510	\$ 315	\$ 259
Acquisitions	2	109	–
Net flows	15	34	18
Impact of markets and other	17	52	38
Balance December 31,	\$ 544	\$ 510	\$ 315

Additional information by business line

The following tables provide additional information on our core earnings by WAM, Insurance and Other Wealth for each of the divisions. Other Wealth consists of variable and fixed annuities, single premium products sold in Asia, and Manulife Bank in Canada¹ and Insurance includes all individual and group insurance businesses.

Financial Performance

As noted above, in 2016 our global WAM businesses contributed \$629 million to core earnings, in line with 2015.

Core earnings in our global insurance businesses in 2016 was \$2,492 million, an increase of 19% compared with 2015. The increase was primarily a result of higher sales and in-force growth in Asia and the strengthening of the U.S. dollar and Japanese yen compared with the Canadian dollar.

Core earnings in our global other wealth businesses in 2016 was \$1,368 million, an increase of 10% compared with 2015. The increase was primarily related to strong sales in Asia, lower amortization of deferred acquisition costs and the release of tax and related provisions in the U.S. as well as the strengthening of the U.S. dollar compared with the Canadian dollar.

Core earnings by line of business

For the years ended December 31,
(\$ millions)

	2016	2015	2014
Wealth and Asset Management	\$ 629	\$ 630	\$ 502
Insurance	2,492	2,097	1,864
Other Wealth	1,368	1,245	965
Corporate and Other ⁽¹⁾	(468)	(544)	(443)
Total core earnings	\$ 4,021	\$ 3,428	\$ 2,888

⁽¹⁾ Excludes Manulife Asset Management results that are included in WAM.

¹ Manulife Bank new loan volumes are no longer being reported as sales.

Core earnings by line of business by division

For the years ended December 31,
(\$ millions)

	2016	2015	2014
Wealth and Asset Management⁽¹⁾			
Asia	\$ 175	\$ 159	\$ 126
Canada	161	141	100
U.S.	298	310	263
Corporate and Other ⁽²⁾	(5)	20	13
Total Wealth and Asset Management	629	630	502
Insurance			
Asia	994	811	667
Canada	763	621	471
U.S.	735	665	726
Total Insurance	2,492	2,097	1,864
Other Wealth⁽³⁾			
Asia	327	264	215
Canada			
Manulife Bank	114	123	123
Canada excluding Manulife Bank	345	367	233
Total Canada	459	490	356
U.S.	582	491	394
Total Other Wealth	1,368	1,245	965
Corporate and Other ⁽⁴⁾	(468)	(544)	(443)
Total core earnings	\$ 4,021	\$ 3,428	\$ 2,888

⁽¹⁾ Wealth and Asset Management is comprised of our fee-based global WAM businesses that do not contain material insurance risk including: mutual funds, group retirement and institutional asset management.

⁽²⁾ Corporate and Other results are net of internal allocations to other divisions.

⁽³⁾ Other Wealth includes variable and fixed annuities, single premium products sold in Asia and Manulife Bank.

⁽⁴⁾ A portion of core earnings from Investment Division has been included in Wealth and Asset Management.

AUMA by line of business

AUMA as at December 31, 2016 was a record for Manulife of \$977 billion, an increase of \$42 billion, or 6% on a constant currency basis, compared with December 31, 2015. The WAM portion of AUMA was \$544 billion and increased \$33.4 billion. The increase was driven by investment returns and continued positive net flows.

As at December 31, (\$ billions)	2016	2015	2014
Wealth and Asset Management	\$ 543.9	\$ 510.5	\$ 314.5
Insurance	262.8	246.1	213.8
Other Wealth	174.4	178.3	157.8
Corporate and Other	(4.0)	0.3	5.0
Total assets under management and administration	\$ 977.1	\$ 935.2	\$ 691.1

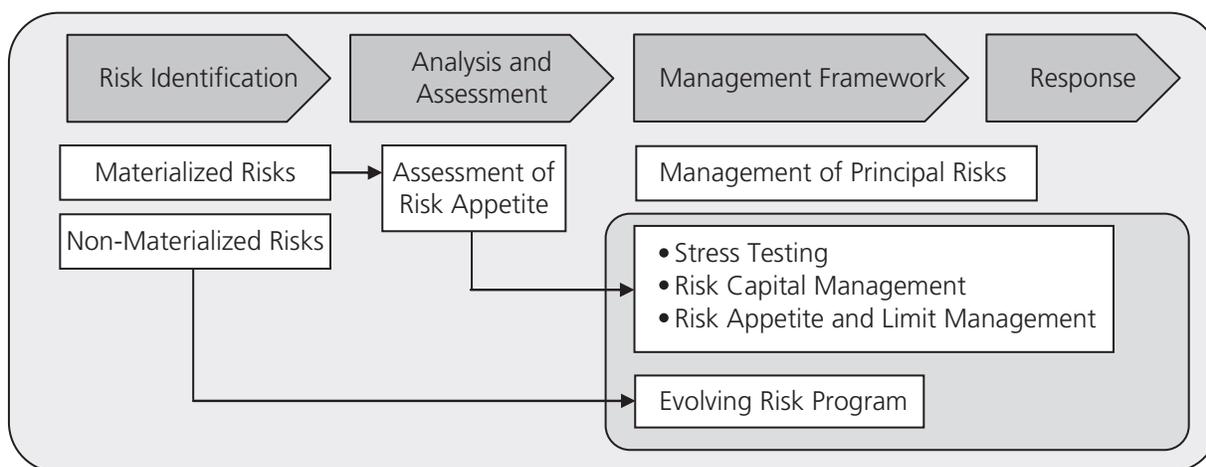
Risk Management

This section provides an overview of the Company's overall risk management approach and more specific strategies for our principal risks. A more detailed description of specific risks which may affect our results of operations or financial condition may be found in the "Risk Factors" section below.

Overview

All of the Company's activities involve elements of risk taking. The objective is to balance the level of risk with business, growth and profitability goals, in order to provide integrated customer solutions, while achieving consistent and sustainable performance over the long-term that benefits the Company and its stakeholders.

Enterprise Risk Management ("ERM") Framework



Our ERM Framework provides a structured approach to implementing risk taking and risk management activities across the enterprise, supporting our long-term revenue, earnings and capital growth strategy. It is communicated through risk policies and standards which are intended to enable consistent design and execution of strategies across the organization. We have a common approach to managing all risks to which the Company is exposed, and to evaluating potential directly comparable risk-adjusted returns on contemplated business activities. Our risk policies and standards cover:

- Assignment of accountability and delegation of authority for risk oversight and risk management;
- The types and levels of risk the Company seeks given its strategic plan and risk appetite;
- Risk identification, measurement, assessment and mitigation which enable effective management and monitoring of risk; and
- Validation, back testing and independent oversight to confirm that the Company generated the risk profile it intended and the root cause analysis of any notable variation.

Our risk management practices are influenced and impacted by internal and external factors (such as economic conditions, political environments, technology and risk culture) which can significantly impact the levels and types of risks the Company might face in its pursuit to strategically optimize risk taking and risk management. Our ERM Framework incorporates relevant impacts and mitigating actions as appropriate.

A strong risk culture and a common approach to risk management are integral to Manulife's risk management practices. Management is responsible for managing risk within risk appetite and has established risk management strategies and monitoring practices. This includes a "three lines of defence" governance model that segregates duties between risk taking activities, risk monitoring and risk oversight, and establishes appropriate accountability for those who assume risk versus those who oversee risk.

The Company's first line of defence includes the Chief Executive Officer ("CEO"), Divisional General Managers and Global Function Heads. In our matrix reporting model, the Divisional General Managers are accountable for their business results, the risks they assume to achieve those results, and for the day-to-day management of the risks and related controls and the Global Function Heads are accountable for the management of the risks and related controls for their function.

The second line of defence is comprised of the Company's Chief Risk Officer ("CRO"), the Global Risk Management ("GRM") function and other global oversight functions. Collectively, this group provides independent oversight of risk taking and risk management activities across the enterprise.

The third line of defence is Internal Audit, which provides independent assurance that controls are effective and appropriate relative to the risk inherent in the business, and that risk mitigation programs and risk oversight functions are effective in managing risks.

Risk Culture

Manulife strives for a risk aware culture, where individuals and groups are encouraged, feel comfortable and are proactive in making transparent, balanced risk-return decisions that are in the long-term interests of the Company. Key areas of focus pertaining to risk culture include: aligning individual and Company objectives; identifying and escalating risks before they become significant issues; promoting a cooperative approach that enables appropriate risk taking; ensuring transparency in identifying, communicating and tracking risks; and systematically acknowledging and surfacing material risks.

Risk Governance

The Board of Directors oversees the Company's culture of integrity and ethics, strategic planning, risk management, and corporate governance, among other things. The Board carries out its responsibilities directly and through its four standing committees. The Board Risk Committee oversees the management of our principal risks, and our programs, policies and procedures to manage those risks. The Board Audit Committee oversees internal control over financial reporting and our finance, actuarial, internal audit and global compliance functions, serves as the conduct review committee, and reviews our compliance with legal and regulatory requirements and also oversees the external auditors. The Management Resources and Compensation Committee oversees our global human resources strategy, policies, programs, management succession, executive compensation, and pension plan governance. The Corporate Governance and Nominating Committee develops our governance policies, practices and procedures, among other things.

The CEO is directly accountable to the Board of Directors for the results and operations of the Company and all risk taking activities and risk management practices required to achieve those results. The CEO is supported by the CRO as well as by the Executive Risk Committee ("ERC"). Together, they shape and promote our risk culture, guide risk taking throughout our global operations and strategically manage our overall risk profile. The ERC, along with other executive-level risk oversight committees, establishes risk policies, guides risk-taking activity, monitors significant risk exposures and sponsors strategic risk management priorities throughout the organization.

GRM, under the direction of the CRO, establishes and maintains our enterprise risk management framework and oversees the execution of individual risk management programs across the enterprise. GRM seeks to ensure a consistent enterprise-wide assessment of risk, risk-based capital and risk-adjusted returns across all operations.

The ERC approves and oversees the execution of the Company's enterprise risk management program. It establishes and presents for approval to the Board the Company's risk appetite and enterprise-wide risk limits and monitors our overall risk profile, including key and emerging risks and risk management activities. As part of these activities, the ERC monitors material risk exposures, endorses and reviews strategic risk management priorities, and reviews and assesses the impact of business strategies, opportunities and initiatives on our overall risk position. The ERC is supported by a number of oversight sub-committees including: Credit Committee, Product Oversight Committee, Global Asset Liability Committee, and the Operational Risk Committee. We also have divisional risk committees as well as a global Wealth and Asset Management Risk Committee, each with mandates similar to the ERC except with a focus at the divisional and global WAM business line levels, as applicable.

Risk Appetite

Risk taking activities are managed within the Company's overall risk appetite, which defines the amount and types of risks the Company is willing to assume in pursuit of its objectives. It is comprised of three components: risk philosophy, risk appetite statements, and risk limits and tolerances.

When making decisions about risk taking and risk management, Manulife places priority on the following risk management objectives:

- To safeguard the commitments and expectations we have established with customers, shareholders and creditors;
- To support the successful design and delivery of customer solutions;
- To prudently and effectively deploy the capital invested in the Company by our shareholders with appropriate risk/return profiles; and
- To protect and/or enhance the Company's reputation and brand.

At least annually, the Company establishes and/or reaffirms its risk appetite to ensure that risk appetite and the Company's strategy align. The risk appetite statements provide 'guideposts' on our appetite for identified risks, any conditions placed on associated risk taking and direction for where quantitative risk limits should be established. The Company's risk appetite statements are as follows:

- Manulife accepts a total level of risk that provides a very high level of confidence to meeting customer obligations while targeting an appropriate overall return to shareholders over time;
- The Company targets a credit rating amongst the strongest of its global peers;
- Manulife values innovation and encourages initiatives intended to strengthen the customers' experience and enhance competitive advantage;
- Capital market risks are acceptable when they are managed within specific risk limits and tolerances;
- The Company believes a balanced investment portfolio reduces overall risk and enhances returns; therefore, it accepts credit and ALDA-related risks;
- The Company pursues insurance risks that add customer and shareholder value where there is competence to assess and monitor them, and for which appropriate compensation is received;
- Manulife accepts that operational risks are an inherent part of the business but will protect its business and customers' assets through cost-effective operational risk mitigation; and

- Manulife expects its officers and employees to act in accordance with the Company's values, ethics and standards and to enhance its brand and reputation.

Risk limits and tolerances are established for risks within our risk classification framework that are inherent in our strategies in order to define the types and amount of risk the Company will assume. Risk tolerance levels are set for risks deemed to be most significant to the Company and are established in relation to economic capital, earnings-at-risk and regulatory capital required. The purpose of risk limits is to cascade the total Company risk appetite to a level that can be effectively managed. Manulife establishes standalone risk limits for risk categories to avoid excessive concentration in any individual risk category and to manage the overall risk profile of the organization.

Risk Identification, Measurement and Assessment

We have a common approach and process to identify, measure, and assess the risks we assume. We evaluate all potential new business initiatives, acquisitions, product offerings, reinsurance arrangements, and investment and financing transactions on a comparable risk-adjusted basis. Divisions and functional groups are responsible for identifying and assessing key and emerging risks on an ongoing basis. A standard inventory of risks is used in all aspects of risk identification, measurement and assessment, and monitoring and reporting.

Risk exposures are evaluated using a variety of risk measures focused on both short-term net income attributed to shareholders and long-term economic value, with certain measures used across all risk categories, while others apply only to some risks or a single risk type. Measures include stress tests such as sensitivity tests, scenario impact analyses and stochastic scenario modeling. In addition, qualitative risk assessments are performed, including for those risk types that cannot be reliably quantified.

We perform a variety of stress tests on earnings, regulatory capital ratios, economic capital, earnings-at-risk and liquidity that consider significant, but plausible events. We also perform other integrated, complex scenario tests to assess key risks and the interaction of these risks.

Economic capital and earnings-at-risk provide measures of enterprise-wide risk that can be aggregated and compared across business activities and risk types. Economic capital measures the amount of capital required to meet obligations with a high and pre-defined confidence level. Our earnings-at-risk metric measures the potential variance from quarterly expected earnings at a particular confidence level. Economic capital and earnings-at-risk are both determined using internal models.

Risk Monitoring and Reporting

Under the direction of the CRO, GRM oversees a formal process for monitoring and reporting on all significant risks at the Company-wide level. Risk exposures are also discussed at various risk oversight committees, along with any exceptions or proposed remedial actions, as required.

On at least a quarterly basis, management and the Board of Directors review risk reports that present an overview of our overall risk profile and exposures across our principal risks. The reports incorporate both quantitative risk exposure measures and sensitivities, and qualitative risk assessments. The reports also highlight key risk management activities and facilitate monitoring compliance with key risk policy limits.

Our Chief Actuary presents the results of the Dynamic Capital Adequacy Test to the Board of Directors annually. Our Chief Auditor reports the results of internal audits of risk controls and risk management programs to the Audit Committee semi-annually. Management reviews the implementation of key risk management strategies, and their effectiveness, with the Board Risk Committee annually.

Risk Control and Mitigation

Risk control activities are in place throughout the Company to seek to mitigate risks within established risk limits. We believe our controls, which include policies, procedures, systems and processes, are appropriate and commensurate with the key risks faced at all levels across the Company. Such controls are an integral part of day-to-day activity, business management and decision making.

GRM establishes and oversees formal review and approval processes, involving independent individuals, groups or risk oversight committees, for product offerings, insurance underwriting, reinsurance, investment activities and other material business activities, based on the nature, size and complexity of the risk taking activity involved. Authorities for assuming risk at the transaction level are delegated to specific individuals based on their skill, knowledge and experience.

Emerging Risk

The identification and assessment of our external environment for emerging risks is an important aspect of our enterprise risk management framework, as these risks, although yet to materialize, could have the potential to have a material impact on our operations.

Our Emerging Risk Framework facilitates the ongoing identification, assessment and monitoring of emerging risks, and includes: maintaining a process that facilitates the ongoing discussion and evaluation of potential emerging risks with senior management and other functions; reviewing and validating emerging risks with the ERC; creating and executing on responses to each emerging risk based on prioritization; and monitoring and reporting on emerging risks on a regular basis.

Regulatory Updates

The Office of the Superintendent of Financial Institutions (“OSFI”) will be implementing a revised approach to the regulatory capital framework in Canada to come into effect in 2018. In September 2016, OSFI released the final Life Insurance Capital Adequacy Test (“LICAT”) guideline that will replace the MCCSR framework in 2018. During 2017, the industry will be completing impact assessments of the guideline, including sensitivity testing. Based on industry information and analysis, OSFI may amend the guideline to reflect appropriate calibration adjustments.

With respect to the impact of LICAT, OSFI has noted that the:¹

- Overall level of excess capital in the industry under LICAT vs. MCCSR is not expected to change significantly;
- LICAT ratios and MCCSR ratios are not directly comparable; and
- Impact on individual life insurers will depend on what businesses they are engaged in, risks that they choose to take on and how these risks are managed.

We expect to continue to be in a strong capital position under the new framework.²

General Macro-Economic Risk Factors

The global macro-economic environment has a significant impact on our financial plans and ability to implement our business strategy. The macro-economic environment can be significantly impacted by the actions of both the government sector (including central banks) and the private sector. The macro-economic environment may also be affected by natural and man-made catastrophes.

Our business strategy and associated financial plans are developed by considering forecasts of economic growth, both globally and in the specific countries we operate. Actual economic growth can be significantly impacted by the macro-economic environment and can deviate significantly from forecast, thus impacting our financial results and the ability to implement our business strategy.

Changes in the macro-economic environment can also have a significant impact on financial markets, including movements in interest rates, spreads on fixed income assets and returns on public equity and ALDA assets. Our financial plan, including income projections, capital projections, and valuation of liabilities are based on certain assumptions with respect to future movements in interest rates and spreads on fixed income assets, and expected future returns from our public equity and ALDA investments. Actual experience is highly variable and can deviate significantly from our assumptions, thus impacting our financial results. In addition, actual experience that is significantly different from our assumptions and/or changes in the macro-economic environment may result in changes to the assumptions themselves which would also impact our financial results.

Specific changes in the macro-economic environment can have very different impacts across different parts of the business. For example, a rise in interest rates is generally beneficial to us in the long-term but can adversely affect valuations of some ALDA assets, especially those that have contractual cash flows.

The spending and savings patterns of our customers could be significantly influenced by the macro-economic environment and could have an impact on the products and services we offer to our customers.

Customer behaviour and emergence of claims on our liabilities can be significantly impacted by the macro-economic environment. For example, a prolonged period of economic weakness could impact the health and well-being of our customers and that could result in increased claims for certain insurance risks.

The following sections describe the risk management strategies for each of our six principal risk categories: strategic risk, market risk, liquidity risk, credit risk, insurance risk and operational risk.

Strategic Risk

Strategic risk is the risk of loss resulting from the inability to adequately plan or implement an appropriate business strategy, or to adapt to change in the external business, political or regulatory environment.

Risk Management Strategy

The CEO and Executive Committee establish and oversee execution of business strategies and have accountability to identify and manage the risks embedded in these strategies. They are supported by a number of processes:

- Strategic business, risk and capital planning that is reviewed with the Board of Directors, Executive Committee, and the ERC;
- Performance and risk reviews of all key businesses with the CEO and annual reviews with the Board of Directors;
- Risk-based capital attribution and allocation designed to encourage a consistent decision-making framework across the organization; and
- Review and approval of acquisitions and divestitures by the CEO and, where appropriate, the Board of Directors.

The CEO and Executive Committee are ultimately responsible for our reputation; however, our employees and representatives are responsible for conducting their business activities in a manner that upholds our reputation. This responsibility is executed through an

¹ Slides 21 and 22, OSFI LICAT Webcast Information Session held on September 15, 2016.

² See “Caution regarding forward-looking statements” above.

enterprise-wide reputation risk policy that specifies the oversight responsibilities of the Board of Directors and the responsibilities of executive management, communication to and education of all directors, officers, employees and representatives, including our Code of Business Conduct and Ethics, and application of guiding principles in conducting all our business activities.

IFRS 7 Disclosures

The shaded text and tables in the following sections of this MD&A represent our disclosure on market and liquidity risk in accordance with IFRS 7, "Financial Instruments – Disclosures," and include a discussion on how we measure risk and our objectives, policies and methodologies for managing these risks. Therefore, the following shaded text and tables represent an integral part of our audited annual Consolidated Financial Statements for the years ended December 31, 2016 and December 31, 2015. The fact that certain text and tables are considered an integral part of the Consolidated Financial Statements does not imply that the disclosures are of any greater importance than the sections not part of the disclosure. Accordingly, the "Risk Management" disclosure should be read in its entirety.

Market Risk

Market risk is the risk of loss resulting from market price volatility, interest rate change, credit and swap spread changes, and from adverse foreign currency rate movements. Market price volatility primarily relates to changes in prices of publicly traded equities and alternative long-duration assets.

Market Risk Management Strategy

Market risk is governed by the Global Asset Liability Committee which oversees the overall market and liquidity risk program. Our overall strategy to manage our market risks incorporates several component strategies, each targeted to manage one or more of the market risks arising from our businesses. At an enterprise level, these strategies are designed to manage our aggregate exposures to market risks against economic capital, regulatory required capital and earnings-at-risk limits.

The following table outlines our key market risks and identifies the risk management strategies which contribute to managing these risks.

Risk Management Strategy	Key Market Risk			
	Publicly Traded Equity Performance Risk	Interest Rate and Spread Risk	Alternative Long-Duration Asset Performance Risk	Foreign Exchange Risk
Product design and pricing	X	X	X	X
Variable annuity guarantee dynamic hedging	X	X		X
Macro equity risk hedging	X			X
Asset liability management	X	X	X	X
Foreign exchange management				X

To reduce publicly traded equity performance risk, we primarily use a variable annuity guarantee dynamic hedging strategy which is complemented by a general macro equity risk hedging strategy. Our strategies employed for variable annuity guarantee dynamic hedging and macro equity risk hedging expose the Company to additional risks. See "Risk Factors" below.

In general, to seek to reduce interest rate risk, we lengthen the duration of our fixed income investments in our liability and surplus segments by executing lengthening interest rate swaps.

Our foreign exchange risk management strategy is designed to hedge the sensitivity of our regulatory capital ratios to movements in foreign exchange rates. Our policy is to generally match the currency of our assets with the currency of the liabilities they support, and similarly, to generally match the currency of the assets in our shareholders' equity account to the currency of our required capital. Where assets and liabilities are not matched, we seek to stabilize our capital ratios through the use of financial instruments such as derivatives.

Product Design and Pricing Strategy

Our policies, standards and standards of practice with respect to product design and pricing are designed with the objective of aligning our product offerings with our risk-taking philosophy and risk appetite, and in particular, that incremental risk generated from new sales aligns with our strategic risk objectives and risk limits. The specific design features of our product offerings, including level of benefit guarantees, policyholder options, fund offerings and availability restrictions as well as our associated investment strategies, help to mitigate the level of underlying risk. We regularly review and modify key features within our product offerings, including premiums and fee charges with a goal of meeting profit targets and staying within risk limits. Certain of our general fund adjustable benefit products have minimum rate guarantees. The rate guarantees for any particular policy are set at the time the policy is issued and governed by insurance regulation in each jurisdiction where the products are sold. The contractual provisions allow crediting rates to be re-set at pre-established intervals subject to the established minimum crediting rate guarantees. The Company may partially mitigate the interest rate exposure by setting new rates on new business and by adjusting rates on in-force business where permitted. In addition, the Company partially mitigates this interest rate risk through its asset liability management process, product design elements, and crediting rate strategies. New product initiatives, new reinsurance arrangements and material insurance underwriting initiatives must be reviewed and approved by the CRO or key individuals within risk management functions.

Hedging Strategies for Variable Annuity and Other Equity Risks

The Company's exposure to movement in public equity market values primarily arises from variable annuity guarantees and to a smaller extent from asset-based fees and general fund public equity holdings.

Dynamic hedging is the primary hedging strategy for variable annuity market risks. Dynamic hedging is employed for new variable annuity guarantees business when written or as soon as practical thereafter.

We seek to manage public equity risk arising from other sources (not dynamically hedged) through our macro equity risk hedging strategy. We seek to manage interest rate risk arising from variable annuity business not dynamically hedged within our asset liability management strategy.

Variable Annuity Dynamic Hedging Strategy

The variable annuity dynamic hedging strategy is designed to hedge the sensitivity of variable annuity guarantee policy liabilities and available capital to fund performance (both public equity and bond funds) and interest rate movements. The objective of the variable annuity dynamic hedging strategy is to offset, as closely as possible, the change in the economic value of guarantees with the profit and loss from our hedge asset portfolio. The economic value of guarantees moves in close tandem, but not exactly, with our variable annuity guarantee policy liabilities, as it reflects best estimate liabilities and does not include any liability provisions for adverse deviations.

Our current variable annuity guarantee dynamic hedging approach is to short exchange-traded equity index and government bond futures and execute currency futures and lengthening interest rate swaps to hedge sensitivity of policy liabilities to fund performance and interest rate movements arising from variable annuity guarantees. We dynamically rebalance these hedge instruments as market conditions change, in order to maintain the hedged position within established limits. Other derivative instruments (such as equity and interest rate options) are also utilized and we may consider the use of additional hedge instruments opportunistically in the future.

Our variable annuity guarantee dynamic hedging strategy is not designed to completely offset the sensitivity of policy liabilities to all risks associated with the guarantees embedded in these products. The profit (loss) on the hedge instruments will not completely offset the underlying losses (gains) related to the guarantee liabilities hedged because:

- Policyholder behaviour and mortality experience are not hedged;
- Provisions for adverse deviation in the policy liabilities are not hedged;
- A portion of interest rate risk is not hedged;
- Credit spreads widen and actions are not taken to adjust accordingly;
- Fund performance on a small portion of the underlying funds is not hedged due to lack of availability of effective exchange-traded hedge instruments;
- Performance of the underlying funds hedged may differ from the performance of the corresponding hedge instruments;
- Correlations between interest rates and equity markets could lead to unfavourable material impacts;
- Unfavourable hedge rebalancing costs can be incurred during periods of high volatility from equity markets, bond markets and/or interest rates. The impact is magnified when these impacts occur concurrently; and
- Not all other risks are hedged.

Macro Equity Risk Hedging Strategy

The objective of the macro equity risk hedging program is to maintain our overall earnings sensitivity to public equity market movements within our Board approved risk appetite limits. The macro equity risk hedging program is designed to hedge earnings sensitivity due to movements in public equity markets arising from all sources (outside of dynamically hedged exposures). Sources of equity market sensitivity addressed by the macro equity risk hedging program include:

- Residual equity and currency exposure from variable annuity guarantees not dynamically hedged;
- General fund equity holdings backing non-participating liabilities;
- Variable life insurance;
- Unhedged provisions for adverse deviation related to variable annuity guarantees dynamically hedged; and
- Variable annuity fees not associated with guarantees and fees on segregated funds without guarantees, mutual funds and institutional assets managed.

Asset Liability Management Strategy

Our asset liability management strategy is designed to help ensure that the market risks embedded in our assets and liabilities held in the Company's general fund are effectively managed and that risk exposures arising from these assets and liabilities are maintained below targeted levels. The embedded market risks include risks related to the level and movement of interest rates and credit spreads, public equity market performance, ALDA performance and foreign exchange rate movements.

General fund product liabilities are segmented into groups with similar characteristics that are supported by specific asset segments. We seek to manage each segment to a target investment strategy appropriate for the premium and benefit pattern, policyholder options and guarantees, and crediting rate strategies of the products they support. Similar strategies are established for assets in the Company's surplus account. The strategies are set using portfolio analysis techniques intended to optimize returns, subject to considerations related to regulatory and economic capital requirements, and risk tolerances. They are designed to achieve broad diversification across asset classes and individual investment risks while being suitably aligned with the liabilities they support. The strategies encompass asset mix, quality rating, term profile, liquidity, currency, and industry concentration targets.

Products which feature guaranteed liability cash flows (i.e. where the projected net flows are not materially dependent upon economic scenarios) are managed to a target return investment strategy. The products backed by this asset segment include:

- Accumulation annuities (other than annuities with pass-through features), which are primarily short-to-medium-term obligations and offer interest rate guarantees for specified terms on single premiums. Withdrawals may or may not have market value adjustments.
- Payout annuities, which have no surrender options and include predictable and very long-dated obligations.
- Insurance products, with recurring premiums extending many years in the future, and which also include a significant component of very long-dated obligations.

We seek to manage the assets backing these long-dated benefits to achieve a target return sufficient to support the obligations over their lifetime, subject to established risk tolerances, by investing in a basket of diversified ALDA with the balance invested in fixed income. Utilizing ALDA to partially support these products is intended to enhance long-term investment returns and reduce aggregate risk through diversification. The size of the target ALDA portfolio is dependent upon the size and term of each segment's liability obligations. We seek to manage fixed income assets to a benchmark developed to minimize interest rate risk against the residual liabilities and to achieve target returns/spreads required to preserve long-term interest rate investment assumptions used in liability pricing.

For insurance and annuity products where significant pass-through features exist, a total return strategy approach is used, generally combining fixed income and ALDA. ALDA may be included to enhance long-term investment returns and reduce aggregate risk through diversification. Target investment strategies are established using portfolio analysis techniques that seek to optimize long-term investment returns while considering the risks related to embedded product guarantees and policyholder withdrawal options, the impact of regulatory and economic capital requirements and management tolerances with respect to short-term income volatility and long-term tail risk exposure. Shorter duration liabilities such as fixed deferred annuities generally do not incorporate ALDA in their target asset mixes.

In our general fund, we seek to limit concentration risk associated with ALDA performance by investing in a diversified basket of assets including public and private equities, commercial real estate, infrastructure, timber, farmland real estate, and oil and gas assets. We further diversify risk by managing publicly traded equities and ALDA investments against established limits, including for industry type and corporate connection, commercial real estate type and geography, and timber and farmland property geography and crop type.

Authority to manage our investment portfolios is delegated to investment professionals who manage to benchmarks derived from the target investment strategies established for each segment, including interest rate risk tolerances. Interest rate risk exposure measures are monitored and communicated to portfolio managers with frequencies ranging from daily to annually, depending on the type of liability. Asset portfolio rebalancing, accomplished using cash investments or derivatives, may occur at frequencies ranging from daily to monthly, depending on our established risk tolerances and the potential for changes in the profile of the assets and liabilities.

Our asset liability management strategy incorporates a wide variety of risk measurement, risk mitigation and risk management, and hedging processes. The liabilities and risks to which the Company is exposed, however, cannot be completely matched or hedged due to both limitations on instruments available in investment markets and uncertainty of impact on liability cash flows from policyholder experience/behaviour.

Foreign Exchange Risk Management Strategy

Our foreign exchange risk management strategy is designed to hedge the sensitivity of our regulatory capital ratios to movements in foreign exchange rates. In particular, the objective of the strategy is to offset within acceptable tolerance levels, changes in required capital with changes in available capital that result from currency movements. These changes occur when assets and liabilities related to business conducted in currencies other than Canadian dollars are translated to Canadian dollars at period ending exchange rates.

Our policy is to generally match the currency of our assets with the currency of the liabilities they support, and similarly, to generally match the currency of the assets in our shareholders' equity account to the currency of our required capital. Where assets and liabilities are not matched, we would seek to stabilize our capital ratios through the use of forward contracts and currency swaps.

Risk exposure limits are measured in terms of potential changes in capital ratios due to foreign exchange rate movements, determined to represent a specified likelihood of occurrence based on internal models.

Market Risk Sensitivities and Market Risk Exposure Measures

Variable Annuity and Segregated Fund Guarantees Sensitivities and Risk Exposure Measures

Guarantees on variable annuity products and segregated funds may include one or more of death, maturity, income and withdrawal guarantees. Variable annuity and segregated fund guarantees are contingent and only payable upon the occurrence of the relevant event, if fund values at that time are below guaranteed values. Depending on future equity market levels, liabilities on current in-force business would be due primarily in the period from 2017 to 2038.

We seek to mitigate a portion of the risks embedded in our retained (i.e. net of reinsurance) variable annuity and segregated fund guarantee business through the combination of our dynamic and macro hedging strategies (see "Publicly Traded Equity Performance Risk" below).

The table below shows selected information regarding the Company's variable annuity and segregated fund investment-related guarantees gross and net of reinsurance.

Variable annuity and segregated fund guarantees, net of reinsurance

As at December 31, (\$ millions)	2016			2015		
	Guarantee value	Fund value	Amount at risk ^{(4),(5)}	Guarantee value	Fund value	Amount at risk ^{(4),(5)}
Guaranteed minimum income benefit ⁽¹⁾	\$ 5,987	\$ 4,432	\$ 1,570	\$ 6,642	\$ 4,909	\$ 1,740
Guaranteed minimum withdrawal benefit	68,594	59,593	9,135	73,232	65,090	9,231
Guaranteed minimum accumulation benefit	19,482	19,989	27	19,608	23,231	72
Gross living benefits ⁽²⁾	94,063	84,014	10,732	99,482	93,230	11,043
Gross death benefits ⁽³⁾	12,200	16,614	1,350	13,693	13,158	1,704
Total gross of reinsurance	106,263	100,628	12,082	113,175	106,388	12,747
Living benefits reinsured	5,241	3,903	1,349	5,795	4,312	1,486
Death benefits reinsured	3,429	3,202	564	3,874	3,501	682
Total reinsured	8,670	7,105	1,913	9,669	7,813	2,168
Total, net of reinsurance	\$ 97,593	\$ 93,523	\$ 10,169	\$ 103,506	\$98,575	\$10,579

⁽¹⁾ Contracts with guaranteed long-term care benefits are included in this category.

⁽²⁾ Where a policy includes both living and death benefits, the guarantee in excess of the living benefit is included in the death benefit category.

⁽³⁾ Death benefits include stand-alone guarantees and guarantees in excess of living benefit guarantees where both death and living benefits are provided on a policy.

⁽⁴⁾ Amount at risk (in-the-money amount) is the excess of guarantee values over fund values on all policies where the guarantee value exceeds the fund value. This amount is not currently payable. For guaranteed minimum death benefit, the amount at risk is defined as the current guaranteed minimum death benefit in excess of the current account balance. For guaranteed minimum income benefit, the amount at risk is defined as the excess of the current annuitization income base over the current account value. For all guarantees, the amount at risk is floored at zero at the single contract level.

⁽⁵⁾ The amount at risk net of reinsurance at December 31, 2016 was \$10,169 million (2015 – \$10,579 million) of which: US\$6,008 million (2015 – US\$6,046 million) was on our U.S. business, \$1,499 million (2015 – \$1,564 million) was on our Canadian business, US\$206 million (2015 – US\$190 million) was on our Japan business and US\$244 million (2015 – US\$277 million) was related to Asia (other than Japan) and our run-off reinsurance business.

The policy liabilities established for variable annuity and segregated fund guarantees were \$6,249 million at December 31, 2016 (2015 – \$7,469 million). This included policy liabilities of \$828 million (2015 – \$840 million) for non-dynamically hedged business and \$5,421 million (2015 – \$6,629 million) for dynamically hedged business.

The decrease in the total policy liabilities for variable annuity and segregated fund guarantees since December 31, 2015 is primarily due to the annual review of actuarial methods and assumptions (see “Critical Accounting and Actuarial Policies” below) and favourable equity markets in the U.S. and Canada.

Investment categories for variable contracts with guarantees

Variable contracts with guarantees are invested, at the policyholder’s discretion subject to contract limitations, in various fund types within the segregated fund accounts and other investments. The account balances by investment category are set out below.

As at December 31, (\$ millions)		
Investment category	2016	2015
Equity funds	\$ 41,805	\$ 42,915
Balanced funds	57,571	61,657
Bond funds	11,585	11,750
Money market funds	2,127	2,304
Other fixed interest rate investments	1,800	2,216
Total	\$ 114,888	\$ 120,842

Caution Related to Sensitivities

In the sections that follow, we provide sensitivities and risk exposure measures for certain risks. These include sensitivities due to specific changes in market prices and interest rate levels projected using internal models as at a specific date, and are measured relative to a starting level reflecting the Company’s assets and liabilities at that date and the actuarial factors, investment activity and investment returns assumed in the determination of policy liabilities. The risk exposures measure the impact of changing one factor at a time and assume that all other factors remain unchanged. Actual results can differ significantly from these estimates for a variety of reasons including the interaction among these factors when more than one changes; changes in actuarial and investment return and future investment activity assumptions; actual experience differing from the assumptions, changes in business mix, effective tax rates and other market factors; and the general limitations of our internal models. For these reasons, the sensitivities should only be viewed as directional estimates of the underlying sensitivities for the respective factors based on the assumptions outlined below. Given the nature of these calculations, we cannot provide assurance that the actual impact on net income attributed to shareholders or on MLI’s MCCR ratio will be as indicated.

Publicly Traded Equity Performance Risk Sensitivities and Exposure Measures

As outlined above, the macro hedging strategy is designed to mitigate public equity risk arising from variable annuity guarantees not dynamically hedged and from other products and fees. In addition, our variable annuity guarantee dynamic hedging strategy is not designed to completely offset the sensitivity of policy liabilities to all risks associated with the guarantees embedded in these products.

The table below shows the potential impact on net income attributed to shareholders resulting from an immediate 10, 20 and 30% change in market values of publicly traded equities followed by a return to the expected level of growth assumed in the valuation of policy liabilities. If market values were to remain flat for an entire year, the potential impact would be roughly equivalent to an immediate decline in market values equal to the expected level of annual growth assumed in the valuation of policy liabilities. Further, if after market values dropped 10, 20 or 30% they continued to decline, remained flat, or grew more slowly than assumed in the valuation the potential impact on net income attributed to shareholders could be considerably more than shown. Refer to “Sensitivity of Earnings to Changes in Assumptions” for more information on the level of growth assumed and on the net income sensitivity to changes in these long-term assumptions. The potential impact is shown after taking into account the impact of the change in markets on the hedge assets. While we cannot reliably estimate the amount of the change in dynamically hedged variable annuity guarantee liabilities that will not be offset by the profit or loss on the dynamic hedge assets, we make certain assumptions for the purposes of estimating the impact on net income attributable to shareholders.

This estimate assumes that the performance of the dynamic hedging program would not completely offset the gain/loss from the dynamically hedged variable annuity guarantee liabilities. It assumes that the hedge assets are based on the actual position at the period end, and that equity hedges in the dynamic program are rebalanced at 5% intervals. In addition, we assume that the macro hedge assets are rebalanced in line with market changes.

It is also important to note that these estimates are illustrative, and that the hedging program may underperform these estimates, particularly during periods of high realized volatility and/or periods where both interest rates and equity market movements are unfavourable.

The Standards of Practice for the valuation of insurance contract liabilities and guidance published by the CIA constrain the investment return assumptions for public equities and certain ALDA assets based on historical return benchmarks for public equities. The potential impact on net income attributed to shareholders does not take into account possible changes to investment return assumptions resulting from the impact of declines in public equity market values on these historical return benchmarks.

Potential immediate impact on net income attributed to shareholders arising from changes to public equity returns^{(1),(2),(3)}

As at December 31, 2016 (\$ millions)	-30%	-20%	-10%	10%	20%	30%
Underlying sensitivity to net income attributed to shareholders⁽⁴⁾						
Variable annuity guarantees	\$ (4,830)	\$ (2,920)	\$ (1,290)	\$ 1,000	\$ 1,690	\$ 2,170
Asset based fees	(410)	(280)	(140)	140	280	410
General fund equity investments ⁽⁵⁾	(910)	(590)	(270)	240	490	750
Total underlying sensitivity before hedging	(6,150)	(3,790)	(1,700)	1,380	2,460	3,330
Impact of macro and dynamic hedge assets ⁽⁶⁾	4,050	2,440	1,060	(910)	(1,610)	(2,160)
Net potential impact on net income after impact of hedging	\$ (2,100)	\$ (1,350)	\$ (640)	\$ 470	\$ 850	\$ 1,170

As at December 31, 2015 (\$ millions)	-30%	-20%	-10%	10%	20%	30%
Underlying sensitivity to net income attributed to shareholders⁽⁴⁾						
Variable annuity guarantees	\$ (5,180)	\$ (3,140)	\$ (1,410)	\$ 1,080	\$ 1,860	\$ 2,420
Asset based fees	(470)	(310)	(160)	160	310	470
General fund equity investments ⁽⁵⁾	(1,030)	(680)	(340)	330	670	1,020
Total underlying sensitivity before hedging	(6,680)	(4,130)	(1,910)	1,570	2,840	3,910
Impact of macro and dynamic hedge assets ⁽⁶⁾	4,750	2,920	1,360	(1,240)	(2,250)	(3,090)
Net potential impact on net income after impact of hedging	\$ (1,930)	\$ (1,210)	\$ (550)	\$ 330	\$ 590	\$ 820

(1) See "Caution Related to Sensitivities" above.

(2) The tables above show the potential impact on net income attributed to shareholders resulting from an immediate 10, 20 and 30% change in market values of publicly traded equities followed by a return to the expected level of growth assumed in the valuation of policy liabilities.

(3) Please refer to "Sensitivity of Earnings to Changes in Assumptions" for more information on the level of growth assumed and on the net income sensitivity to changes in these long-term assumptions.

(4) Defined as earnings sensitivity to a change in public equity markets including settlements on reinsurance contracts, but before the offset of hedge assets or other risk mitigants.

(5) This impact for general fund equities is calculated as at a point-in-time and does not include: (i) any potential impact on public equity weightings; (ii) any gains or losses on AFS public equities held in the Corporate and Other segment; or (iii) any gains or losses on public equity investments held in Manulife Bank. The participating policy funds are largely self-supporting and generate no material impact on net income attributed to shareholders as a result of changes in equity markets.

(6) Includes the impact of rebalancing equity hedges in the macro and dynamic hedging program. The impact of dynamic hedge rebalancing represents the impact of rebalancing equity hedges for dynamically hedged variable annuity guarantee best estimate liabilities at 5% intervals, but does not include any impact in respect of other sources of hedge ineffectiveness e.g. fund tracking, realized volatility and equity, interest rate correlations different from expected among other factors.

Changes in equity markets impact our available and required components of the MCCR ratio. The following table shows the potential impact to MLI's MCCR ratio resulting from changes in public equity market values, assuming that the change in the value of the hedge assets does not completely offset the change of the related variable annuity guarantee liabilities.

Potential immediate impact on MLI's MCCR ratio arising from public equity returns different than the expected return for policy liability valuation^{(1),(2),(3)}

Percentage points	Impact on MLI's MCCR ratio					
	-30%	-20%	-10%	10%	20%	30%
December 31, 2016	(12)	(8)	(4)	3	14	18
December 31, 2015	(14)	(7)	(4)	1	3	7

(1) See "Caution Related to Sensitivities" above. In addition, estimates exclude changes to the net actuarial gains/losses with respect to the Company's pension obligations as a result of changes in equity markets, as the impact on the quoted sensitivities is not considered to be material.

(2) The potential impact is shown assuming that the change in value of the hedge assets does not completely offset the change in the dynamically hedged variable annuity guarantee liabilities. The estimated amount that would not be completely offset relates to our practices of not hedging the provisions for adverse deviation and of rebalancing equity hedges for dynamically hedged variable annuity liabilities at 5% intervals.

(3) OSFI rules for segregated fund guarantees reflect full capital impacts of shocks over 20 quarters within a prescribed range. As such, the deterioration in equity markets could lead to further increases in capital requirements after the initial shock.

Interest Rate and Spread Risk Sensitivities and Exposure Measures

At December 31, 2016, we estimated the sensitivity of our net income attributed to shareholders to a 50 basis point parallel change in interest rates to be minimal.

The table below shows the potential impact on net income attributed to shareholders from a 50 basis point parallel move in interest rates. This includes a change of 50 basis points in current government, swap and corporate rates for all maturities across all markets with no change in credit spreads between government, swap and corporate rates, and with a floor of zero on government rates where government rates are not currently negative, relative to the rates assumed in the valuation of policy liabilities, including embedded derivatives. For variable annuity guarantee liabilities that are dynamically hedged, it is assumed that interest rate hedges are rebalanced at 20 basis point intervals.

As the sensitivity to a 50 basis point change in interest rates includes any associated change in the applicable reinvestment scenarios, the impact of changes to interest rates for less than, or more than 50 basis points is unlikely to be linear. Furthermore, our sensitivities are not consistent across all regions in which we operate, and the impact of yield curve changes will vary depending upon the geography that the change occurs in. Reinvestment assumptions used in the valuation of policy liabilities tend to amplify the negative effects of a decrease in interest rates, and dampen the positive effects of interest rate increases. This is because the reinvestment assumptions used in the valuation of our insurance liabilities are based on interest rate scenarios and calibration criteria set by the Actuarial Standards Board, while our interest rate hedges are valued using current market interest rates. Therefore, in any particular quarter, changes to the reinvestment assumptions are not fully aligned to changes in current market interest rates especially when there is a significant change in the shape of the interest rate curve. As a result, the impact from non-parallel movements may be materially different from the estimated impact of parallel movements. For example, if long-term interest rates increase more than short-term interest rates (sometimes referred to as a steepening of the yield curve) in North America, the decrease in the value of our swaps may be greater than the decrease in the value of our insurance liabilities. This could result in a charge to net income attributed to shareholders in the short-term even though the rising and steepening, if sustained, may have a positive long-term economic impact.

The potential impact on net income attributed to shareholders does not take into account any future potential changes to our URR assumptions or calibration criteria for stochastic risk-free rates or other potential impacts of lower interest rate levels, for example, increased strain on the sale of new business or lower interest earned on our surplus assets. The impact also does not reflect any unrealized gains or losses on AFS fixed income assets held in our surplus segment. Changes in the market value of these assets may provide a natural economic offset to the interest rate risk arising from our product liabilities. In order for there to also be an accounting offset, the Company would need to realize a portion of the AFS fixed income asset unrealized gains or losses. It is not certain we would crystallize any of the unrealized gains or losses available. As at December 31, 2016, the AFS fixed income assets held in the surplus segment were in a net after-tax unrealized loss position of \$683 million.

The impact does not reflect any potential effect of changing interest rates to the value of our ALDA assets. Rising interest rates could negatively impact the value of our ALDA assets (see “Critical Accounting and Actuarial Policies – Fair Value of Invested Assets”, below). More information on ALDA can be found under the section “Alternative Long-Duration Asset Performance Risk Sensitivities and Exposure Measures”.

The following table shows the potential impact on net income attributed to shareholders including the change in the market value of fixed income assets held in our surplus segment, which could be realized through the sale of these assets.

Potential impact on net income attributed to shareholders and MLI’s MCCR ratio of an immediate parallel change in interest rates relative to rates assumed in the valuation of policy liabilities^{(1),(2),(3),(4),(5)}

As at December 31,	2016		2015	
	-50bp	+50bp	-50bp	+50bp
Net income attributed to shareholders (\$ millions)				
Excluding change in market value of AFS fixed income assets held in the surplus segment	\$ –	\$ –	\$ (100)	\$ 100
From fair value changes in AFS fixed income assets held in surplus, if realized	1,000	(900)	600	(600)
MLI’s MCCR ratio (Percentage points)				
Before impact of change in market value of AFS fixed income assets held in the surplus segment ⁽⁵⁾	(6)	5	(6)	4
From fair value changes in AFS fixed income assets held in surplus, if realized	1	(4)	3	(3)

⁽¹⁾ See “Caution Related to Sensitivities” above. In addition, estimates exclude changes to the net actuarial gains/losses with respect to the Company’s pension obligations as a result of changes in interest rates, as the impact on the quoted sensitivities is not considered to be material.

⁽²⁾ Includes guaranteed insurance and annuity products, including variable annuity contracts as well as adjustable benefit products where benefits are generally adjusted as interest rates and investment returns change, a portion of which have minimum credited rate guarantees. For adjustable benefit products subject to minimum rate guarantees, the sensitivities are based on the assumption that credited rates will be floored at the minimum.

⁽³⁾ The amount of gain or loss that can be realized on AFS fixed income assets held in the surplus segment will depend on the aggregate amount of unrealized gain or loss.

⁽⁴⁾ Sensitivities are based on projected asset and liability cash flows at the beginning of the quarter adjusted for the estimated impact of new business, investment markets and asset trading during the quarter. Any true-up to these estimates, as a result of the final asset and liability cash flows to be used in the next quarter’s projection, are reflected in the next quarter’s sensitivities. Impact of realizing fair value changes in AFS fixed income is as of the end of the quarter.

⁽⁵⁾ The impact on MLI’s MCCR ratio includes both the impact of lower earnings on available capital as well as the increase in required capital that results from a decline in interest rates. The potential increase in required capital accounted for 5 of the 6 points impact of a 50 basis point decline in interest rates on MLI’s MCCR ratio in 4Q16.

The \$100 million decrease in sensitivity to a 50 basis point decline in interest rates from December 31, 2015 was primarily due to normal rebalancing as part of our interest risk hedging program, partially offset by updates to our valuation assumptions as a result of our annual review of actuarial methods and assumptions.

The following tables show the potential impact on net income attributed to shareholders resulting from a change in corporate spreads and swap spreads over government bond rates for all maturities across all markets with a floor of zero on the total interest rate, relative to the spreads assumed in the valuation of policy liabilities.

Potential impact on net income attributed to shareholders arising from changes to corporate spreads^{(1),(2),(3),(4)}

As at December 31, (\$ millions)	2016		2015	
	-50bp	+50bp	-50bp	+50bp
Corporate spreads	\$ (800)	\$ 700	\$ (700)	\$ 700

(1) See "Caution Related to Sensitivities" above.

(2) The impact on net income attributed to shareholders assumes no gains or losses are realized on our AFS fixed income assets held in the surplus segment and excludes the impact arising from changes in off-balance sheet bond fund value arising from changes in credit spreads. The participating policy funds are largely self-supporting and generate no material impact on net income attributed to shareholders as a result of changes in corporate spreads.

(3) Sensitivities are based on projected asset and liability cash flows at the beginning of the fourth quarter adjusted for the estimated impact of new business, investment markets and asset trading during the quarter. Any true-up to these estimates, as a result of the final asset and liability cash flows to be used in the next quarter's projection, are reflected in the next quarter's sensitivities.

(4) Corporate spreads are assumed to grade to the long-term average over 5 years.

As the sensitivity to a 50 basis point decline in corporate spreads includes the impact of a change in deterministic reinvestment scenarios where applicable, the impact of changes to corporate spreads for less than, or more than, the amounts indicated are unlikely to be linear.

The \$100 million increase in sensitivity to a 50 basis point decline in corporate spreads from December 31, 2015 was primarily due to updates to our valuation assumptions as a result of our annual review of actuarial methods and assumptions.

Potential impact on net income attributed to shareholders arising from changes to swap spreads^{(1),(2),(3)}

As at December 31, (\$ millions)	2016		2015	
	-20bp	+20bp	-20bp	+20bp
Swap spreads	\$ 500	\$ (500)	\$ 500	\$ (500)

(1) See "Caution Related to Sensitivities" above.

(2) The impact on net income attributed to shareholders assumes no gains or losses are realized on our AFS fixed income assets held in the surplus segment and excludes the impact arising from changes in off-balance sheet bond fund value arising from changes in credit spreads. The participating policy funds are largely self-supporting and generate no material impact on net income attributed to shareholders as a result of changes in swap spreads.

(3) Sensitivities are based on projected asset and liability cash flows at the beginning of the fourth quarter adjusted for the estimated impact of new business, investment markets and asset trading during the quarter. Any true-up to these estimates, as a result of the final asset and liability cash flows to be used in the next quarter's projection, are reflected in the next quarter's sensitivities.

Swap spreads remain at historically low levels, and if they were to rise, this could generate material charges to net income attributed to shareholders. We have reported gains in 2015 and the first three quarters of 2016 totaling almost \$1 billion as a result of falling swap spreads during that time. As noted in "Fourth Quarter Financial Highlights" above, we reported a charge of \$242 million in 4Q16 when swap rates rose.

Alternative Long-Duration Asset Performance Risk Sensitivities and Exposure Measures

The following table shows the potential impact on net income attributed to shareholders resulting from an immediate 10% change in market values of ALDA followed by a return to the expected level of growth assumed in the valuation of policy liabilities. If market values were to remain flat for an entire year, the potential impact would be roughly equivalent to an immediate decline in market values equal to the expected level of annual growth assumed in the valuation of policy liabilities. Further, if after market values dropped 10% they continued to decline, remained flat, or grew more slowly than assumed in the valuation of policy liabilities, the potential impact on net income attributed to shareholders could be considerably more than shown. Refer to "Sensitivity of Earnings to Changes in Assumptions" for more information on the level of growth assumed and on the net income sensitivity to changes in these long-term assumptions.

ALDA includes commercial real estate, timber and farmland real estate, oil and gas direct holdings, and private equities, some of which relate to oil and gas.

Potential impact on net income attributed to shareholders arising from changes in ALDA returns^{(1),(2),(3),(4),(5)}

As at December 31, (\$ millions)	2016		2015	
	-10%	10%	-10%	10%
Real estate, agriculture and timber assets	\$ (1,300)	\$ 1,200	\$ (1,200)	\$ 1,200
Private equities and other ALDA	(1,200)	1,200	(1,100)	1,100
Alternative long-duration assets	\$ (2,500)	\$ 2,400	\$ (2,300)	\$ 2,300

(1) See "Caution Related to Sensitivities" above.

(2) This impact is calculated as at a point-in-time impact and does not include: (i) any potential impact on ALDA weightings; (ii) any gains or losses on ALDA held in the Corporate and Other segment; or (iii) any gains or losses on ALDA held in Manulife Bank.

(3) The participating policy funds are largely self-supporting and generate no material impact on net income attributed to shareholders as a result of changes in ALDA returns. For some classes of ALDA, where there is not an appropriate long-term benchmark available, the return assumptions used in valuation are not permitted by the Standards of Practice and CIA guidance to result in a lower reserve than an assumption based on a historical return benchmark for public equities in the same jurisdiction.

(4) Net income impact does not consider any impact of the market correction on assumed future return assumptions.

(5) Please refer to "Sensitivity of Earnings to Changes in Assumptions" for more information on the level of growth assumed and on the net income sensitivity to changes in these long-term assumptions.

Foreign Exchange Risk Sensitivities and Exposure Measures

The Company generally matches the currency of its assets with the currency of the insurance and investment contract liabilities they support, with the objective of mitigating risk of loss arising from currency exchange rate changes. As at December 31, 2016, the Company did not have a material unmatched currency exposure.

The following table shows the potential impact on core earnings of a 10% change in the Canadian dollar relative to our key operating currencies.

Potential impact on core earnings^{(1),(2)}

As at December 31, (\$ millions)	2016		2015	
	+10% strengthening	-10% weakening	+10% strengthening	-10% weakening
10% change in the Canadian dollar relative to the U.S. dollar and the Hong Kong dollar	\$ (230)	\$ 230	\$ (230)	\$ 230
10% change in the Canadian dollar relative to the Japanese yen	(50)	50	(50)	50

(1) This item is a non-GAAP measure. See "Performance and Non-GAAP Measures" below.

(2) See "Caution Related to Sensitivities" above.

Liquidity Risk

Liquidity risk is the risk of not having access to sufficient funds or liquid assets to meet both expected and unexpected cash and collateral demands.

Liquidity Risk Management Strategy

Global liquidity management policies and procedures are designed to provide adequate liquidity to cover cash and collateral obligations as they come due, and to sustain and grow operations in both normal and stressed conditions. They reflect legal, regulatory, tax, operational or economic impediments to inter-entity funding. The asset mix of our balance sheet takes into account the need to hold adequate unencumbered and appropriate liquid assets to satisfy the requirements arising under stressed scenarios and to allow our liquidity ratios to remain strong. We manage liquidity centrally and closely monitor the liquidity positions of our principal subsidiaries.

We seek to mitigate liquidity risk by diversifying our business across different products, markets, geographical regions and policyholders. We design insurance products to encourage policyholders to maintain their policies in-force, to help generate a diversified and stable flow of recurring premium income. We design the policyholder termination features of our wealth management products and related investment strategies with the goal of mitigating the financial exposure and liquidity risk related to unexpected policyholder terminations. We establish and implement investment strategies intended to match the term profile of the assets to the liabilities they support, taking into account the potential for unexpected policyholder terminations and resulting liquidity needs. Liquid assets represent a large portion of our total assets. We aim to reduce liquidity risk in our deposit funded businesses by diversifying our funding sources and appropriately managing the term structure of our funding. We forecast and monitor daily operating liquidity and cash movements in various individual entities and operations as well as centrally, aiming to ensure liquidity is available and cash is employed optimally.

We also maintain centralized cash pools and access to other sources of liquidity and contingent liquidity such as repurchase funding agreements. Our centralized cash pool consists of cash or near-cash, high quality short-term investments that are continually monitored for their credit quality and market liquidity.

We have established a variety of contingent funding sources. We maintain a \$500 million committed unsecured revolving credit facility with certain Canadian chartered banks available for MFC, and a US\$500 million committed unsecured revolving credit facility with certain U.S. banks available for MFC and certain of its subsidiaries. There were no outstanding borrowings under these credit facilities as of December 31, 2016. In addition, JHUSA is a member of the regional Federal Home Loan Bank of Indianapolis (“FHLBI”), which enables the Company to obtain loans from FHLBI as an alternative source of liquidity that is collateralized by qualifying mortgages or U.S. Treasury securities. Based on regulatory limitations, as of December 31, 2016, JHUSA had an estimated maximum borrowing capacity of US\$4.4 billion under the FHLBI facility, with no amounts outstanding.

The following table outlines the maturity of the Company’s significant financial liabilities.

Maturity of financial liabilities⁽¹⁾

As at December 31, 2016 (\$ millions)	Less than 1 year	1 to 3 years	3 to 5 years	Over 5 years	Total
Long-term debt	\$ 7	\$ 999	\$ 669	\$ 4,021	\$ 5,696
Capital instruments	–	–	–	7,180	7,180
Derivatives	593	595	511	12,452	14,151
Deposits from Bank clients ⁽²⁾	15,157	1,936	826	–	17,919
Lease obligations	135	188	138	505	966

⁽¹⁾ The amounts shown above are net of the related unamortized deferred issue costs.

⁽²⁾ Carrying value and fair value of deposits from Bank clients as at December 31, 2016 was \$17,919 million and \$17,978 million, respectively (2015 – \$18,114 million and \$18,226 million, respectively). Fair value is determined by discounting contractual cash flows, using market interest rates currently offered for deposits with similar terms and conditions. All deposits from Bank clients were categorized in Level 2 of the fair value hierarchy (2015 – Level 2).

Through the normal course of business, pledging of assets is required to comply with jurisdictional regulatory and other requirements including collateral pledged to partially mitigate derivative counterparty credit risk, assets pledged to exchanges as initial margin and assets held as collateral for repurchase funding agreements. Total unencumbered assets were \$396.3 billion as at December 31, 2016 (2015 – \$385.3 billion).

Liquidity Risk Exposure Measures

We manage liquidity levels of the consolidated group and key subsidiaries against established thresholds. We measure liquidity under both immediate (within one month) and ongoing (within one year) stress scenarios. Our policy is to maintain the ratio of assets to liabilities, both adjusted for their liquidity values, above the pre-established limit.

Increased use of derivatives for hedging purposes has necessitated greater emphasis on measurement and management of contingent liquidity risk related to these instruments. The market value of our derivative portfolio is therefore regularly stress tested to assess the potential collateral and cash settlement requirements under various market conditions.

Manulife Bank has a standalone liquidity risk management policy framework. The framework includes stress testing, cash flow modeling, a funding plan and a contingency plan. The Bank has an established securitization infrastructure which enables the Bank to access a range of funding and liquidity sources. The Bank models extreme but plausible stress scenarios that demonstrate that the Bank has a sufficient pool of highly liquid money market securities and holdings of sovereign bonds, near-sovereign bonds and other liquid marketable securities, which when combined with the Bank’s capacity to securitize residential mortgage assets provides sufficient liquidity to meet potential requirements under these stress scenarios.

Credit Risk

Credit risk is the risk of loss due to the inability or unwillingness of a borrower or counterparty to fulfill its payment obligations.

Credit Risk Management Strategy

Credit risk is governed by the Credit Committee which oversees the overall credit risk management program. The Company has established objectives for overall quality and diversification of our general fund investment portfolio and criteria for the selection of counterparties, including derivative counterparties, reinsurers and insurance providers. Our policies establish exposure limits by borrower, corporate connection, quality rating, industry, and geographic region, and govern the usage of credit derivatives. Corporate connection limits vary according to risk rating. Our general fund fixed income investments are primarily public and private investment grade bonds and commercial mortgages. We have a program for selling Credit Default Swaps (“CDS”) that employs a highly selective, diversified and conservative approach. CDS decisions follow the same underwriting standards as our cash bond portfolio and the addition of this asset class allows us to better diversify our overall credit portfolio.

Our credit granting units follow a defined evaluation process that provides an objective assessment of credit proposals. We assign a risk rating based on a detailed examination of the borrower that includes a review of business strategy, market competitiveness,

industry trends, financial strength, access to funds, and other risks facing the organization. We assess and update risk ratings regularly, based on a standardized 22-point scale consistent with those of external rating agencies. For additional input to the process, we also assess credit risks using a variety of industry standard market-based tools and metrics. We map our risk ratings to pre-established probabilities of default and loss given defaults, based on historical industry and Company experience, and to resulting default costs.

We establish delegated credit approval authorities and make credit decisions on a case-by-case basis at a management level appropriate to the size and risk level of the transaction, based on the delegated authorities that vary according to risk rating. Major credit decisions are approved by the Credit Committee and the largest decisions are approved by the CEO and, in certain cases, by the Board of Directors.

We limit the types of authorized derivatives and applications and require pre-approval of all derivative application strategies and regular monitoring of the effectiveness of derivative strategies. Derivative counterparty exposure limits are established based on a minimum acceptable counterparty credit rating (generally A- from internationally recognized rating agencies). We measure derivative counterparty exposure as net potential credit exposure, which takes into consideration mark-to-market values of all transactions with each counterparty, net of any collateral held, and an allowance to reflect future potential exposure. Reinsurance counterparty exposure is measured reflecting the level of ceded liabilities. The creditworthiness of all reinsurance counterparties is reviewed internally on a regular basis.

Regular reviews of the credits within the various portfolios are undertaken with the goal of identifying changes to credit quality, and where appropriate, taking corrective action. Prompt identification of problem credits is a key objective. Credit Risk Management provides independent credit risk oversight by reviewing assigned risk ratings, and monitoring problem and potential problem credits.

We establish an allowance for losses on a loan when it becomes impaired as a result of deterioration in credit quality, to the extent there is no longer assurance of timely realization of the carrying value of the loan and related investment income. We reduce the carrying value of an impaired loan to its estimated net realizable value when we establish the allowance. We establish an allowance for losses on reinsurance contracts when a reinsurance counterparty becomes unable or unwilling to fulfill its contractual obligations. We base the allowance for loss on current recoverables and ceded policy liabilities. There is no assurance that the allowance for losses will be adequate to cover future potential losses or that additional allowances or asset write-downs will not be required.

Policy liabilities include general provisions for credit losses from future asset impairments.

Our credit policies, procedures and investment strategies are established under a strong governance framework and are designed to ensure that risks are identified, measured and monitored consistent with our risk appetite. We seek to actively manage credit exposure in our investment portfolio to reduce risk and minimize losses, and derivative counterparty exposure is managed proactively. In 2016, credit defaults and downgrade charges (changes in credit ratings impact the measurement of our policy liabilities – see Critical Accounting and Actuarial Policies below) were generally in line with our historical averages. However, we still expect volatility on a quarterly basis and losses could potentially rise above long-term expected and historical levels.

Credit Risk Exposure Measures

As at December 31, 2016 and December 31, 2015, for every 50% that credit defaults over the next year exceed the rates provided for in policy liabilities, net income attributed to shareholders would be reduced by \$54 million and \$57 million in each year, respectively. Downgrades could also be higher than assumed in policy liabilities resulting in policy liability increases and a reduction in net income attributed to shareholders.

The table below shows net impaired assets and allowances for loan losses.

Net Impaired Assets and Loan Losses

As at December 31,

(\$ millions, unless otherwise stated)

	2016	2015
Net impaired fixed income assets	\$ 224	\$ 161
Net impaired fixed income assets as a % of total invested assets	0.070%	0.052%
Allowance for loan losses	\$ 118	\$ 101

Insurance Risk

Insurance risk is the risk of loss due to actual experience emerging differently than assumed when a product was designed and priced with respect to mortality and morbidity claims, policyholder behaviour and expenses.

Insurance Risk Management Strategy

Insurance risk is governed by the Product Oversight Committee which oversees the overall insurance risk management program. The committee has established a broad framework for managing insurance risk under a set of policies, standards and guidelines, to ensure that our product offerings align with our risk taking philosophy and risk limits, and achieve acceptable profit margins. These cover:

- product design features
- use of reinsurance
- pricing models and software
- internal risk-based capital allocations
- target profit objectives
- pricing methods and assumption setting
- stochastic and stress scenario testing
- required documentation
- review and approval processes
- experience monitoring programs

In each business unit that sells products with insurance risks, we designate individual pricing officers who are accountable for pricing activities, chief underwriters who are accountable for underwriting activities and chief claims risk managers who are accountable for claims activities. Both the pricing officer and the general manager of each business unit approve the design and pricing of each product, including key claims, policyholder behaviour, investment return and expense assumptions, in accordance with global policies and standards. Risk management functions provide additional oversight, review and approval of all product and pricing initiatives, as well as material underwriting initiatives. Actuarial functions provide oversight review and approval of policy liability valuation methods and assumptions. In addition, both risk and actuarial functions review and approve new reinsurance arrangements. We perform annual risk and compliance self-assessments of the product development, pricing, underwriting and claims activities of all businesses. To leverage best practices, we facilitate knowledge transfer between staff working with similar businesses in different geographies.

We utilize a global underwriting manual intended to ensure insurance underwriting practices for direct written life business are consistent across the organization while reflecting local conditions. Each business unit establishes underwriting policies and procedures, including criteria for approval of risks and claims adjudication policies and procedures.

We apply retention limits per insured life that are intended to reduce our exposure to individual large claims which are monitored in each business unit. These retention limits vary by market and jurisdiction. We reinsure exposure in excess of these limits with other companies. Our current global life retention limit is US\$30 million for individual policies (US\$35 million for survivorship life policies) and is shared across businesses. We apply lower limits in some markets and jurisdictions. We aim to further reduce exposure to claims concentrations by applying geographical aggregate retention limits for certain covers. Enterprise-wide, we aim to reduce the likelihood of high aggregate claims by operating globally and insuring a wide range of unrelated risk events.

We seek to actively manage the Company's aggregate exposure to each of policyholder behaviour risk and claims risk against enterprise-wide economic capital and earnings-at-risk limits. Policyholder behaviour risk limits cover the combined risk arising from policy lapses and surrenders, withdrawals and other policyholder driven activity. The claims risk limits cover the combined risk arising from mortality, longevity and morbidity.

Internal experience studies, as well as trends in our experience and that of the industry, are monitored to update current and projected claims and policyholder behaviour assumptions, resulting in updates to policy liabilities as appropriate.

Operational Risk

Operational risk is the risk of loss resulting from inadequate or failed internal processes, systems failures, human-performance failures or from external events.

Operational Risk Management Strategy

Our corporate governance practices, corporate values, and integrated enterprise-wide approach to managing risk set the foundation for mitigating operational risks. This base is further strengthened by internal controls and systems, compensation programs, and seeking to hire and retain trained and competent people throughout the organization. We align compensation programs with business strategy, long-term shareholder value and good governance practices, and we benchmark these compensation practices against peer companies.

We have an enterprise operational risk management framework that sets out the processes we use to identify, assess, manage, mitigate and report on significant operational risk exposures. Execution of our operational risk management strategy focuses on change management and working to achieve a cultural shift toward greater awareness and understanding of operational risk. We have an Operational Risk Committee, which is the main decision-making committee for all operational risk matters, and which has oversight responsibility for operational risk strategy, management and governance. We have enterprise-wide risk management programs for specific operational risks that could materially impact our ability to do business or impact our reputation.

Legal and Regulatory Risk Management Strategy

Global Compliance oversees our regulatory compliance program and function, supported by designated Chief Compliance Officers in every Division. The program is designed to promote compliance with regulatory obligations worldwide and to assist in making the Company aware of the laws and regulations that affect us, and the risks associated with failing to comply. Divisional compliance groups monitor emerging legal and regulatory issues and changes, and prepare us to address new requirements. Global Compliance also independently assesses and monitors the effectiveness of a broad range of regulatory compliance processes and business practices against potential legal, regulatory, fraud and reputation risks, and allows significant issues to be escalated and proactively mitigated. Among these processes and business practices are: privacy (i.e. handling of personal and other confidential information), sales and marketing practices, sales compensation practices, asset management practices, fiduciary responsibilities, employment practices, underwriting and claims processing, product design, and regulatory filings. In addition, we have policies, processes and controls in place to help protect the Company, our customers and other related third parties from acts of fraud and from risks associated with money laundering and terrorist financing. Audit Services, Global Compliance and divisional compliance personnel periodically assess the effectiveness of the control environment. For further discussion of government regulation and legal proceedings, refer to "Government Regulation" in MFC's Annual Information Form dated February 9, 2017 and "Legal and Regulatory Proceedings" below.

Technology, Information Security and Business Continuity Risk Management Strategy

We have an enterprise-wide business continuity and disaster recovery program. This includes policies, plans and procedures that seek to minimize the impact of natural or man-made disasters, and is designed to ensure that key business functions can continue normal operations in the event of a major disruption. Each business unit is accountable for preparing and maintaining detailed business continuity plans and processes. The global program incorporates periodic scenario analysis designed to validate the assessment of both critical and non-critical units, as well as the establishment and testing of appropriate business continuity plans for all critical functions. The business continuity team establishes and regularly tests crisis management plans and global crisis communications protocols. We maintain off-site backup facilities and failover capability designed to minimize downtime and accelerate system recovery.

Our Technology Risk Management Function provides strategy, direction, and oversight, and facilitates governance for all technology risk domain activities across Manulife. The scope of this function includes: reducing information risk exposures by introducing a robust enterprise information risk management framework and supporting infrastructure for proactively identifying, managing, monitoring and reporting on critical information risk exposures; promoting transparency and informed decision-making by building and maintaining information risk profiles and risk dashboards for Global Information Services and Divisions aligned with enterprise and operational risk reporting; providing advisory services to Global Services and the Divisions around current and emerging technology risks and their impact to the Company's information risk profile; and reducing vendor information risk exposures by incorporating sound information risk management practices into sourcing, outsourcing and offshoring initiatives and programs.

The enterprise-wide information security program, which is overseen by the Chief Information Risk Officer, seeks to mitigate information security risks. This program establishes the information security framework for the Company, including governance, policies and standards, and appropriate controls to protect information and computer systems. We also have annual security awareness training sessions for all employees.

Many jurisdictions in which we operate are implementing more stringent privacy legislation. Our global privacy program, overseen by our Chief Privacy Officer, seeks to manage the risk of privacy breaches. It includes policies and standards, ongoing monitoring of emerging privacy legislation, and a network of privacy officers. Processes have been established to provide guidance on handling personal information and for reporting privacy incidents and issues to appropriate management for response and resolution.

In addition, the Chief Information Risk Officer, the Chief Privacy Officer, and their teams work closely on information security and privacy matters.

Human Resource Risk Management Strategy

We have a number of human resource policies, practices and programs in place that seek to manage the risks associated with attracting and retaining top talent, including recruiting programs at every level of the organization, training and development programs for our individual contributor and leadership segments globally, employee engagement surveys, and competitive compensation programs that are designed to attract, motivate and retain high-performing and high potential employees.

Model Risk Management Strategy

We have designated model risk management teams working closely with model owners and users that seek to manage model risk. Our model risk oversight program includes processes intended to ensure that our critical business models are conceptually sound and used as intended, and to assess the appropriateness of the calculations and outputs.

Third-Party Risk Management Strategy

Our governance framework to address third-party risk includes appropriate policies (such as our Global Outsourcing Policy and Global Procurement Policy), standards and procedures, and monitoring of ongoing results and contractual compliance of third-party arrangements.

Project Risk Management Strategy

To seek to ensure that key projects are successfully implemented and monitored by management, we have a Global Project Management Centre of Expertise, which is responsible for establishing policies and standards for project management. Our policies, standards and practices are benchmarked against leading practices.

Environmental Risk Management Strategy

Our Environmental Risk Policy reflects the Company's commitment to conducting all business activities in a manner that recognizes the need to preserve the quality of the natural environment. Our Environmental Risk Policy has been designed to monitor and manage environmental risk and to seek to achieve compliance with all applicable environmental laws and regulations for business units, affiliates and subsidiaries. Business unit environmental procedures, protocols and due diligence standards are in place to help identify, monitor and manage environmental issues in advance of acquisition of property, to help to mitigate environmental risks. Historical and background investigation and subsequent soil and ground water subsurface testing may be conducted as required to assess manageable environmental risk. Regular property inspections and limitations on permitted activities further help to manage environmental liability or financial risk. Other potentially significant financial risks for individual assets, such as fire and earthquake, have generally been insured where practicable.

Capital Management Framework

Manulife seeks to manage its capital with the objectives of:

- Operating with sufficient capital to be able to honour all commitments to its policyholders and creditors with a high degree of confidence;
- Retaining the ongoing confidence of regulators, policyholders, rating agencies, investors and other creditors in order to ensure access to capital markets; and
- Optimizing return on capital to meet shareholders' expectations subject to constraints and considerations of adequate levels of capital established to meet the first two objectives.

Capital is managed and monitored in accordance with the Capital Management Policy. The Policy is reviewed and approved by the Board of Directors annually and is integrated with the Company's risk and financial management frameworks. It establishes guidelines regarding the quantity and quality of capital, internal capital mobility, and proactive management of ongoing and future capital requirements.

Our capital management framework takes into account the requirements of the Company as a whole as well as the needs of each of our subsidiaries. Internal capital targets are set above regulatory requirements, and consider a number of factors, including expectations of regulators and rating agencies, results of sensitivity and stress testing and our own risk assessments. We monitor against these internal targets and initiate actions appropriate to achieving our business objectives.

We periodically assess the strength of our capital position under various stress scenarios. The annual Dynamic Capital Adequacy Testing ("DCAT") typically quantifies the financial impact of economic events arising from shocks in public equity and other markets, interest rates and credit, amongst others. Our 2016 DCAT results demonstrate that we would have sufficient assets, under the various adverse scenarios tested, to discharge our policy liabilities. This conclusion was also supported by a variety of other stress tests conducted by the Company.

We use an Economic Capital ("EC") framework to inform our internal view of the level of required capital and available capital. The EC framework is a key component of the Own Risk and Solvency Assessment ("ORSA") process, which ties together our risk management, strategic planning and capital management practices to confirm that our capital levels continue to be adequate from an economic perspective.

Capital management is also integrated into our product planning and performance management practices.

In order to mitigate the impact of currency movements on the consolidated capital ratios, the currency mix of assets supporting capital is managed in relation to the Company's global capital requirements. As a result, both available and required capital increase (decrease) when the Canadian dollar weakens (strengthens).

The composition of capital between equity and other capital instruments impacts the financial leverage ratio which is an important consideration in determining the Company's financial strength and credit ratings. The Company monitors and rebalances its capital mix through capital issuances and redemptions.

Capital and Funding Activities

In 2016, Manulife commenced its global funding strategy to diversify funding source and broaden our investor base. We raised \$5.4 billion of funding in Canada, the U.S., and various markets in Asia. During the year ended December 31, 2016, \$1.1 billion of securities matured or were redeemed.

The following table provides our funding activity for the year ended December 31, 2016

(\$ millions) ⁽¹⁾	Issued	Redeemed or matured
Preferred shares ^{(2),(3)}	\$ 900	\$ –
Subordinated debentures ^{(4),(5)}	464	950
Senior debt ^{(6),(7)}	4,055	150
Total	\$ 5,419	\$ 1,100

⁽¹⁾ Amounts have been translated to Canadian dollar equivalents using the December 31, 2016 exchange rate.

⁽²⁾ A total of \$900 million of preferred shares were issued during the year: MFC issued 16 million Non-cumulative 5-Year Rate Reset Class 1 Shares, Series 21 ("Series 21 Shares") for gross proceeds of \$400 million on February 25, 2016 and an additional 1 million Series 21 Shares for gross proceeds of \$25 million on March 3, 2016; MFC issued 19 million Non-cumulative 5-Year Rate Reset Class 1 Shares, Series 23 for gross proceeds of \$475 million on November 22, 2016.

⁽³⁾ Excludes 1,664,169 Non-cumulative Rate Reset Class 1 Shares, Series 3 ("Series 3 Shares") issued by MFC which were converted on a one-for-one basis into Non-cumulative Floating Rate Class 1 Shares, Series 4 ("Series 4 Shares") issued by MFC. For further details on the preferred share conversions, refer to Note 13 Share Capital and Earnings Per Share.

⁽⁴⁾ Issued SG\$500 million (3.85%) of MFC subordinated debentures on May 25, 2016.

⁽⁵⁾ A total of \$950 million of subordinated debentures were redeemed during the year: \$550 million (4.21%) MLI subordinated debentures on November 18, 2016 and \$400 million (Floating) JHFC subordinated notes on December 15, 2016.

⁽⁶⁾ A total of US\$3.02 billion of MFC senior notes were issued during the year: US\$750 million (5.375%) and US\$1 billion (4.150%) on March 4, 2016, US\$1 billion (4.70%) on June 23, 2016 and US\$270 million (3.527%) on December 2, 2016.

⁽⁷⁾ \$150 million promissory note due to Manulife Finance (Delaware) L.P. matured on December 15, 2016.

The following measure of capital reflects our capital management activities at the MFC level.

As at December 31, (\$ millions)	2016	2015	2014
Non-controlling interests	\$ 743	\$ 592	\$ 464
Participating policyholders' equity	248	187	156
Preferred shares	3,577	2,693	2,693
Common shareholders' equity	38,255	38,466	30,613
Total equity ⁽¹⁾	42,823	41,938	33,926
Adjusted for accumulated other comprehensive loss on cash flow hedges	(232)	(264)	(211)
Total equity excluding accumulated other comprehensive loss on cash flow hedges	43,055	42,202	34,137
Liabilities for preferred shares and capital instruments	7,180	7,695	5,426
Total capital	\$ 50,235	\$ 49,897	\$ 39,563

⁽¹⁾ Total equity includes unrealized gains and losses on AFS debt securities and AFS equities, net of taxes. The unrealized gain or loss on AFS debt securities are excluded from the OSFI definition of regulatory capital. As at December 31, 2016, the unrealized loss on AFS debt securities, net of taxes, \$634 million (2015 – \$81 million unrealized gain).

The "Total capital" referred to in the table above does not include \$5.7 billion (2015 – \$1.9 billion, 2014 – \$3.9 billion) of senior indebtedness issued by MFC because this form of financing does not meet OSFI's definition of regulatory capital at the MFC level. The Company has down-streamed the proceeds from this financing into operating entities in a form that qualifies as regulatory capital at the subsidiary level. Total capital in 2014 also does not include liabilities for subscription receipts issued in 2014 as part of the financing of the Standard Life acquisition. For regulatory purposes, capital is further adjusted for various additions or deductions, as mandated by the guidelines issued by OSFI.

Total capital was \$50.2 billion as at December 31, 2016 compared with \$49.9 billion as at December 31, 2015, an increase of \$0.3 billion. The increase from December 31, 2015 was primarily driven by net income attributed to shareholders net of dividends paid of \$1.4 billion and net capital issuances of \$0.4 billion (does not include the \$3.9 billion of senior debt issued net of maturities, as it is not in the definition of regulatory capital), partially offset by the unfavourable impact of foreign exchange rates of \$1.0 billion and the unfavourable change in unrealized losses on AFS debt securities of \$0.7 billion.

Financial Leverage Ratio

MFC's financial leverage ratio increased to 29.5% at year-end 2016 from 23.8% a year ago. The 5.7 point increase primarily related to net capital issuances in 2016 of \$4.3 billion which addressed higher regulatory capital requirements through issuances in several markets as we execute on our global funding diversification strategy.

Common Shareholder Dividends

The declaration and payment of shareholder dividends and the amount thereof are at the discretion of the Board of Directors and depend upon various factors, including the results of operations, financial condition, cash requirements and future prospects of the Company and regulatory restrictions on the payment of shareholder dividends, as well as any other factors deemed relevant by the Board of Directors.

Common Shareholder Dividends Paid

For the years ended December 31, \$ per share	2016	2015	2014
Dividends paid	\$ 0.740	\$ 0.665	\$ 0.570

The Company offers a Dividend Reinvestment Program ("DRIP") whereby shareholders may elect to automatically reinvest dividends in the form of MFC common shares instead of receiving cash. The offering of the program and its terms of execution are subject to the Board of Directors' discretion. In 2016, common shares in connection with DRIP were purchased on the open market with no applicable discount.

Regulatory Capital Position¹

MFC monitors and manages its consolidated capital in compliance with the applicable OSFI guideline. Under this regime our consolidated available capital is measured against a required amount of risk capital determined in accordance with the guideline.

MFC's operating activities are mostly conducted within MLI or its subsidiaries. MLI is regulated by OSFI and is subject to consolidated risk-based capital requirements using the OSFI MCCR framework. Some affiliate reinsurance business is undertaken outside the MLI consolidated framework.

Our MCCR ratio for MLI was 230% as at December 31, 2016, compared with 223% at the end of 2015, and is well in excess of OSFI's Supervisory Target ratio of 150% and Regulatory Minimum ratio of 120%. The increase in the MCCR ratio is primarily due to

¹ The "Risk Factors" section of the MD&A outlines a number of regulatory capital risks.

increased capital from net capital issuances and net income, partially offset by increases in required capital and the funding of MFC shareholder dividends. MFC's MCCR ratio was 199% as at December 31, 2016. The difference between the MLI and MFC ratios was largely due to the \$5.7 billion of MFC senior debt outstanding that, under OSFI rules, does not qualify as available capital at the MFC level.

As at December 31, 2016, MLI's non-consolidated operations and subsidiaries all maintained capital levels in excess of local requirements.

OSFI will be implementing a revised approach to the regulatory capital framework in Canada to come into effect in 2018. See "Risk Management – Regulatory Updates" above.

Remittability of Capital

As part of its capital management, Manulife promotes internal capital mobility so that Manulife's parent company has access to funds to meet its obligations and to optimize the use of excess capital. Cash remittance is defined as the cash remitted or payable to the Group from operating subsidiaries and excess capital generated by stand-alone Canadian operations. It is one of the key performance indicators used by management to evaluate our financial flexibility.

In 2016, MFC subsidiaries delivered \$1.8 billion in remittances, which was \$400 million lower compared with the 2015 level. Robust remittances from our Canadian and U.S. subsidiaries were offset by capital injections to our Asian subsidiaries, which were needed largely to address the impact of lower interest rates on local capital requirements.

Credit Ratings

Manulife's operating companies have strong financial strength ratings from credit rating agencies. Maintaining strong ratings on debt and capital instruments issued by MFC and its subsidiaries allows us to access capital markets at competitive pricing levels. Ratings are important factors in establishing the competitive position of insurance companies and maintaining public confidence in products being offered. Should these credit ratings decrease materially, our cost of financing may increase and our access to funding and capital through capital markets could be reduced.

During 2016, Moody's, DBRS, Fitch and A.M. Best maintained their assigned ratings of MFC and its primary insurance operating companies. S&P maintained their assigned ratings of MFC and all primary operating companies, with the exception of Manulife Life Insurance Company, our Japan subsidiary ("Manulife Japan"). On March 18, 2016, S&P placed the AA- insurer financial strength rating of Manulife Japan on Creditwatch with negative implications after the identification of a misapplication of its guarantee criteria. On June 14, 2016, S&P removed the Creditwatch on Manulife Japan's financial strength rating and downgraded the rating one notch, reflecting the A+ rating ceiling for the Japan sovereign.

The following table summarizes the financial strength and claims paying ability ratings of MLI and certain of its subsidiaries as at February 3, 2017.

Financial Strength Ratings

	S&P	Moody's	DBRS	Fitch	A.M. Best
The Manufacturers Life Insurance Company	AA-	A1	AA(Low)	AA-	A+ (Superior)
John Hancock Life Insurance Company (U.S.A.)	AA-	A1	Not Rated	AA-	A+ (Superior)
Manulife (International) Limited	AA-	Not Rated	Not Rated	Not Rated	Not Rated
Manulife Life Insurance Company	A+	Not Rated	Not Rated	Not Rated	Not Rated

As at February 3, 2017, S&P, Moody's, DBRS, Fitch, and A.M. Best had a stable outlook on these ratings.

Critical Accounting and Actuarial Policies

The preparation of financial statements in accordance with IFRS requires management to make estimates and assumptions that affect the reported amounts and disclosures made in the Consolidated Financial Statements and accompanying notes. These estimates and assumptions are based on historical experience, management's assessment of current events and conditions and activities that the Company may undertake in the future as well as possible future economic events. Actual results could differ from these estimates. The estimates and assumptions described in this section depend upon subjective or complex judgments about matters that may be uncertain, and changes in these estimates and assumptions could materially impact the Consolidated Financial Statements.

Our significant accounting policies are described in note 1 to the Consolidated Financial Statements. Significant estimation processes relate to the determination of insurance and investment contract liabilities, assessment of relationships with other entities for consolidation, fair value of certain financial instruments, derivatives and hedge accounting, provisioning for asset impairment, determination of pension and other post-employment benefit obligations and expenses, income taxes and uncertain tax positions, valuation and impairment of goodwill and intangible assets and the measurement and disclosure of contingent liabilities as described below. In addition, in the determination of the fair values of invested assets, where observable market data is not available, management applies judgment in the selection of valuation models.

Policy Liabilities (Insurance and Investment Contract Liabilities)

Policy liabilities for IFRS are valued in Canada under standards established by the Actuarial Standards Board. These standards are designed to ensure we establish an appropriate liability on the Consolidated Statements of Financial Position to cover future obligations to all our policyholders. The assumptions underlying the valuation of policy liabilities are required to be reviewed and updated on an ongoing basis to reflect recent and emerging trends in experience and changes in risk profile of the business. In conjunction with prudent business practices to manage both product and asset related risks, the selection and monitoring of appropriate valuation assumptions is designed to minimize our exposure to measurement uncertainty related to policy liabilities.

Determination of Policy Liabilities

Policy liabilities have two major components: a best estimate amount and a provision for adverse deviation. The best estimate amount represents the estimated value of future policyholder benefits and settlement obligations to be paid over the term remaining on in-force policies, including the costs of servicing the policies. The best estimate amount is reduced by the future expected policy revenues and future expected investment income on assets supporting the policies, before any consideration for reinsurance ceded. To determine the best estimate amount, assumptions must be made for a number of key factors, including future mortality and morbidity rates, investment returns, rates of policy termination, and premium persistency, operating expenses, certain taxes (other than income taxes, and includes temporary tax timing and permanent tax rate differences on the cash flows available to satisfy policy obligations) and foreign currency. Reinsurance is used to transfer part or all of a policy liability to another insurance company at terms negotiated with that insurance company. A separate asset for reinsurance ceded is calculated based on the terms of the reinsurance treaties that are in-force, with deductions taken for the credit standing of the reinsurance counterparties where appropriate.

To recognize the uncertainty involved in determining the best estimate actuarial liability assumptions, a provision for adverse deviation ("PfAD") is established. The PfAD is determined by including a margin of conservatism for each assumption to allow for possible mis-estimation of, or deterioration in, future experience in order to provide greater comfort that the policy liabilities will be sufficient to pay future benefits. The CIA establishes suggested ranges for the level of margins for adverse deviation based on the risk profile of the business. Our margins are set taking into account the risk profile of our business. The effect of these margins is to increase policy liabilities over the best estimate assumptions. The margins for adverse deviation decrease the income that is recognized at the time a new policy is sold and increase the income recognized in later periods as the margins release as the remaining policy risks reduce.

Best Estimate Assumptions

We follow established processes to determine the assumptions used in the valuation of our policy liabilities. The nature of each risk factor and the process for setting the assumptions used in the valuation are discussed below.

Mortality

Mortality relates to the occurrence of death. Mortality assumptions are based on our internal as well as industry past and emerging experience and are differentiated by sex, underwriting class, policy type and geographic market. We make assumptions about future mortality improvements using historical experience derived from population data. Reinsurance is used to offset some of our direct mortality exposure on in-force life insurance policies with the impact of the reinsurance directly reflected in our policy valuation for the determination of policy liabilities net of reinsurance. Actual mortality experience is monitored against these assumptions separately for each business. The results are favourable where mortality rates are lower than assumed for life insurance and where mortality rates are higher than assumed for payout annuities. Overall 2016 experience was unfavourable (2015 – unfavourable) when compared with our assumptions.

Morbidity

Morbidity relates to the occurrence of accidents and sickness for the insured risks. Morbidity assumptions are based on our internal as well as industry past and emerging experience and are established for each type of morbidity risk and geographic market. For our

JH Long Term Care business we make assumptions about future morbidity changes. Actual morbidity experience is monitored against these assumptions separately for each business. Our morbidity risk exposure relates to future expected claims costs for long-term care insurance, as well as for group benefits and certain individual health insurance products we offer. Overall 2016 experience was unfavourable (2015 – unfavourable) when compared with our assumptions.

Property and Casualty

Our Property and Casualty Reinsurance business insures against catastrophic losses from natural and human disasters. Policy liabilities are held for incurred claims including provision for anticipated development and for premiums received and not yet earned. Overall 2016 claims loss experience was in line with expectations (2015 – in line with expectations) with respect to the provisions that were established.

Policy Termination and Premium Persistency

Policy termination includes lapses and surrenders, where lapses represent the termination of policies due to non-payment of premiums and surrenders represent the voluntary termination of policies by policyholders. Premium persistency represents the level of ongoing deposits on contracts where there is policyholder discretion as to the amount and timing of deposits. Policy termination and premium persistency assumptions are primarily based on our recent experience adjusted for expected future conditions. Assumptions reflect differences by type of contract within each geographic market and actual experience is monitored against these assumptions separately for each business. Overall 2016 experience was unfavourable (2015 – unfavourable) when compared with our assumptions.

Expenses and Taxes

Operating expense assumptions reflect the projected costs of maintaining and servicing in-force policies, including associated overhead expenses. The expenses are derived from internal cost studies and are projected into the future with an allowance for inflation. For some developing businesses, there is an expectation that unit costs will decline as these businesses mature. Actual expenses are monitored against assumptions separately for each business. Overall maintenance expenses for 2016 were unfavourable (2015 – unfavourable) when compared with our assumptions. Taxes reflect assumptions for future premium taxes and other non-income related taxes. For income taxes, policy liabilities are adjusted only for temporary tax timing and permanent tax rate differences on the cash flows available to satisfy policy obligations.

Investment Returns

We segment assets to support liabilities by business segment and geographic market and establish investment strategies for each liability segment. The projected cash flows from these assets are combined with projected cash flows from future asset purchases/sales to determine expected rates of return for future years. The investment strategies for future asset purchases and sales are based on our target investment policies for each segment and the reinvestment returns are derived from current and projected market rates for fixed interest investments and our projected outlook for non-fixed interest assets. Credit losses are projected based on our own and industry experience, as well as specific reviews of the current investment portfolio. Investment return assumptions for each asset class also incorporate expected investment management expenses that are derived from internal cost studies. In 2016, actual investment returns were unfavourable (2015 – unfavourable) when compared with our assumptions. Investment-related experience and the direct impact of interest rates and equity markets are discussed in the “Financial Performance” section above.

Segregated Funds

We offer segregated funds to policyholders that offer certain guarantees, including guaranteed returns of principal on maturity or death, as well as guarantees of minimum withdrawal amounts or income benefits. The on-balance sheet liability for these benefits is the expected cost of these guarantees including appropriate valuation margins for the various contingencies including mortality and lapse. The dominant driver of the cost of guarantees is the return on the underlying funds in which the policyholders invest. See “Risk Management – Market Risk – Hedging Strategies for Variable Annuity and Other Equity Risks” and the “Financial Performance – Analysis of Net Income” sections above.

Foreign Currency

Foreign currency risk results from a mismatch of the currency of the policy liabilities and the currency of the assets designated to support these obligations. We generally match the currency of our assets with the currency of the liabilities they support, with the objective of mitigating the risk of loss arising from movements in currency exchange rates. Where a currency mismatch exists, the assumed rate of return on the assets supporting the liabilities is reduced to reflect the potential for adverse movements in exchange rates.

Experience Adjusted Products

Where policies have features that allow the impact of changes in experience to be passed on to policyholders through policy dividends, experience rating refunds, credited rates or other adjustable features, the projected policyholder benefits are adjusted to reflect the projected experience. Minimum contractual guarantees and other market considerations are taken into account in determining the policy adjustments.

Provision for Adverse Deviation

The aggregate provision for adverse deviation is the sum of the provisions for adverse deviation for each risk factor. Margins for adverse deviation are established by product type and geographic market for each assumption or factor used in the determination of the best estimate actuarial liability. The margins are established based on the risk characteristics of the business being valued.

Margins for interest rate risk are included by testing a number of scenarios of future interest rates. The margin can be established by testing a limited number of scenarios, some of which are prescribed by Canadian Actuarial Standards of Practice, and determining the liability based on the worst outcome. Alternatively, the margin can be set by testing many scenarios, which are developed according to actuarial guidance. Under this approach the liability would be the average of the outcomes above a percentile in the range prescribed by the Canadian Actuarial Standards of Practice.

In addition to the explicit margin for adverse deviation, the valuation basis for segregated fund liabilities explicitly limits the future revenue recognition in the valuation basis to the amount necessary to offset acquisition expenses, after allowing for the cost of any guarantee features. The fees that are in excess of this limitation are reported as an additional margin and are shown in segregated fund non-capitalized margins.

The provision for adverse deviation and the future revenue deferred in the valuation due to the limitations on recognition of future revenue in the valuation of segregated fund liabilities are shown in the table below.

As at December 31, (\$ millions)	2016	2015
Best estimate actuarial liability	\$ 207,573	\$ 196,098
Provision for adverse deviation		
Insurance risks (mortality/morbidity)	16,553	15,087
Policyholder behaviour (lapse/surrender/premium persistency)	4,416	4,204
Expenses	2,200	2,498
Investment risks (non-credit)	26,202	27,793
Investment risks (credit)	1,862	1,715
Segregated funds guarantees	2,462	2,565
Total provision for adverse deviation ("PfAD")⁽¹⁾	53,695	53,862
Segregated funds – additional margins	10,167	10,656
Total of PfAD and additional segregated fund margins	\$ 63,862	\$ 64,518

⁽¹⁾ Reported net actuarial liabilities (excluding the \$5,918 million (2015 – \$6,354 million) reinsurance asset related to the Company's in-force participating life insurance closed block that is retained on a funds withheld basis as part of the NYL transaction) as at December 31, 2016 of \$261,268 million (2015 – \$249,960 million) are comprised of \$207,573 million (2015 – \$196,098 million) of best estimate actuarial liabilities and \$53,695 million (2015 – \$53,862 million) of PfAD.

The change in the PfAD from period to period is impacted by changes in liability and asset composition, by currency and interest rate movements and by material changes in valuation assumptions. The overall increase in PfAD for insurance risks and policyholder behaviour was primarily due to our annual review of actuarial valuation methods and assumptions. The overall decrease in PfAD for non-credit investment risks primarily resulted from our annual review of actuarial valuation methods and assumptions.

Sensitivity of Earnings to Changes in Assumptions

When the assumptions underlying our determination of policy liabilities are updated to reflect recent and emerging experience or change in outlook, the result is a change in the value of policy liabilities which in turn affects net income attributed to shareholders. The sensitivity of net income attributed to shareholders to changes in non-economic and certain asset related assumptions underlying policy liabilities is shown below, and assumes that there is a simultaneous change in the assumptions across all business units.

For changes in asset related assumptions, the sensitivity is shown net of the corresponding impact on income of the change in the value of the assets supporting liabilities. In practice, experience for each assumption will frequently vary by geographic market and business, and assumption updates are made on a business/geographic specific basis. Actual results can differ materially from these estimates for a variety of reasons, including the interaction among these factors when more than one changes, changes in actuarial and investment return and future investment activity assumptions, actual experience differing from the assumptions, changes in business mix, effective tax rates and other market factors, and the general limitations of our internal models.

Potential impact on net income attributed to shareholders arising from changes to non-economic assumptions⁽¹⁾

As at December 31, (\$ millions)	Decrease in net income attributable to shareholders	
	2016	2015
Policy related assumptions		
2% adverse change in future mortality rates ^{(2),(4)}		
Products where an increase in rates increases insurance contract liabilities	\$ (400)	\$ (400)
Products where a decrease in rates increases insurance contract liabilities	(500)	(500)
5% adverse change in future morbidity rates ^{(3),(4)}	(3,700)	(3,000)
10% adverse change in future termination rates ⁽⁴⁾	(1,900)	(2,000)
5% increase in future expense levels	(500)	(400)

⁽¹⁾ The participating policy funds are largely self-supporting and generate no material impact on net income attributed to shareholders as a result of changes in non-economic assumptions. Experience gains or losses would generally result in changes to future dividends, with no direct impact to shareholders.

⁽²⁾ An increase in mortality rates will generally increase policy liabilities for life insurance contracts whereas a decrease in mortality rates will generally increase policy liabilities for policies with longevity risk such as payout annuities.

⁽³⁾ No amounts related to morbidity risk are included for policies where the policy liability provides only for claims costs expected over a short period, generally less than one year, such as Group Life and Health.

⁽⁴⁾ The impacts of the sensitivities on LTC for morbidity, mortality and lapse are assumed to be moderated by partial offsets from the Company's ability to contractually raise premium rates in such events, subject to state regulatory approval.

The increase in morbidity sensitivity between December 31, 2015 and December 31, 2016 is primarily due to updates to our valuation assumptions as a result of the Long Term Care triennial review.

Potential impact on net income attributed to shareholders arising from changes to asset related assumptions supporting actuarial liabilities

As at December 31, (\$ millions)	Increase (decrease) in after-tax income			
	2016		2015	
	Increase	Decrease	Increase	Decrease
Asset related assumptions updated periodically in valuation basis changes				
100 basis point change in future annual returns for public equities ⁽¹⁾	\$ 500	\$ (500)	\$ 600	\$ (600)
100 basis point change in future annual returns for ALDA ⁽²⁾	2,900	(3,500)	3,000	(3,400)
100 basis point change in equity volatility assumption for stochastic segregated fund modelling ⁽³⁾	(200)	200	(300)	300

⁽¹⁾ The sensitivity to public equity returns above includes the impact on both segregated fund guarantee reserves and on other policy liabilities. For a 100 basis point increase in expected growth rates, the impact from segregated fund guarantee reserves is a \$200 million increase (2015 – \$200 million increase). For a 100 basis point decrease in expected growth rates, the impact from segregated fund guarantee reserves is a \$200 million decrease (2015 – \$200 million decrease). Expected long-term annual market growth assumptions for public equities pre-dividends for key markets are based on long-term historical observed experience and compliance with actuarial standards. The pre-dividend growth rates for returns in the major markets used in the stochastic valuation models for valuing segregated fund guarantees are 7.5% per annum in Canada, 7.6% per annum in the U.S. and 5.2% per annum in Japan. Growth assumptions for European equity funds are market-specific and vary between 5.8% and 7.85%.

⁽²⁾ ALDA include commercial real estate, timber and farmland real estate, direct oil and gas properties, and private equities, some of which relate to oil and gas. Expected long-term return assumptions are set in accordance with the Standards of Practice for the valuation of insurance contract liabilities and guidance published by the CIA. The guidance requires that the investment return assumption for these assets should not be higher than the historical long-term average returns of an appropriate broad-based index. Where such experience is not available, investment return assumptions should not result in a lower reserve than an assumption based on a historical return benchmark for public equities in the same jurisdiction. Annual best estimate return assumptions for ALDA and public equity including market growth rates and annual income, such as rent, production proceeds and dividends, vary between 5.25% and 12%, with an average of 9.7% based on the current asset mix backing our guaranteed insurance and annuity business as of December 31, 2016. The annual return assumptions for ALDA and public equity, including margins for adverse deviations in our valuation which take into account the uncertainty of achieving the returns, will vary based on our holding period. On average, for a 20-year horizon, the assumption varies between 2.5% and 7.5%.

⁽³⁾ Volatility assumptions for public equities are based on long-term historical observed experience and compliance with actuarial standards. The resulting volatility assumptions are 17.0% per annum in Canada and 17.15% per annum in the U.S. for large cap public equities, and 19% per annum in Japan. For European equity funds, the volatility varies between 16.25% and 18.4%.

Review of Actuarial Methods and Assumptions

A comprehensive review of actuarial methods and assumptions is performed annually. The review is designed to reduce the Company's exposure to uncertainty by ensuring assumptions for both asset related and liability related risks remain appropriate. This is accomplished by monitoring experience and selecting assumptions which represent a current best estimate view of expected future experience, and margins that are appropriate for the risks assumed. While the assumptions selected represent the Company's current best estimates and assessment of risk, the ongoing monitoring of experience and changes in the economic environment are likely to result in future changes to the valuation assumptions, which could be material.

2016 Review of Actuarial Methods and Assumptions

The 2016 full year review of actuarial methods and assumptions resulted in an increase in insurance and investment contract liabilities of \$655 million, net of reinsurance, and a decrease in net income attributed to shareholders of \$453 million.

For the year ended December 31, 2016 (\$ millions)	Change in gross insurance and investment contract liabilities	Change in net insurance and investment contract liabilities	Change in net income attributed to shareholders
JH Long Term Care triennial review	\$ 696	\$ 696	\$ (452)
Mortality and morbidity updates	(12)	(53)	76
Lapse and policyholder behavior			
U.S. Variable Annuities guaranteed minimum withdrawal benefit incidence and utilization	(1,024)	(1,024)	665
Other lapses and policyholder behaviour	516	431	(356)
Economic reinvestment assumptions	459	443	(313)
Other updates	719	162	(73)
Net impact	\$ 1,354	\$ 655	\$ (453)

JH Long Term Care triennial review

U.S. Insurance completed a comprehensive long-term care experience study. This included a review of mortality, morbidity and lapse experience, as well as the reserve for in-force rate increases filed as a result of the 2013 review. In addition, the Company implemented refinements to the modelling of future tax cash flows for long-term care. The net impact of the review was a \$452 million charge to net income attributed to shareholders for the year ended December 31, 2016.

Expected future claims costs increased primarily due to claims periods being longer than expected in policy liabilities, and a reduction in lapse and mortality rates. This increase in expected future claims costs was partially offset by a number of items, including expected future premium increases resulting from this year's review and a decrease in the margin for adverse deviations related to the rate of inflation embedded in our benefit utilization assumptions.

The review of premium increases assumed in the policy liabilities resulted in a benefit to earnings of \$1.0 billion for the year ended December 31, 2016; this includes future premium increases that are due to our 2016 review of morbidity, mortality and lapse assumptions, and outstanding amounts from our 2013 state filings. Premium increases averaging approximately 20% will be sought on the vast majority of the in-force business, excluding the carryover of 2013 amounts requested. Our assumptions reflect the estimated timing and amount of state approved premium increases. Our actual experience obtaining price increases could be materially different than we have assumed, resulting in further increases or decreases in policy liabilities, which could be material.

Mortality and morbidity updates

Mortality and morbidity assumptions were updated across several business units to reflect recent experience, including updates to morbidity assumptions for certain medical insurance products in Japan, leading to a \$76 million benefit to net income attributed to shareholders for the year ended December 31, 2016.

Updates to lapses and policyholder behaviour

U.S. Variable Annuities guaranteed minimum withdrawal benefit incidence and utilization assumptions were updated to reflect recent experience which led to a \$665 million benefit to net income attributed to shareholders for the year ended December 31, 2016. We updated our incidence assumptions to reflect the favourable impact of policyholders taking withdrawals later than expected. This was partially offset by an increase in our utilization assumptions.

In Japan, lapse rates for term life insurance products were increased at certain durations which led to a \$228 million charge to net income attributed to shareholders for the year ended December 31, 2016. Other updates to lapse and policyholder behavior assumptions were made across several product lines, including term products in Canada, which led to a \$128 million charge to net income attributed to shareholders for the year ended December 31, 2016.

Updates to economic reinvestment assumptions

The Company updated economic reinvestment assumptions for risk-free rates used in the valuation of policy liabilities which resulted in a \$313 million charge to net income attributed to shareholders for the year ended December 31, 2016. These updates included a proactive 10 basis point reduction to our URR assumptions and a commensurate change in our calibration criteria for stochastic risk-free rates. These updates reflect the fact that interest rates are lower than they were when the current prescribed URR and calibration criteria for stochastic risk-free rates were promulgated by the Actuarial Standards Board ("ASB") in 2014. The ASB has indicated that it will update the promulgation periodically, when necessary. We expect the promulgation to be updated in 2017 and, if required, we will make further updates to our economic reinvestment assumptions at that time.

Other updates

Other model refinements related to the projection of both asset and liability cash flows across several business units led to a \$73 million charge to net income attributed to shareholders for the year ended December 31, 2016. This included a charge due to refinements to our CALM models and assumptions offset by a benefit due to refinements to the modelling of future tax cash flows for certain assets in the U.S.

2015 Review of Actuarial Methods and Assumptions

The 2015 full year review of actuarial methods and assumptions resulted in an increase in insurance and investment contract liabilities of \$558 million, net of reinsurance, and a decrease in net income attributed to shareholders of \$451 million for the year ended December 31, 2015.

For the year ended December 31, 2015 (\$ millions)	Change in gross insurance and investment contract liabilities	Change in net insurance and investment contract liabilities	Change in net income attributed to shareholders
Mortality and morbidity updates	\$ (191)	\$ (146)	\$ 168
Lapses and policyholder behaviour	953	571	(446)
Other updates	(584)	133	(173)
Net impact	\$ 178	\$ 558	\$ (451)

Updates to mortality and morbidity

Assumptions were updated across several business units to reflect recent experience. In Japan, a reduction to the margin for adverse deviations applied to the best estimate morbidity assumptions for certain medical insurance products resulted in a \$237 million increase in net income attributed to shareholders for the year ended December 31, 2015. The reduction in this margin is a result of emerging experience being aligned with expectations leading to a decrease in the level of conservatism required for this assumption.

Other mortality and morbidity updates led to a \$69 million decrease in net income attributed to shareholders for the year ended December 31, 2015. This included a refinement to the modelling of mortality improvement on a portion of the Canadian retail insurance business that led to an increase to net income attributed to shareholders. This was more than offset by a review of the Company mortality assumption for some of the JH Annuities business and a number of other updates across several business units.

Updates to lapses and policyholder behaviour

Lapse rates were updated across several business units to reflect recent experience. Lapse rates for JH universal life and variable universal life products were updated which led to a net \$235 million decrease in net income attributed to shareholders for the year ended December 31, 2015. Lapse rates for the low cost universal life products were reduced which led to a decrease in net income attributed to shareholders; this was partially offset by a reduction in lapse rates for the variable universal life products which led to an increase in net income attributed to shareholders.

Other updates to lapse and policyholder behavior assumptions were made across several product lines including term and whole life insurance products in Japan, which led to a \$211 million decrease in net income attributed to shareholders for the year ended December 31, 2015.

Other updates

The Company implemented a refinement to the modelling of asset and liability cash flows associated with inflation-linked benefit options in the Long Term Care business, which led to a \$264 million increase in net income attributed to shareholders for the year ended December 31, 2015.

The Company implemented a refinement to the projection of the term policy conversion options in Canadian retail insurance which led to a \$200 million decrease in net income attributed to shareholders for the year ended December 31, 2015.

Other model refinements related to the projection of both asset and liability cash flows across several business units led to a \$237 million decrease in net income attributed to shareholders for the year ended December 31, 2015. This included several items such as refinements to the modelling of reinsurance contracts in North America, updates to the future investment expense assumptions, updates to the future ALDA investment return assumptions and updates to certain future expense assumptions in JH Insurance.

Change in net insurance contract liabilities

The change in net insurance contract liabilities can be attributed to several sources: new business, acquisitions, in-force movement and currency impact. Changes in net insurance contract liabilities are substantially offset in the financial statements by premiums, investment income, policy benefits and other policy related cash flows. The changes in net insurance contract liabilities by business segment are shown below:

2016 Net Insurance Contract Liability Movement Analysis

For the year ended December 31, 2016 (\$ millions)	Asia Division	Canadian Division	U.S. Division	Corporate and Other	Total
Balance, January 1	\$ 45,986	\$ 71,473	\$ 132,906	\$ (503)	\$ 249,862
New business ^{(1),(2)}	3,857	253	(493)	–	3,617
In-force movement ^{(1),(3)}	6,051	1,636	6,061	(75)	13,673
Changes in methods and assumptions ⁽¹⁾	108	22	549	(24)	655
Currency impact ⁽⁴⁾	(1,435)	–	(3,831)	12	(5,254)
Balance, December 31	\$ 54,567	\$ 73,384	\$ 135,192	\$ (590)	\$ 262,553

- ⁽¹⁾ The \$17,172 million increase reported as the change in insurance contract liabilities and change in reinsurance assets on the 2016 Consolidated Statements of Income primarily consists of changes due to normal in-force movement, new policies and changes in methods and assumptions. These three items net to an increase of \$17,945 million, of which \$16,906 million is included in the income statement increase in insurance contract liabilities and change in reinsurance assets, and \$1,039 million is included in net claims and benefits. The Consolidated Statements of Income change in insurance contract liabilities also includes the change in embedded derivatives associated with insurance contracts. Of the \$17,290 million net increase in insurance contract liabilities related to new business and in-force movement, \$16,196 million was an increase in actuarial liabilities. The remaining amount was an increase of \$1,094 million in other insurance contract liabilities.
- ⁽²⁾ New business policy liability impact is positive/(negative) when estimated future premiums, together with future investment income, are expected to be more/(less) than sufficient to pay estimated future benefits, policyholder dividends and refunds, taxes (excluding income taxes) and expenses on new policies issued.
- ⁽³⁾ The net in-force movement over the year was an increase of \$13,673 million, reflecting expected growth in insurance contract liabilities in all three divisions.
- ⁽⁴⁾ The decrease in policy liabilities from currency impact reflects the appreciation of the Canadian dollar relative to the U.S. dollar, Hong Kong dollar and Japanese yen. To the extent assets are currency matched to liabilities, the increase in insurance contract liabilities due to currency impact is offset by a corresponding increase from currency impact in the value of assets supporting those liabilities.

2015 Net Insurance Contract Liability Movement Analysis

For the year ended December 31, 2015 (\$ millions)	Asia Division	Canadian Division	U.S. Division	Corporate and Other	Total
Balance, January 1	\$ 33,662	\$ 54,488	\$ 121,671	\$ (351)	\$ 209,470
Acquisitions ⁽¹⁾	–	16,411	(13,375)	–	3,036
New business ^{(2),(3)}	1,044	104	1,057	–	2,205
In-force movement ^{(2),(4),(5)}	5,173	9	419	135	5,736
Changes in methods and assumptions ⁽²⁾	46	452	279	(219)	558
Currency impact ⁽⁶⁾	6,061	9	22,855	(68)	28,857
Balance, December 31	\$ 45,986	\$ 71,473	\$ 132,906	\$ (503)	\$ 249,862

- ⁽¹⁾ In 2015, the Company acquired Standard Life and NYL assumed the Company's in-force participating life insurance closed block through net 60% reinsurance agreements. The U.S. division acquisition amount of \$(13,375 million) consists of \$(5,785 million) premium ceded and \$(7,590 million) reinsurance asset. See note 3 to the 2016 Consolidated Financial Statements.
- ⁽²⁾ The \$642 million increase reported as the change in insurance contract liabilities and change in reinsurance assets on the 2015 Consolidated Statements of Income primarily consists of changes due to normal in-force movement, new policies and changes in methods and assumptions, including the \$(7,590) million change in reinsurance asset related to the NYL reinsurance. These four items net to an increase of \$909 million, of which \$702 million is included in the income statement increase in insurance contract liabilities and change in reinsurance assets, and \$207 million is included in net claims and benefits. The Consolidated Statements of Income change in insurance contract liabilities also includes the change in embedded derivatives associated with insurance contracts. Of the \$7,941 million net increase in insurance contract liabilities related to new business and in-force movement, \$7,710 million was an increase in actuarial liabilities. The remaining amount was an increase of \$231 million in other insurance contract liabilities.
- ⁽³⁾ New business policy liability impact is positive/(negative) when estimated future premiums, together with future investment income, are expected to be more/(less) than sufficient to pay estimated future benefits, policyholder dividends and refunds, taxes (excluding income taxes) and expenses on new policies issued.
- ⁽⁴⁾ The net in-force movement over the year was \$5,736 million, reflecting expected growth in insurance contract liabilities in all three divisions. This was largely offset in the U.S. and Canada by changes in interest rates and the resulting impact on the fair value of assets which back those policy liabilities.
- ⁽⁵⁾ See Financial Performance – Impact of Fair Value Accounting above.
- ⁽⁶⁾ The increase in policy liabilities from currency impact reflects the depreciation of the Canadian dollar relative to the U.S. dollar, Hong Kong dollar and Japanese yen. To the extent assets are currency matched to liabilities, the increase in insurance contract liabilities due to currency impact is offset by a corresponding increase from currency impact in the value of assets supporting those liabilities.

Consolidation

The Company is required to consolidate the financial position and results of entities it controls. Control exists when the Company:

- has the power to govern the financial and operating policies of the entity;
- is exposed to a significant portion of the entity's variable returns; and
- is able to use its power to influence variable returns from the entity.

The Company uses the same principles to assess control over any entity it is involved with. In evaluating control, potential factors assessed include the effects of:

- substantive potential voting rights that are currently exercisable or convertible;
- contractual management relationships with the entity;
- rights and obligations resulting from policyholders to manage investments on their behalf; and
- the effect of any legal or contractual restraints on the Company from using its power to affect its variable returns from the entity.

An assessment of control is based on arrangements in place and the assessed risk exposures at inception. Initial evaluations are reconsidered at a later date if:

- the Company acquires additional interests in the entity or its interests in an entity are diluted;
- the contractual arrangements of the entity are amended such that the Company's involvement with the entity changes; or
- the Company's ability to use its power to affect its variable returns from the entity changes.

Subsidiaries are consolidated from the date on which control is obtained by the Company and cease to be consolidated from the date that control ceases.

Fair Value of Invested Assets

A large portion of the Company's invested assets are recorded at fair value. Refer to note 1 to the 2016 Consolidated Financial Statements for a description of the methods used in determining fair values. When quoted prices in active markets are not available for a particular investment, significant judgment is required to determine an estimated fair value based on market standard valuation methodologies including discounted cash flow methodologies, matrix pricing, consensus pricing services, or other similar techniques. The inputs to these market standard valuation methodologies include: current interest rates or yields for similar instruments, credit rating of the issuer or counterparty, industry sector of the issuer, coupon rate, call provisions, sinking fund requirements, tenor (or expected tenor) of the instrument, management's assumptions regarding liquidity, volatilities and estimated future cash flows. Accordingly, the estimated fair values are based on available market information and management's judgments about the key market factors impacting these financial instruments. Financial markets are susceptible to severe events evidenced by rapid depreciation in asset values accompanied by a reduction in asset liquidity. The Company's ability to sell assets, or the price ultimately realized for these assets, depends upon the demand and liquidity in the market and increases the use of judgment in determining the estimated fair value of certain assets.

Evaluation of Invested Asset Impairment

AFS fixed income and equity securities are carried at fair market value, with changes in fair value recorded in Other Comprehensive Income ("OCI") with the exception of unrealized gains and losses on foreign currency translation of AFS fixed income securities which are included in net income attributed to shareholders. Securities are reviewed on a regular basis and any fair value decrement is transferred out of Accumulated Other Comprehensive Income ("AOCI") and recorded in net income attributed to shareholders when it is deemed probable that the Company will not be able to collect all amounts due according to the contractual terms of a fixed income security or when fair value of an equity security has declined significantly below cost or for a prolonged period of time.

Provisions for impairments of mortgage loans and private placement loans are recorded with losses reported in earnings when there is no longer reasonable assurance as to the timely collection of the full amount of the principal and interest.

Significant judgment is required in assessing whether an impairment has occurred and in assessing fair values and recoverable values. Key matters considered include economic factors, Company and industry specific developments, and specific issues with respect to single issuers and borrowers.

Changes in circumstances may cause future assessments of asset impairment to be materially different from current assessments, which could require additional provisions for impairment. Additional information on the process and methodology for determining the allowance for credit losses is included in the discussion of credit risk in note 10 to the 2016 Consolidated Financial Statements.

Derivative Financial Instruments

The Company uses derivative financial instruments ("derivatives") including swaps, forwards and futures agreements, and options to help manage current and anticipated exposures to changes in interest rates, foreign exchange rates, commodity prices and equity market prices, and to replicate permissible investments. Refer to note 5 to the 2016 Consolidated Financial Statements for a description of the methods used to determine the fair value of derivatives.

The accounting for derivatives is complex and interpretations of the primary accounting guidance continue to evolve in practice. Judgment is applied in determining the availability and application of hedge accounting designations and the appropriate accounting treatment under such accounting guidance. Differences in judgment as to the availability and application of hedge accounting designations and the appropriate accounting treatment may result in a differing impact on the Consolidated Financial Statements of the Company from that previously reported. Assessments of hedge effectiveness and measurements of ineffectiveness of hedging relationships are also subject to interpretations and estimations. If it was determined that hedge accounting designations were not appropriately applied, reported net income attributed to shareholders could be materially affected.

Employee Future Benefits

The Company maintains defined contribution and defined benefit pension plans and other post-employment plans for employees and agents, including registered (tax qualified) pension plans that are typically funded, as well as supplemental non-registered (non-qualified) pension plans for executives, retiree welfare plans and disability welfare plans that are typically not funded. The largest of the defined benefit pension and retiree welfare plans in the U.S. and Canada are the material plans that are discussed herein and that are the subject of the disclosures in note 16 to the 2016 Consolidated Financial Statements.

Due to the long-term nature of defined benefit pension and retiree welfare plans, the calculation of the defined benefit obligation and net benefit cost depends on various assumptions such as discount rates, salary increase rates, cash balance interest crediting rates, health care cost trend rates and rates of mortality. These assumptions are determined by management and are reviewed annually. Changes in assumptions and differences between actual and expected experience give rise to actuarial gains and losses that affect the amount of the defined benefit obligation and other comprehensive income ("OCI"). During 2016, the actual experience resulted in a gain of \$136 million (2015 – gain of \$39 million) for the defined benefit pension plans and a gain of \$6 million (2015 – gain of \$5 million) for the retiree welfare plans. These gains were fully recognized in OCI in 2016. The key assumptions, as well as the sensitivity of the defined benefit obligation to changes in these assumptions, are presented in note 16 to the 2016 Consolidated Financial Statements.

Contributions to the registered (tax qualified) defined benefit pension plans are made in accordance with the applicable U.S. and Canadian regulations. During 2016, the Company contributed \$42 million (2015 – \$46 million) to these plans. As at December 31, 2016, the difference between the fair value of assets and the defined benefit obligation for these plans was a surplus of \$292 million (2015 – surplus of \$133 million). For 2017, the contributions to the plans are expected to be approximately \$33 million.

The Company's supplemental pension plans for executives are not funded; benefits under these plans are paid as they become due. During 2016, the Company paid benefits of \$65 million (2015 – \$73 million) under these plans. As at December 31, 2016, the defined benefit obligation for these plans amounted to \$782 million (2015 – \$834 million).

The Company's retiree welfare plans are partially funded, although there are no regulations or laws governing or requiring the funding of these plans. As at December 31, 2016, the difference between the fair value of plan assets and the defined benefit obligation for these plans was a deficit of \$79 million (2015 – deficit of \$78 million).

Income Taxes

The Company is subject to income tax laws in various jurisdictions. Tax laws are complex and potentially subject to different interpretations by the taxpayer and the relevant tax authority. The provision for income taxes represents management's interpretation of the relevant tax laws and its estimate of current and future income tax implications of the transactions and events during the period. A deferred tax asset or liability results from temporary differences between carrying values of the assets and liabilities and their respective tax basis. Deferred tax assets and liabilities are recorded based on expected future tax rates and management's assumptions regarding the expected timing of the reversal of such temporary differences. The realization of deferred tax assets depends upon the existence of sufficient taxable income within the carryback or carry forward periods under the tax law in the applicable tax jurisdiction. A deferred tax asset is recognized to the extent that future realization of the tax benefit is probable. Deferred tax assets are reviewed at each reporting date and are reduced to the extent that it is no longer probable that the tax benefit will be realized. Factors in management's determination include, among other things, the following:

- future taxable income exclusive of reversing temporary differences and carry forwards;
- future reversals of existing taxable temporary differences;
- taxable income in prior carryback years; and
- tax planning strategies.

The Company may be required to change its provision for income taxes if the ultimate deductibility of certain items is successfully challenged by taxing authorities or if estimates used in determining the amount of deferred tax assets to recognize change significantly, or when receipt of new information indicates the need for adjustment in the recognition of deferred tax assets. Additionally, future events, such as changes in tax laws, tax regulations, or interpretations of such laws or regulations, could have an impact on the provision for income tax, deferred tax balances, actuarial liabilities (see "Critical Accounting and Actuarial Policies – Expenses and Taxes" above) and the effective tax rate. Any such changes could significantly affect the amounts reported in the Consolidated Financial Statements in the year these changes occur.

Goodwill and Intangible Assets

Under IFRS, goodwill is tested at the cash generating unit level ("CGU") or group of CGUs level. A CGU comprises the smallest group of assets that are capable of generating largely independent cash flows and is either a business segment or a level below. The tests performed in 2016 demonstrated that there was no impairment of goodwill or intangible assets with indefinite lives. Changes in discount rates and cash flow projections used in the determination of embedded values or reductions in market-based earnings multiples may result in impairment charges in the future, which could be material.

Impairment charges could occur in the future as a result of changes in economic conditions. The goodwill testing for 2017 will be updated based on the conditions that exist in 2017 and may result in impairment charges, which could be material.

In 2016, we reported a \$97 million charge to write-off a finite intangible asset related to our John Hancock Long Term Care ("JH LTC") distribution network.

Future Accounting and Reporting Changes

There are a number of new accounting and reporting changes issued under IFRS including those still under development by the International Accounting Standards Board ("IASB") that will impact the Company beginning in 2016. Summaries of each of the most recently issued key accounting standards are presented below.

(a) Changes effective in 2016

(I) Amendments to IAS 16 "Property, Plant and Equipment" and IAS 38 "Intangible Assets"

Effective January 1, 2016, the Company adopted the amendments issued to IAS 16 "Property, Plant and Equipment" and IAS 38 "Intangible Assets" which were issued in May 2014. These amendments were applied prospectively. The amendments clarified that depreciation or amortization of assets accounted for under these two standards should reflect a pattern of consumption of the assets rather than reflect economic benefits expected to be generated from the assets. Adoption of these amendments did not have a significant impact on the Company's Consolidated Financial Statements.

(II) Amendments to IAS 41 "Agriculture" and IAS 16 "Property, Plant and Equipment"

Effective January 1, 2016, the Company adopted the amendments to IAS 41 "Agriculture" and IAS 16 "Property, Plant and Equipment" which were issued in June 2014. These amendments were applied retrospectively. These amendments require that "bearer plants" (that is, plants used in the production of agricultural produce and not intended to be sold as a living plant except for incidental scrap sales) should be considered as property, plant and equipment in the scope of IAS 16 and should be measured either at cost or revalued amount with changes recognized in OCI. Previously these plants were in the scope of IAS 41 and were measured at fair value less cost to sell. These amendments only apply to the accounting requirements of a bearer plant and not agricultural land properties. The Company chose to carry bearer plants at cost. Adoption of these amendments did not have a significant impact on the Company's Consolidated Financial Statements.

(III) Amendments to IFRS 10 "Consolidated Financial Statements", IFRS 12 "Disclosure of Interests in Other Entities", and IAS 28 "Investments in Associates and Joint Ventures"

Effective January 1, 2016, the Company adopted amendments to IFRS 10 "Consolidated Financial Statements", IFRS 12 "Disclosure of Interests in Other Entities", and IAS 28 "Investments in Associates and Joint Ventures" which were issued in December 2014. These amendments were applied retrospectively. The amendments clarify the requirements when applying the investment entities consolidation exception. Adoption of these amendments did not have a significant impact on the Company's Consolidated Financial Statements.

(b) Accounting and reporting changes issued with an effective date later than 2016

(I) Annual Improvements 2014-2016 Cycle

Annual Improvements 2014-2016 Cycle were issued in December 2016 resulting in minor amendments to three standards and are effective for the Company starting January 1, 2017. The Company is assessing the impact of these amendments.

(II) IFRS 16 "Leases"

IFRS 16 "Leases" was issued in January 2016 and is effective for years beginning on or after January 1, 2019, to be applied retrospectively or on a modified retrospective basis. It will replace IAS 17 "Leases" and IFRIC 4 "Determining whether an arrangement contains a lease". IFRS 16 sets out the principles for the recognition, measurement, presentation and disclosure of leases for both parties to a contract, the customer ("lessee") and the supplier ("lessor"). The standard brings most leases on-balance sheet for lessees under a single model, eliminating the previous classifications of operating and finance leases. Exemptions to this treatment are for lease contracts with low value assets or leases with duration less than one year. The on-balance sheet treatment will result in the grossing up of the balance sheet due to right-of-use assets being recognized with offsetting liabilities. Lessor accounting will remain largely unchanged with previous classifications of operating and finance leases being maintained. The Company is assessing the impact of this standard.

(III) Amendments to IAS 7 "Statement of Cash Flows"

Amendments to IAS 7 "Statement of Cash Flows" were issued in January 2016 and are effective for annual periods beginning on or after January 1, 2017, to be applied prospectively. These amendments require companies to provide information about changes in their financing liabilities. Adoption of these amendments is not expected to have a significant impact on the Company's Consolidated Financial Statements.

(IV) IFRIC 22 Foreign Currency Transactions and Advance Consideration

IFRIC 22 "Foreign Currency Transactions and Advance Consideration" was issued in December 2016, will be effective for annual periods beginning on or after January 1, 2018 and may be applied retrospectively or prospectively. IFRIC 22 addresses which foreign exchange rate to use to measure a foreign currency transaction when advance payments are made or received and non-monetary assets or liabilities are recognized prior to recognition of the underlying transaction. IFRIC 22 does not relate to goods or services accounted for at fair value or at the fair value of consideration paid or received at a date other than the date of initial recognition of the non-monetary asset or liability, or to income taxes, insurance contracts or reinsurance contracts. The foreign exchange rate on the day of the advance payment is used to measure the foreign currency transaction. If multiple advance payments are made or received, each payment is measured separately. The Company is assessing the impact of this standard.

(V) IFRS 9 "Financial Instruments"

IFRS 9 "Financial Instruments" was issued in November 2009 and amended in October 2010, November 2013 and July 2014, and is effective for years beginning on or after January 1, 2018, to be applied retrospectively, or on a modified retrospective basis. It is intended to replace IAS 39 "Financial Instruments: Recognition and Measurement".

The project has been divided into three phases: classification and measurement, impairment of financial assets, and hedge accounting. IFRS 9's current classification and measurement methodology provides that financial assets are measured at either amortized cost or fair value on the basis of the entity's business model for managing the financial assets and the contractual cash flow characteristics of the financial assets. The classification and measurement for financial liabilities remains generally unchanged; however, for a financial liability designated as at fair value through profit or loss, revisions have been made in the accounting for changes in fair value attributable to changes in the credit risk of that liability. Gains or losses caused by changes in an entity's own credit risk on such liabilities are no longer recognized in profit or loss but instead are reflected in OCI.

Revisions to hedge accounting were issued in November 2013 as part of the overall IFRS 9 project. The amendment introduces a new hedge accounting model, together with corresponding disclosures about risk management activity for those applying hedge accounting. The new model represents a substantial overhaul of hedge accounting that will enable entities to better reflect their risk management activities in their financial statements.

Revisions issued in July 2014 replace the existing incurred loss model used for measuring the allowance for credit losses with an expected loss model. Changes were also made to the existing classification and measurement model designed primarily to address specific application issues raised by early adopters of the standard. They also address the income statement accounting mismatches and short-term volatility issues which have been identified as a result of the insurance contracts project.

The Company expects to defer IFRS 9 until January 1, 2021 as allowed under the amendments to IFRS 4 "Insurance Contracts" outlined below.

(VI) Amendments to IFRS 4 "Insurance Contracts"

Amendments to IFRS 4 "Insurance Contracts" were issued in September 2016, which will be effective for annual periods beginning on or after January 1, 2018. The amendments introduce two approaches to address the concerns about the differing effective dates of IFRS 9 "Financial Instruments" and the forthcoming new insurance contracts standard: the overlay approach and the deferral approach. The overlay approach provides an option for all issuers of insurance contracts to adjust profit or loss for eligible financial assets by removing any additional accounting volatility that may arise from applying IFRS 9 before the new insurance contracts standard. The deferral approach provides companies whose activities are predominantly related to insurance an optional temporary exemption from applying IFRS 9 until January 1, 2021. The Company expects to defer IFRS 9 until January 1, 2021.

(VII) Amendments to IAS 12 "Income Taxes"

Amendments to IAS 12 "Income Taxes" were issued in January 2016 and are effective for years beginning on or after January 1, 2017 and to be applied retrospectively. The amendments clarify recognition of deferred tax assets relating to unrealized losses on debt instruments measured at fair value. A deductible temporary difference arises when the carrying amount of the debt instrument measured at fair value is less than the cost for tax purposes, irrespective of whether the debt instrument is held for sale or held to maturity. The recognition of the deferred tax asset that arises from this deductible temporary difference is considered in combination with other deferred taxes applying local tax law restrictions where applicable. In addition, when estimating future taxable profits, consideration can be given to recovering more than the asset's carrying amount where probable. Adoption of these amendments is not expected to have a significant impact on the Company's Consolidated Financial Statements.

(VIII) Amendments to IFRS 2 "Share-Based Payment"

Amendments to IFRS 2 "Share-Based Payment" were issued in June 2016, and are effective for annual periods beginning on or after January 1, 2018. The amendments clarify the effects of vesting and non-vesting conditions on the measurement of cash-settled share-based payments; provide guidance on the classification of share-based payment transactions with net settlement features for withholding tax obligations; and clarify accounting for modification to the terms and conditions of a share-based payment that changes the classification of the transaction from cash-settled to equity-settled. Adoption of these amendments is not expected to have a significant impact on the Company's Consolidated Financial Statements.

(IX) Amendments to IFRS 15 "Revenue from Contracts with Customers"

In May 2014, IFRS 15 "Revenue from Contracts with Customers" was issued, and replaces IAS 11 "Construction Contracts," IAS 18 "Revenue" and several interpretations. Amendments to IFRS 15 were issued in April 2016. IFRS 15 as amended is effective for annual periods beginning on or after January 1, 2018, to be applied as described below.

IFRS 15 clarifies revenue recognition principles, provides a robust framework for recognizing revenue and cash flows arising from contracts with customers and enhances qualitative and quantitative disclosure requirements. IFRS 15 does not apply to insurance contracts, financial instruments and lease contracts. Accordingly, the adoption of IFRS 15 may impact the revenue recognition related to the Company's asset management and service contracts and may result in additional financial statement disclosure.

The amendments clarify when a promised good or service is separately identifiable from other promises in a contract; provide clarifications on how to apply the principal versus agent application guidance; and provide clarifications on how an entity will evaluate the nature of a promise to grant a license of intellectual property to determine whether the promise is satisfied over time or at a point in time.

The amendments provide two practical expedients to alleviate transition burden. An entity that uses the full retrospective approach may apply IFRS 15 only to contracts that are not completed as at the beginning of the earliest period presented. An entity may determine the aggregate effect of all of the modifications that occurred between contract inception and the earliest date presented, rather than accounting for the effects of each modification separately. The Company is assessing the impact of this standard.

Differences between IFRS and Hong Kong Financial Reporting Standards

Manulife's Consolidated Financial Statements are presented in accordance with IFRS. IFRS differs in certain respects from Hong Kong Financial Reporting Standards ("HKFRS"). Until IFRS 17 "Insurance Contracts" is issued and becomes effective, IFRS 4 "Insurance Contracts" permits the use of the insurance standard in effect at the time an issuer adopts IFRS. IFRS insurance contract liabilities are valued in Canada under standards established by the Canadian Actuarial Standards Board. In certain interest rate environments, insurance contract liabilities determined in accordance with HKFRS may be higher than those computed in accordance with current IFRS.

IFRS and Hong Kong Regulatory Requirements

Insurers in Hong Kong are required by the Office of the Commissioner of Insurance to meet minimum solvency requirements. As at December 31, 2016, the Company's business that falls within the scope of these requirements has sufficient assets to meet the minimum solvency requirements under both Hong Kong regulatory requirements and IFRS.

Risk Factors

Our insurance, wealth and asset management and other financial services businesses subject Manulife to a broad range of risks. Management has identified the following risks and uncertainties to which our businesses, operations and financial condition are subject. The risks and uncertainties described below are not the only ones facing us. Additional risks not presently known to us or that we currently deem immaterial could also impair our businesses, operations and financial condition. If any of such risks should occur, the trading price of our securities, including common shares, preferred shares and debt securities, could decline, and you may lose all or part of your investment.

Strategic Risk Factors

We operate in highly competitive markets and compete for customers with both insurance and non-insurance financial services companies. Customer loyalty and retention, and access to distributors, are important to the Company's success and are influenced by many factors, including our distribution practices and regulations, product features, service levels, prices, and our financial strength ratings and reputation.

We may not be successful in executing our business strategies or these strategies may not achieve our objectives.

- Refer to "Risk Management – Strategic Risk" above.
- The economic environment could be volatile and our regulatory environment will continue to evolve, potentially with higher capital requirements which could materially impact our competitiveness. Further, the attractiveness of our product offerings relative to our competitors will be influenced by competitor actions as well as our own, and the requirements of the applicable regulatory regimes. For these and other reasons, there is no certainty that we will be successful in implementing our business strategies or that these strategies will achieve the objectives we target.
- Macro-economic factors may result in our inability to achieve business strategies and plans. Of note, economic factors such as flat or declining equity markets, equity market volatility, or a period of prolonged low interest rates could impact our ability to achieve business objectives. Other factors, such as management actions taken to bolster capital and manage the Company's risk profile, including new or amended reinsurance agreements, and additional actions that the Company may take to help manage near-term regulatory capital ratios or help mitigate equity market and interest rate exposures, could adversely impact our longer term earnings potential.

Our insurance businesses are heavily regulated, and changes in regulation may reduce our profitability and limit our growth.

- Our insurance operations are subject to a wide variety of insurance and other laws and regulations. Insurance and securities regulators in Canada, the United States, Asia and other jurisdictions regularly re-examine existing laws and regulations applicable to insurance companies, investment advisors, brokers-dealers and their products. Compliance with applicable laws and regulations is time consuming and personnel-intensive, and changes in these laws and regulations or in the interpretation or enforcement thereof, may materially increase our direct and indirect compliance costs and other expenses of doing business, thus having a material adverse effect on our results of operations and financial condition.
- In addition, international regulators as well as domestic financial authorities and regulators in many countries have been reviewing their capital requirements and are implementing, or are considering implementing, changes aimed at strengthening risk management and capitalization of financial institutions. Future regulatory capital, actuarial and accounting changes, including changes with a retroactive impact, could have a material adverse effect on the Company's consolidated financial condition, results of operations and regulatory capital both on transition and going forward. In addition, such changes could have a material adverse effect on the Company's position relative to that of other Canadian and international financial institutions with which Manulife competes for business and capital. See "Risk Management – Regulatory Updates" section above for changes related to a revised regulatory capital framework in Canada effective 2018.
- In Canada, MFC and its principal operating subsidiary, MLI, are governed by the Insurance Companies Act (Canada) ("ICA"). The ICA is administered, and the activities of the Company are supervised, by the Office of the Superintendent of Financial Institutions ("OSFI"). MLI is also subject to regulation and supervision under the insurance laws of each of the provinces and territories of Canada. Regulatory oversight is vested in various governmental agencies having broad administrative power with respect to, among other things, dividend payments, capital adequacy and risk-based capital requirements, asset and reserve valuation requirements, permitted investments and the sale and marketing of insurance contracts. These regulations are intended to protect policyholders and beneficiaries rather than investors and may adversely impact shareholder value.
- Some recent examples of regulatory and professional standard developments which could impact our net income attributed to shareholders and/or capital position are provided below.
 - The International Accounting Standards Board ("IASB") issued an exposure draft of new accounting standard for insurance contracts in June 2013. The standard is expected to be issued in 2017 with an effective date of 2021. For further discussion on the IASB exposure draft, refer to the risk factor entitled "International Financial Reporting Standards will have a material impact on our financial results".
 - As outlined in the "Risk Management – Regulatory Updates" section above, OSFI will be implementing a revised approach to the regulatory capital framework in Canada to come into effect in 2018. The development of a new required capital framework for segregated funds (variable annuities) is progressing separately and will have a later implementation date. In addition, OSFI is considering stand-alone capital requirements for Canadian operating life insurance companies, such as MLI.

- In 2013, the International Association of Insurance Supervisors (“IAIS”) committed to the completion of several capital initiatives that would apply to select global insurance groups to reflect their systemic importance to the international financial system, including Basic Capital Requirements introduced in 2015, and the Higher Loss Absorbency requirements to be implemented in 2019. The most relevant for the Company is the IAIS plan to adopt a global Insurance Capital Standard in 2019 that will apply to all large internationally active insurance groups. It is not yet known how the proposals will affect capital requirements and the competitive position of the Company. In addition, IAIS designates annually a group of Global Systemically Important Insurers (“GSII”) that are subject to incremental capital and oversight requirements. While Manulife was not named a GSII in the past, there remains a risk of such a designation.
- The National Association of Insurance Commissioners (“NAIC”) has been reviewing reserving and capital methodologies as well as the overall risk management framework. These reviews will affect U.S. life insurers, including John Hancock, and could lead to increased reserving and/or capital requirements for our business in the United States. In addition, the NAIC is continuing to explore the development of a group capital calculation tool; however, the scope of any such tool has not yet been determined.
- The Actuarial Standards Board (“ASB”) promulgates Mortality improvement rates and the Ultimate Reinvestment Rate (“URR”) referenced in the CIA Standards of Practice for the valuation of insurance contract liabilities. These promulgations are updated periodically and both are expected to be updated in 2017. In the event that new promulgations are published, they will apply to the determination of actuarial liabilities and both may lead to a material increase in actuarial liabilities and a reduction in net income attributed to shareholders. In 2016, the Company updated economic reinvestment assumptions for risk-free rates used in the valuation of policy liabilities which included a proactive 10 basis point reduction to our URR assumptions and a commensurate change in our calibration criteria for stochastic risk-free rates. If required, we will make further updates to our economic reinvestment assumptions in 2017.
- In the United States, state insurance laws regulate most aspects of our business, and our U.S. insurance subsidiaries are regulated by the insurance departments of the states in which they are domiciled and the states in which they are licensed. State laws grant insurance regulatory authorities broad administrative powers with respect to, among other things: licensing companies and agents to transact business; calculating the value of assets to determine compliance with statutory requirements; mandating certain insurance benefits; regulating certain premium rates; reviewing and approving policy forms; regulating unfair trade and claims practices, including through the imposition of restrictions on marketing and sales practices, distribution arrangements and payment of inducements; regulating advertising; protecting privacy; establishing statutory capital and reserve requirements and solvency standards; fixing maximum interest rates on insurance policy loans and minimum rates for guaranteed crediting rates on life insurance policies and annuity contracts; approving changes in control of insurance companies; restricting the payment of dividends and other transactions between affiliates; and regulating the types, amounts and valuation of investments. Changes in any such laws and regulations, or in the interpretation or enforcement thereof by regulators, could significantly affect our business, results of operations and financial condition.
- Currently, the U.S. federal government does not directly regulate the business of insurance. However, federal legislation and administrative policies in several areas can significantly and adversely affect state regulated insurance companies. These areas include financial services regulation, securities regulation, pension regulation, privacy, tort reform legislation and taxation. In addition, under the Dodd-Frank Wall Street Reform and Consumer Protection Act (“Dodd-Frank”), the U.S. Board of Governors of the Federal Reserve has supervisory powers over non-bank financial companies that are determined to be systemically important, including certain insurance companies. For further discussion on Dodd-Frank, refer to the risk factor entitled “Dodd-Frank could adversely impact our results of operations and our liquidity”.
- Insurance guaranty associations in Canada and the United States have the right to assess insurance companies doing business in their jurisdiction for funds to help pay the obligations of insolvent insurance companies to policyholders and claimants. Because the amount and timing of an assessment is beyond our control, the liabilities that we have currently established for these potential liabilities may not be adequate.
- While many of the laws and regulations to which we are subject are intended to protect policyholders, beneficiaries, depositors and investors in our products and services, others also set standards and requirements for the governance of our operations. Failure to comply with applicable laws or regulations could result in financial penalties or sanctions, and damage our reputation.
- From time to time, regulators raise issues during examinations or audits of Manulife that could have a material adverse impact on us. We cannot predict whether or when regulatory actions may be taken that could adversely affect our operations. For further discussion of government regulation and legal proceedings refer to “Government Regulation” in MFC’s Annual Information Form dated February 9, 2017 and “Legal and Regulatory Proceedings” below. Refer to the risk factor “Our non-North American operations face political, legal, operational and other risks that could negatively affect those operations or our results of operations and financial condition” for further discussion on the impact to our operations.

Dodd-Frank could adversely impact our results of operations and our liquidity.

- Dodd-Frank establishes a framework for regulation of over-the-counter (“OTC”) derivatives which affects activities of the Company that use derivatives for various purposes, including hedging equity market, interest rate and foreign currency exposures. Regulations promulgated by the U.S. Commodities Futures Trading Commission and the U.S. Securities and Exchange Commission (“SEC”) under Dodd-Frank require certain types of OTC derivative transactions to be executed through a centralized exchange or regulated facility and be cleared through a regulated clearinghouse. These rules impose additional costs on the Company.
- Derivative transactions executed through exchanges or regulated facilities attract incremental collateral requirements in the form of initial margin, and require variation margin to be cash settled on a daily basis which increases liquidity risk for the Company. The increase in margin requirements (relative to bilateral agreements) combined with a more restricted list of securities that qualify as eligible collateral requires us to hold larger positions in cash and treasuries, which could reduce net income attributed to shareholders.

- In-force OTC derivative transactions are grandfathered and will migrate to being cleared through exchanges over time, or the Company may elect to accelerate the migration. As such, this may not become a significant risk for Manulife until a large portion of our derivatives have transitioned to clearinghouses (expected in the 2019 to 2022 timeframe) and market conditions adverse to liquidity (material increases in interest rates and/or equity markets) have been experienced. However, in certain situations such as ratings downgrade, our counterparties may be able to accelerate the transition by exercising any potential rights to terminate the contract. Some OTC derivative contracts also give Manulife and its counterparties the right to cancel the contract after specific dates. Any such cancellation by our counterparties could accelerate the transition to clearing.
- Other jurisdictions in which Manulife operates in are expected to enact similar regulations within the next few years for cleared transactions as well as new upfront collateral and more restrictive collateral (relative to the current OTC market) to cover changes in derivative values for non-cleared transactions. We cannot predict the effect of the legislation on our hedging costs, our hedging strategy or its implementation, or whether Dodd-Frank and similar regulations in other jurisdictions will lead to an increase or decrease in or change in composition of the risks we seek to hedge.

International Financial Reporting Standards will have a material impact on our financial results.

- The IASB has stated that it expects to issue a new accounting standard for insurance contracts in 2017, with an effective date of 2021. Until this standard is completed and becomes effective, IFRS does not currently prescribe an insurance contract measurement model and therefore, as permitted by IFRS 4 "Insurance Contracts", insurance contract liabilities continue to be measured using CALM. Under CALM, the measurement of actuarial liabilities is based on projected liability cash flows, together with estimated future premiums and net investment income generated from assets held to support those liabilities.
- This new standard will build upon an exposure draft of a new accounting standard for insurance contracts that the IASB issued in June 2013. The comment period on that exposure draft ended on October 25, 2013. We, along with other international companies in the industry, provided feedback on the significant issues we identified in relation to that exposure draft. This was supported by comprehensive field testing of the proposal within the exposure draft response period, results of which were shared with the IASB.
- As drafted in 2013, the standard would create material volatility in our financial results and capital position; and could result in a lower discount rate used for the determination of actuarial liabilities, thereby increasing our actuarial liabilities and reducing our equity. The Company's capital position (see note below) and income for accounting purposes could be highly correlated to prevailing market conditions, resulting in material volatility of reported results, that may necessitate changes to business strategies. Note: The regulatory capital framework in Canada is currently aligned with IFRS. In Canada, OSFI will decide on the appropriate recognition of the accounting outcomes within the regulatory capital framework.
- Additionally, other jurisdictions may not adopt the standard as issued or on the same timeline as published by the IASB, and there is a possibility that Canada will be the first to adopt the standard. Adopting the standard in Canada before it is adopted elsewhere could increase our cost of capital compared with global competitors and the banking sector in Canada.
- Any mismatch between the underlying economics of our business and the new accounting standard could have significant unintended negative consequences on our business model; and potentially affect our customers, shareholders and the capital markets.

Changes in tax laws, tax regulations, or interpretations of such laws or regulations could make some of our products less attractive to consumers, could increase our corporate taxes or cause us to change the value of our deferred tax assets and liabilities as well as our tax assumptions included in the valuation of our policy liabilities. This could have a material adverse effect on our business, results of operations and financial condition.

- Many of the products that the Company sells benefit from one or more forms of preferred tax treatment under current income tax regimes. For example, the Company sells life insurance policies that benefit from the deferral or elimination of taxation on earnings accrued under the policy, as well as permanent exclusion of certain death benefits that may be paid to policyholders' beneficiaries. We also sell annuity contracts that allow the policyholders to defer the recognition of taxable income earned within the contract. Other products that the Company sells, such as certain employer-paid health and dental plans, also enjoy similar, as well as other, types of tax advantages. The Company also benefits from certain tax benefits, including tax-exempt interest, dividends-received deductions, tax credits (such as foreign tax credits), and favourable tax rates and/or income measurement rules for tax purposes.
- There is risk that tax legislation could be enacted that would lessen or eliminate some or all of the tax advantages currently benefiting the Company or its policyholders or its other clients. This could occur in the context of deficit reduction or other tax reforms. The effects of any such changes could result in materially lower product sales, lapses of policies currently held, and/or our incurrence of materially higher corporate taxes, any of which could have a material adverse effect on our business, results of operations and financial condition.
- Additionally, the Company may be required to change its provision for income taxes or carrying amount of deferred tax assets or liabilities if the characterization of certain items is successfully challenged by taxing authorities or if future transactions or events, which could include changes in tax laws, tax regulations or interpretations of such laws or regulations, occur. Any such changes could significantly affect the amounts reported in the consolidated financial statements in the year these changes occur.
- Tax reform in the U.S. is a current topic. A reduction to the corporate tax rate would result in a write down in the value of our net deferred tax asset and change to our assumptions, followed by a reduction in our ongoing effective tax rate. We estimate that a 1% reduction in the U.S. corporate tax rate would result in a one-time charge of approximately US\$60 million related to our net deferred tax asset position and assumptions in our policy liabilities and an annual benefit to tax expense reported in core earnings of US\$15 million. Other tax reform changes could reduce or eliminate the annual benefit of the lower rate.

Access to capital may be negatively impacted by market conditions.

- Disruptions, uncertainty or volatility in the financial markets may limit our access to capital required to operate our business. Such market conditions may limit our ability to satisfy regulatory capital requirements, to access the capital necessary to grow our business and meet our refinancing requirements. Under extreme conditions, we may be forced, among other things, to delay raising capital, issue different types of capital than we would otherwise, less effectively deploy such capital, issue shorter term securities than we prefer, or issue securities that bear an unattractive cost of capital which could decrease our profitability, dilute our existing shareholders, and significantly reduce our financial flexibility.

We may experience future downgrades in our financial strength or credit ratings, which may materially adversely impact our financial condition and results of operations.

- Credit rating agencies publish financial strength ratings on life insurance companies that are indicators of an insurance company's ability to meet contract holder and policyholder obligations. Credit rating agencies also assign credit ratings, which are indicators of an issuer's ability to meet the terms of its obligations in a timely manner, and are important factors in a company's overall funding profile and ability to access external capital.
- Ratings are important factors in establishing the competitive position of insurance companies, maintaining public confidence in products being offered, and determining the cost of capital. A ratings downgrade, or the potential for such a downgrade could, among other things: increase our cost of capital and limit our access to the capital markets; cause some of our existing liabilities to be subject to acceleration, additional collateral support, changes in terms, or additional financial obligations; result in the termination of our relationships with broker-dealers, banks, agents, wholesalers and other distributors of our products and services; unfavourably impact our ability to execute on our hedging strategies; materially increase the number of surrenders, for all or a portion of the net cash values, by the owners of policies, contracts and general account guaranteed interest contracts ("GICs") we have issued, and materially increase the number of withdrawals by policyholders of cash values from their policies; and reduce new sales, particularly with respect to general account GICs purchased by pension plans and other institutions. Any of these consequences could adversely affect our results of operations and financial condition.
- Credit rating agencies remain concerned with: our capital and net earnings volatility associated with fair-value accounting; net residual exposures to equity markets and lower interest rates; challenges associated with managing in-force long-term care, universal life with secondary guarantees and variable annuity products in the U.S. Some credit rating agencies also view our financial leverage and earnings coverage metrics as not meeting expectations. There can be no guarantee that downgrades will not occur.
- It is possible that there will be changes in the benchmarks for capital, liquidity, earnings and other factors used by these credit rating agencies that are important to a ratings assignment at a particular rating level. Any such changes could have a negative impact on our ratings, which could adversely impact our results of operations, financial condition and access to capital markets.

Competitive factors may adversely affect our market share and profitability.

- The insurance, wealth and asset management industries are highly competitive. Our competitors include other insurers, securities firms, investment advisors, mutual funds, banks and other financial institutions. Our competitors compete with us for customers, access to distribution channels such as brokers and independent agents, and for employees. In some cases, competitors may be subject to less onerous regulatory requirements, have lower operating costs or have the ability to absorb greater risk while maintaining their financial strength ratings, thereby allowing them to price their products more competitively or offer features that make their products more attractive. These competitive pressures could result in increased pricing pressures on a number of our products and services and may harm our ability to maintain or increase our profitability. Because of the highly competitive nature of the financial services industry, there can be no assurance that we will continue to effectively compete with our industry rivals and competitive pressure may have a material adverse effect on our business, results of operations and financial condition.

We may experience difficulty in marketing and distributing products through our current and future distribution channels.

- We distribute our insurance and wealth management products through a variety of distribution channels, including brokers, independent agents, broker-dealers, banks, wholesalers, affinity partners, other third-party organizations and our own sales force in Asia. We generate a significant portion of our business through individual third-party arrangements. We periodically negotiate provisions and renewals of these relationships, and there can be no assurance that such terms will remain acceptable to us or relevant third parties. An interruption in our continuing relationship with certain of these third parties could significantly affect our ability to market our products and could have a material adverse effect on our business, results of operations and financial condition.

Industry trends could adversely affect the profitability of our businesses.

- Our business segments continue to be influenced by a variety of trends that affect our business and the financial services industry in general. The impact of the volatility and instability of the financial markets on our business is difficult to predict. The Company's business plans, financial condition and results of operations have been, in the recent past, and may in the future, be negatively impacted or affected.

We may face unforeseen liabilities or asset impairments arising from possible acquisitions and dispositions of businesses or difficulties integrating acquired businesses.

- We have engaged in acquisitions and dispositions of businesses in the past, and expect to continue to do so in the future as we may deem appropriate. There could be unforeseen liabilities or asset impairments, including goodwill impairments that arise in connection with the businesses that we may sell, have acquired, or may acquire in the future. In addition, there may be liabilities or asset impairments that we fail, or are unable, to discover in the course of performing due diligence investigations on acquisition targets. Furthermore, the use of our own funds as consideration in any acquisition would consume capital resources that would no longer be available for other corporate purposes.
- Our ability to achieve some or all of the benefits we anticipate from any acquisitions of businesses will depend in large part upon our ability to successfully integrate the businesses in an efficient and effective manner. We may not be able to integrate the businesses smoothly or successfully, and the process may take longer than expected. The integration of operations may require the dedication of significant management resources, which may distract management's attention from our day-to-day business. Acquisitions of operations outside of North America, especially any acquisition in a jurisdiction in which we do not currently operate, may be particularly challenging or costly to integrate. If we are unable to successfully integrate the operations of any acquired businesses, we may be unable to realize the benefits we expect to achieve as a result of the acquisitions and the results of operations may be less than expected.

If our businesses do not perform well, or if the outlook for our businesses is significantly lower than historical trends, we may be required to recognize an impairment of goodwill or intangible assets or to establish a valuation allowance against our deferred tax assets, which could have a material adverse effect on our results of operations and financial condition.

- Goodwill represents the excess of the amounts we paid to acquire subsidiaries and other businesses over the fair value of their net identifiable assets at the date of acquisition. Intangible assets represent assets that are separately identifiable at the time of an acquisition and provide future benefits such as the John Hancock brand.
- Goodwill and intangible assets with indefinite lives are tested at least annually for impairment. Goodwill is tested at the cash generating unit ("CGU") or group of CGUs level, representing the smallest group of assets that is capable of generating largely independent cash flows. The Company completed its 2016 goodwill and intangible asset tests in the fourth quarter of 2016, and as a result, management concluded that there was no impairment of goodwill or intangible assets with indefinite lives. Going forward, as a result of the impact of economic conditions and changes in product mix and the granular level of goodwill testing under IFRS, additional impairment charges could occur in the future.
- At December 31, 2016, under IFRS we had \$5,884 million of goodwill and \$4,223 million of intangible assets.
- If market conditions deteriorate in the future and, in particular, if MFC's common share price is low relative to book value per share, if the Company's actions to limit risk associated with its products or investments cause a significant change in any one CGU's recoverable amount, or if the outlook for a CGU's results deteriorate, the Company may need to reassess the value of goodwill and/or intangible assets which could result in impairments during 2017 or subsequent periods. Such impairments could have a material adverse effect on our results of operations and financial condition.
- Deferred income tax balances represent the expected future tax effects of the differences between the book and tax basis of assets and liabilities, loss carry forwards and tax credits. Deferred tax assets are recorded when the Company expects to claim deductions on tax returns in the future for expenses that have already been recorded in the financial statements.
- The availability of those deductions is dependent on future taxable income against which the deductions can be made. Deferred tax assets are assessed periodically by management to determine if they are realizable. Factors in management's determination include the performance of the business including the ability to generate gains from a variety of sources and tax planning strategies. If based on information available at the time of the assessment, it is determined that the deferred tax asset will not be realized, then the deferred tax asset is reduced to the extent that it is no longer probable that the tax benefit will be realized. At December 31, 2016, we had \$4,439 million of deferred tax assets.

We may not be able to protect our intellectual property and may be subject to infringement claims.

- We rely on a combination of contractual rights and copyright, trademark, patent and trade secret laws to establish and protect our intellectual property. In particular, we have invested considerable resources in promoting the brand names "Manulife" and "John Hancock" and expect to continue to do so. Although we use a broad range of measures to protect our intellectual property rights, third parties may infringe or misappropriate our intellectual property. We may have to litigate to enforce and protect our copyrights, trademarks, patents, trade secrets and know-how or to determine their scope, validity or enforceability, which represents a diversion of resources that may be significant in amount and may not prove successful. The loss of intellectual property protection or the inability to secure or enforce the protection of our intellectual property assets could have a material adverse effect on our business and our ability to compete.
- We also may be subject to costly litigation in the event that another party alleges our operations or activities infringe upon its intellectual property rights. Third parties may have, or may eventually be issued, patents that could be infringed by our products, methods, processes or services. Any party that holds such a patent could make a claim of infringement against us. We may also be subject to claims by third parties for breach of copyright, trademark, trade secret or license usage rights. Any such claims and any resulting litigation could result in significant liability for damages. If we were found to have infringed a third-party patent or other intellectual property rights, we could incur substantial liability, and in some circumstances could be enjoined from providing certain products or services to our customers or utilizing and benefiting from certain methods, processes, copyrights, trademarks, trade

secrets or licenses, or alternatively could be required to enter into costly licensing arrangements with third parties, all of which could have a material adverse effect on our business, results of operations and financial condition.

Applicable laws may discourage takeovers and business combinations that common shareholders of MFC might consider in their best interests.

- The ICA contains restrictions on the purchase or other acquisition, issue, transfer and voting of the shares of an insurance company. In addition, under applicable U.S. insurance laws and regulations in states where certain of our insurance company subsidiaries are domiciled, no person may acquire control of MFC without obtaining prior approval of those states' insurance regulatory authorities. These restrictions may delay, defer, prevent, or render more difficult a takeover attempt that common shareholders of MFC might consider in their best interests. For instance, they may prevent shareholders of MFC from receiving the benefit from any premium to the market price of MFC's common shares offered by a bidder in a takeover context. Even in the absence of a takeover attempt, the existence of these provisions may adversely affect the prevailing market price of MFC's common shares if they are viewed as discouraging takeover attempts in the future.

Entities within the MFC Group are interconnected which may make separation difficult.

- MFC operates in local markets through subsidiaries and branches of subsidiaries. These local operations are financially and operationally interconnected to lessen expenses, share and reduce risk, and efficiently utilize financial resources. In general, external capital required for companies in the Manulife group has been raised at the MFC or MLI level and then transferred to other entities as equity or debt capital as appropriate. Other linkages include the use of loans, guarantees, capital maintenance agreements, derivatives, shared services and reinsurance. Accordingly, the risks undertaken by a subsidiary may be transferred to or shared by affiliates through financial and operational linkages. Some of the consequences of this are:
 - Financial difficulties at a subsidiary may not be isolated and could cause material adverse effects on affiliates and the group as a whole.
 - Linkages may make it difficult to dispose of or separate a subsidiary or business within the group by way of a spin-off or similar transaction and the disposition or separation of a subsidiary or business may not fully eliminate the liability of the Company and its remaining subsidiaries for shared risks. Issues raised by such a transaction could include, (i) MFC and its remaining subsidiaries may continue to have residual risk under guarantees and reinsurance arrangements that could not be terminated; (ii) internal capital mobility and efficiency could be limited; (iii) significant potential tax consequences; (iv) uncertainty about the accounting and regulatory outcomes of such a transaction; (v) there may be a requirement for significant capital injections; and (vi) the transaction may result in increased sensitivity of net income attributed to shareholders and capital of MFC and its remaining subsidiaries to market declines.

Market Risk Factors

Our most significant source of publicly traded equity risk arises from variable annuity and segregated funds with guarantees, where the guarantees are linked to the performance of the underlying funds.

- Publicly traded equity performance risk arises from a variety of sources, including guarantees associated with certain variable annuity and segregated fund products, asset based fees, and investments in publicly traded equities supporting both our general fund products and our surplus segment.
- Guaranteed benefits are contingent and payable upon death, maturity, permitted withdrawal or annuitization. If equity markets decline or even if they increase by an amount lower than that assumed in our actuarial valuation, additional liabilities may need to be established to cover the contingent liabilities, resulting in a reduction in net income attributed to shareholders and regulatory capital ratios. Further, if equity markets do not recover to the amount of the guarantees, by the dates the liabilities are due, the accrued liabilities will need to be paid out in cash. In addition, sustained flat or declining public equity markets would likely reduce asset based fee revenues related to variable annuities and segregated funds with guarantees and related to other wealth and insurance products.
- Where publicly traded equity investments are used to support policy liabilities, the policy valuation incorporates projected investment returns on these assets. If actual returns are lower than the expected returns, the Company's policy liabilities will increase, reducing net income attributed to shareholders.
- For products where the investment strategy applied to future cash flows in the policy valuation includes investing a specified portion of future cash flows in publicly traded equities, a decline in the value of publicly traded equities relative to other assets could require us to change the investment mix assumed for future cash flows, which may increase policy liabilities and reduce net income attributed to shareholders. A reduction in the outlook for expected future returns for publicly traded equities, which could result from a fundamental change in future expected economic growth, would increase policy liabilities and reduce net income attributed to shareholders. Furthermore, to the extent publicly traded equities are held as AFS, other than temporary impairments that arise will reduce income.
- Expected long-term annual market growth assumptions for public equities for key markets are based on long-term historical observed experience. In the stochastic valuations of our segregated fund guarantee business, those rates inclusive of dividends are 9.5% per annum in Canada, 9.6% per annum in the U.S., 6.2% per annum in Japan and vary between 7.8% and 9.85% for European equity funds. The calibration of the economic scenario generators that are used to value segregated fund guarantee business complies with current CIA Standards of Practice for the valuation of these products. Implicit margins, determined through stochastic valuation processes, lower net yields used to establish policy liabilities. Assumptions used for public equities backing

liabilities are also developed based on historical experience but are constrained by different CIA Standards of Practice and differ slightly from those used in stochastic valuation. Alternative asset return assumptions vary based on asset class but are largely consistent, after application of valuation margins and differences in taxation, with returns assumed for public equities.

We experience interest rate and spread risk within the general fund primarily due to the uncertainty of future returns on investments.

- Interest rate and spread risk arises from general fund guaranteed benefit products, general fund adjustable benefit products with minimum rate guarantees, general fund products with guaranteed surrender values, segregated fund products with minimum benefit guarantees and from surplus fixed income investments. The risk arises within the general fund primarily due to the uncertainty of future returns on investments to be made as assets mature and as recurring premiums are received and invested or reinvested to support longer dated liabilities. Interest rate risk also arises due to minimum rate guarantees and guaranteed surrender values on products where investment returns are generally passed through to policyholders. In order to reduce interest rate risk, the duration of fixed income investments in liability and surplus segments is lengthened by entering into interest rate hedges.
- The valuation of policy liabilities reflects assumptions for the yield on future investments and the projected cash flows associated with interest rate hedges. A general decline in interest rates, without a change in corporate bond spreads and swap spreads, will reduce the assumed yield on future investments but favourably impact the value of lengthening interest rate hedges. Conversely, a general increase in interest rates, without a change in corporate bond spreads and swap spreads, will increase the assumed yield on future investments, but unfavourably impact the value of lengthening interest rate hedges. The Company's disclosed estimated impact from interest rate movements reflects a parallel increase and decrease in interest rates of specific amounts. The reinvestment assumptions used in the valuation of our insurance liabilities are based on interest rate scenarios and calibration criteria set by the Actuarial Standards Board, while our interest rate hedges are valued using current market interest rates. Therefore, in any particular quarter, changes to the reinvestment assumptions are not fully aligned to changes in current market interest rates especially when there is a significant change in the shape of the interest rate curve. As a result, the impact from non-parallel movements may be materially different from the estimated impact of parallel movements. Furthermore, changes in interest rates could change the reinvestment scenarios used in the calculation of our actuarial liabilities. The reinvestment scenario changes tend to amplify the negative effects of a decrease in interest rates, and dampen the positive effects of interest rate increases. In addition, decreases in corporate bond spreads or increases in swap spreads will result in an increase in policy liabilities and a reduction in net income attributed to shareholders, while an increase in corporate bond spreads or a decrease in swap spreads will have the opposite impact. The impact of changes in interest rates and in spreads may be partially offset by changes to credited rates on adjustable products that pass through investment returns to policyholders.
- For segregated fund and variable annuity products, a sustained increase in interest rate volatility or a decline in interest rates would also likely increase the costs of hedging the benefit guarantees provided.

We experience ALDA performance risk when actual returns are lower than expected returns.

- ALDA performance risk arises from general fund investments in commercial real estate, timber properties, farmland properties, infrastructure, oil and gas properties, and private equities.
- Where these assets are used to support policy liabilities, the policy valuation incorporates projected investment returns on these assets. ALDA assumptions vary by asset class and generally have a similar impact on policy liabilities as public equities would. If actual returns are lower than the expected returns, the Company's policy liabilities will increase, reducing net income attributed to shareholders. A reduction in the outlook for expected future returns for ALDA, which could result from a variety of factors such as a fundamental change in future expected economic growth or declining risk premiums due to increased competition for such assets, would increase policy liabilities and reduce net income attributed to shareholders. Further, if returns on certain external asset benchmarks used to determine permissible assumed returns under the CIA Standards of Practice are lower than expected, the Company's policy liabilities will increase, reducing net income attributed to shareholders.
- In recent periods, the value of oil and gas assets has been negatively impacted by the decline in energy prices and could be further negatively affected by additional declines in energy prices as well as by a number of other factors including production declines, adverse operating results, the impact of weather conditions on seasonal demand, our ability to execute on capital programs, incorrect assessments of the value of acquisitions, uncertainties associated with estimating oil and natural gas reserves, difficult economic conditions and geopolitical events. Changes in government regulation of the oil and gas industry, including environmental regulation, carbon taxes and changes in the royalty rates resulting from provincial royalty reviews, could also adversely affect the value of our oil and gas investments. The negative impact of changes in these factors can take time to be fully reflected in the valuations of these investments, especially if the change is large and rapid. It can take time for market participants to adjust their forecasts and better understand the potential medium to long term impact of the changes. As a result, valuation changes in any given period may reflect the delayed impact of events that occurred in prior periods.
- Difficult economic conditions could result in higher vacancy, lower rental rates and lower demand for real estate investments, all of which would negatively impact the value of our real estate investments. Difficult economic conditions could also prevent companies in which we have made private equity investments from achieving their business plans and could cause the value of these investments to fall, or even cause the companies to fail entirely. Declining valuation multiples in the public equity market would also likely cause values to decline in our private equity portfolio. The timing and amount of investment income from private equity investments is difficult to predict, and investment income from these investments can vary from quarter to quarter.
- In addition, a rising interest rate environment could result in the value of some of our ALDA investments declining, particularly those with fixed contractual cash flows such as real estate.

- We rely on a diversified portfolio of ALDA assets to generate returns. Diversification benefits may go down over time, especially during a period of economic stress, which would adversely affect portfolio returns.
- The Company determines investment return assumptions for alternative long-duration assets in accordance with the Standards of Practice for the valuation of insurance contract liabilities and guidance published by the CIA. The guidance requires that the investment return assumption for these assets should not be higher than the historical long-term average returns of an appropriate broad-based index. Where such experience is not available, the investment return assumption for these assets should not result in a lower reserve than an assumption based on a historical return benchmark for public equities in the same jurisdiction. As a result, the impact of changes in the historical returns for public equity benchmarks may result in an update to our investment return assumptions.

Our liabilities are valued based on an assumed asset investment strategy over the long-term.

- We assume an investment strategy for the assets that back our liabilities. The strategy involves making assumptions on the kind of assets we will invest and the returns such assets will generate.
- We may not be able to implement our investment strategy as assumed due to a lack of assets available at the returns we assume. This may result in a change in investment strategy and/or assumed future returns, thus adversely impacting our financial results.

We experience foreign exchange risk as a substantial portion of our business is transacted in currencies other than Canadian dollars.

- Our financial results are reported in Canadian dollars. A substantial portion of our business is transacted in currencies other than Canadian dollars, mainly U.S. dollars, Hong Kong dollars and Japanese yen. If the Canadian dollar strengthens relative to these currencies, net income attributed to shareholders would decline and our reported shareholders' equity would decline. Further, to the extent that the resultant change in available capital is not offset by a change in required capital, our regulatory capital ratios would be reduced. A weakening of the Canadian dollar against the foreign currencies in which we do business would have the opposite effect, and would increase net income attributed to shareholders and shareholders' equity and would potentially increase our regulatory capital ratios. See "Impact of Foreign Exchange Rates" above.

The Company's hedging strategies will not fully reduce the market risks related to the product guarantees and fees being hedged, hedging costs may increase and the hedging strategies expose the Company to additional risks.

- The Company's market risk hedging strategies include a variable annuity guarantee dynamic hedging strategy and a macro equity risk hedging strategy. The variable annuity dynamic hedging strategy is designed to hedge the sensitivity of variable annuity guarantee policy liabilities to fund performance (both public equity and bond funds) and interest rate movements. The macro equity risk hedging strategy is designed to hedge a portion of our earnings sensitivity to public equity market movements arising from variable annuity guarantees not dynamically hedged, directly held exposures, and from other products and fees. Some of the limitations and risks associated with each strategy are described below.
- Our hedging strategies rely on the execution of derivative transactions in a timely manner. Therefore, hedging costs and the effectiveness of the strategy may be negatively impacted if markets for these instruments become illiquid. The Company is subject to the risk of increased funding and collateral demands which may become significant as equity markets increase.
- The Company is also subject to counterparty risks arising from the derivative instruments and to the risk of increased funding and collateral demands which may become significant as equity markets and interest rates increase. The strategies are highly dependent on complex systems and mathematical models that are subject to error and rely on forward-looking long-term assumptions that may prove inaccurate, and which rely on sophisticated infrastructure and personnel which may fail or be unavailable at critical times. Due to the complexity of the strategies there may be additional, unidentified risks that may negatively impact our business and future financial results. In addition, rising equity markets and interest rates that would otherwise result in profits on variable annuities will be offset by losses from our hedging positions. Refer to the risk factor "If a counterparty fails to fulfill its obligations, we may be exposed to risks we had sought to mitigate" for further information pertaining to counterparty risks.
- Under certain market conditions, which include a sustained increase in realized equity and interest rate volatilities, a decline in interest rates, or an increase in the correlation between equity returns and interest rate declines, the costs of hedging the benefit guarantees provided in variable annuities may increase or become uneconomic. In addition, there can be no assurance that our dynamic hedging strategy will fully offset the risks arising from the variable annuities being hedged.
- Policy liabilities and MCSR required capital for variable annuity guarantees are determined using long-term forward-looking estimates of volatilities. These long-term forward-looking volatilities assumed for policy liabilities and required capital meet the CIA and OSFI calibration standards. To the extent that realized equity or interest rate volatilities in any quarter exceed the assumed long-term volatilities, or correlations between interest rate changes and equity returns are higher, there is a risk that rebalancing will be greater and more frequent, resulting in higher hedging costs.
- The level of guarantee claims ultimately paid will be impacted by policyholder longevity and policyholder activity including the timing and amount of withdrawals, lapses and fund transfers. The sensitivity of liability values to equity market and interest rate movements that we hedge are based on long-term expectations for longevity and policyholder activity, since the impact of actual longevity and policyholder experience variances cannot be hedged using capital markets instruments.

Changes in market interest rates may impact our net income attributed to shareholders and capital ratios.

- A prolonged low interest rate environment may result in charges related to lower fixed income reinvestment assumptions and an increase in new business strain until products are repositioned for the lower rate environment. Other potential consequences of low interest rates include:
 - Low interest rates could negatively impact sales;
 - Lower risk-free rates tend to increase the cost of hedging, and as a result the offering of guarantees could become uneconomic;
 - The reinvestment of cash flows into low yielding AFS bonds could result in lower future earnings on surplus;
 - A lower interest rate environment could be correlated with other macro-economic factors including unfavourable economic growth and lower returns on other asset classes;
 - Lower interest rates could contribute to potential impairments of goodwill;
 - Lower interest rates could lead to lower mean bond parameters used for the stochastic valuation of segregated fund guarantees, resulting in higher policy liabilities;
 - Lower interest rates would also reduce expected earnings on in-force policies, which would reduce core earnings, lower net income attributed to shareholders and may increase new business strain until products are repositioned for the lower rate environment;
 - A prolonged low interest environment may also result in the Actuarial Standard Board lowering the promulgated Ultimate Reinvestment Rate ("URR") and require us to increase our provisions;
 - The difference between the current investable returns and the returns used in pricing new business are generally capitalized when new business is written. Lower interest rates result in higher new business strain until products are re-priced or interest rates increase; and
 - Fixed income reinvestment rates other than the URR are based on current market rates. The net income sensitivity to changes in current rates is outlined in the section "Interest Rate and Spread Risk Sensitivities and Exposure Measures" above.

AFS investments are recorded at fair value, but losses arising on those investments may not have been recorded in income.

- Some of our investments are classified as AFS. AFS debt securities are recorded at fair value, but unrealized gains and losses are recorded in a separate component of equity and are not charged to net income attributed to shareholders. Unrealized gains are recorded in net income attributed to shareholders when the related asset is sold. Unrealized losses are recorded in net income attributed to shareholders either when the related asset is sold or when the related asset is considered impaired and the impairment is not considered to be temporary. Should market levels decline, impairments may be judged to be other than temporary and part or all of any unrealized losses may be charged against future income as a result.
- Our valuation of certain financial instruments may include methodologies, estimations and assumptions which are subjective in nature. Changes to investment valuations may arise in the future which materially adversely affect our results of operations and financial condition.
- The fair value for certain of our investments that are not actively traded is determined using models and other valuation techniques. These values therefore incorporate considerable judgment and involve making estimates including those related to the timing and amounts of expected future cash flows and the credit standing of the issuer or counterparty. The use of different methodologies and assumptions may have a material effect on the estimated fair value amounts.
- Significant market disruption could result in rapidly widening credit spreads and illiquidity, volatile markets and for some instruments significantly reduced trading activity. It has been, and may continue to be difficult to value certain of our securities if trading is less active and/or market data is harder to observe. Consequently, valuations may include inputs and assumptions that are less observable or require greater estimation thereby resulting in values which may differ materially from the value at which the investments may be ultimately sold. Further, rapidly changing credit and equity market conditions could materially impact the valuation of securities as reported within our Consolidated Financial Statements and the period-to-period changes in value could vary significantly. Decreases in value that become recognizable in future periods could have a material adverse effect on our results of operations and financial condition.

Liquidity Risk Factors

Manulife is exposed to liquidity risk in each of our operating companies and in our holding company. In the operating companies, expected cash and collateral demands arise day-to-day to fund anticipated policyholder benefits, withdrawals of customer deposit balances, reinsurance settlements, derivative instrument settlements/collateral pledging, expenses, investment and hedging activities. Under stressed conditions, unexpected cash and collateral demands could arise primarily from a change in the level of policyholders either terminating policies with large cash surrender values or not renewing them when they mature, withdrawals of customer deposit balances, borrowers renewing or extending their loans when they mature, derivative settlements or collateral demands, and reinsurance settlements or collateral demands.

Adverse capital and credit market conditions may significantly affect our liquidity risk.

- Reduced asset liquidity may restrict our ability to sell certain types of assets for cash without taking significant losses. If providers of credit preserve their capital, our access to borrowing from banks and others or access to other types of credit such as letters of credit, may be reduced. If investors have a negative perception of our creditworthiness, this may reduce access to wholesale

borrowing in the debt capital markets, or increase borrowing costs. Should large and unexpected cash outflows occur, exceeding our worst case stress testing, we may be forced to sell assets at a loss or raise additional funds at significant cost in order to meet our liquidity needs.

- We are dependent on cash flow from operations, a pool of highly liquid money market securities and holdings of sovereign bonds, near-sovereign bonds and other liquid marketable securities to provide liquidity. We need liquidity to meet our payment obligations including those related to insurance and annuity benefits, cashable liabilities, our operating expenses, interest on our debt, dividends on our equity capital, and to replace maturing and certain callable liabilities.
- Liquid assets are also required to pledge as collateral to support activities such as the use of derivatives for hedging purposes and to cover cash settlement associated with exchange-traded derivatives that are settled with exchanges. The implementation of Dodd-Frank in the United States increased the amount of derivatives executed through centralized exchanges and cleared through regulated clearinghouses and therefore increased related liquidity risk. Other jurisdictions in which we operate could enact similar regulations within the next few years for cleared transactions as well as new upfront collateral and more restrictive collateral (relative to the current OTC market) to cover changes in derivative values for non-cleared transactions. The principal sources of our liquidity are cash and our assets that are readily convertible into cash, including insurance and annuity premiums, fee income earned on AUM, money market securities, and cash flow from our investment portfolio. The issuance of long-term debt, common and preferred shares and other capital securities may also increase our available liquid assets or be required to replace certain maturing or callable liabilities.
- In the event we seek additional financing, the availability and terms of such financing will depend on a variety of factors including market conditions, the availability of credit to the financial services industry, our credit ratings and credit capacity, as well as the possibility that customers, lenders or investors could develop a negative perception of our long-term or short-term financial prospects if we incur large financial losses or if the level of our business activity decreases further due to a significant market downturn.

We are exposed to re-pricing risk on letters of credit.

- In the normal course of business, third-party banks issue letters of credit on our behalf. In lieu of posting collateral, our businesses utilize letters of credit for which third parties are the beneficiaries, as well as for affiliate reinsurance transactions between subsidiaries of MFC. Letters of credit and letters of credit facilities must be renewed periodically. At time of renewal, the Company is exposed to re-pricing risk and under adverse conditions increases in costs may be realized. In the most extreme scenarios, letters of credit capacity could become constrained due to non-renewals which would restrict our flexibility to manage capital. This could negatively impact our ability to meet local capital requirements or our sales of products in jurisdictions in which our operating companies have been affected. As at December 31, 2016, letters of credit for which third parties are beneficiary, in the amount of \$83 million, were outstanding. There were no assets pledged against these outstanding letters of credit as at December 31, 2016.

Our obligations to pledge collateral or make payments related to declines in value of specified assets may adversely affect our liquidity.

- In the normal course of business, we are obligated to pledge assets to comply with jurisdictional regulatory and other requirements including collateral pledged in relation to derivative contracts and assets held as collateral for repurchase funding agreements. The amount of collateral we may be required to post under these agreements, and the amount of payments we are required to make to our counterparties, may increase under certain circumstances, including a sustained or continued decline in the value of our derivative contracts. Such additional collateral requirements and payments could have an adverse effect on our liquidity. As at December 31, 2016, total pledged assets were \$6,182 million, compared with \$6,071 million in 2015.

Our banking subsidiary relies on confidence sensitive deposits and this increases our liquidity risk.

- Manulife Bank is a wholly-owned subsidiary of our Canadian life insurance operating company, MLI. The Bank is principally funded by retail deposits. A real or perceived problem with the Bank or its parent companies could result in a loss of confidence in the Bank's ability to meet its obligations, which in turn may trigger a significant withdrawal of deposit funds. A substantial portion of the Bank's deposits are demand deposits that can be withdrawn at any time, while the majority of the Bank's assets are first residential mortgages in the form of home equity lines of credit, which represent long-term funding obligations. If deposit withdrawal speeds exceed our extreme stress test assumptions the Bank may be forced to sell assets at a loss to third parties, call the home equity lines of credit or the Bank may request support from MLI.

As a holding company, MFC depends on the ability of its subsidiaries to transfer funds to it to meet MFC's obligations and pay dividends.

- MFC is a holding company and relies on dividends and interest payments from our insurance and other subsidiaries as the principal source of cash flow to meet MFC's obligations and pay dividends. As a result, MFC's cash flows and ability to service its obligations are dependent upon the earnings of its subsidiaries and the distribution of those earnings and other funds by its subsidiaries to MFC. Substantially all of MFC's business is currently conducted through its subsidiaries. In addition, OSFI is considering capital requirements for MLI on a stand-alone basis that could further restrict dividends and other distributions to MFC.
- The ability of our holding company to fund its cash requirements depends upon it receiving dividends, distributions and other payments from our operating subsidiaries. The ability of MFC's insurance subsidiaries to pay dividends to MFC in the future will depend on their earnings and regulatory restrictions. These subsidiaries are subject to a variety of insurance and other laws and regulations that vary by jurisdiction and are intended to protect policyholders and beneficiaries in that jurisdiction first and foremost, rather than investors. These subsidiaries are generally required to maintain solvency and capital standards as set by their local

regulators and may also be subject to other regulatory restrictions, all of which may limit the ability of subsidiary companies to pay dividends or make distributions to MFC. Such limits could have a material adverse effect on MFC's liquidity, including its ability to pay dividends to shareholders and service its debt.

- The potential changes to regulatory capital and actuarial and accounting standards could also limit the ability of the insurance subsidiaries to pay dividends or make distributions and could have a material adverse effect on MFC's liquidity and on internal capital mobility, including on MFC's ability to pay dividends to shareholders and service its debt. We may be required to raise additional capital, which could be dilutive to existing shareholders, or to limit the new business we write, or to pursue actions that would support capital needs but adversely impact our subsequent earnings potential. In addition, the timing and outcome of these initiatives could have a significantly adverse impact on our competitive position relative to that of other Canadian and international financial institutions with which we compete for business and capital.
- The payment of dividends to MFC by MLI is subject to restrictions set out in the ICA. The ICA prohibits the declaration or payment of any dividend on shares of an insurance company if there are reasonable grounds for believing: (i) the company does not have adequate capital and adequate and appropriate forms of liquidity; or (ii) the declaration or the payment of the dividend would cause the company to be in contravention of any regulation made under the ICA respecting the maintenance of adequate capital and adequate and appropriate forms of liquidity, or of any direction made to the company by the Superintendent. All of our U.S. and Asian operating life insurance companies are subsidiaries of MLI.
- Certain of MFC's U.S. insurance subsidiaries also are subject to insurance laws in Michigan, New York, Massachusetts, and Vermont, the jurisdictions in which these subsidiaries are domiciled, which impose general limitations on the payment of dividends and other upstream distributions by these subsidiaries to MLI.
- Our Asian insurance subsidiaries are also subject to restrictions in the jurisdictions in which these subsidiaries are domiciled which could affect their ability to pay dividends to MLI in certain circumstances.
- The Company seeks to maintain capital in its insurance subsidiaries in excess of the minimum required in all jurisdictions in which the Company does business. The minimum requirements in each jurisdiction may increase due to regulatory changes and we may decide to maintain additional capital in our operating subsidiaries to fund expected growth of the business or to deal with changes in the risk profile of such subsidiaries. Any such increases in the level of capital may reduce the ability of the operating companies to pay dividends and have a material adverse effect on MFC's liquidity.

The declaration and payment of dividends and the amount thereof is subject to change.

- The holders of common shares are entitled to receive dividends as and when declared by the Board of Directors of MFC, subject to the preference of the holders of Class A Shares, Class 1 Shares, Class B Shares (collectively, the "Preferred Shares") and any other shares ranking senior to the common shares with respect to priority in payment of dividends. The declaration and payment of dividends and the amount thereof is subject to the discretion of the Board of Directors of MFC and is dependent upon the results of operations, financial condition, cash requirements and future prospects of, and regulatory restrictions on the payment of dividends by MFC and other factors deemed relevant by the Board of Directors of MFC. Although MFC has historically declared quarterly cash dividends on the common shares, MFC is not required to do so and the Board of Directors of MFC may reduce, defer or eliminate MFC's common share dividend in the future.
- The foregoing risk disclosure in respect of the declaration and payment of dividends on the common shares applies equally in respect of the declaration and payment of dividends on the Preferred Shares, notwithstanding that the Preferred Shares have a fixed rate of dividend.
- See "Government Regulation" and "Dividends" in MFC's Annual Information Form dated February 9, 2017 for a summary of additional statutory and contractual restrictions concerning the declaration of dividends by MFC.

Credit Risk Factors

Worsening regional and global economic conditions or the rise in interest rates could result in borrower or counterparty defaults or downgrades, and could lead to increased provisions or impairments related to our general fund invested assets and off-balance sheet derivative financial instruments, and an increase in provisions for future credit impairments to be included in our policy liabilities. Any of our reinsurance providers being unable or unwilling to fulfill their contractual obligations related to the liabilities we cede to them could lead to an increase in policy liabilities.

Our invested assets primarily include investment grade bonds, private placements, commercial mortgages, asset-backed securities, and consumer loans. These assets are generally carried at fair value, but changes in value that arise from a credit-related impairment are recorded as a charge against income. The return assumptions incorporated in actuarial liabilities include an expected level of future asset impairments. There is a risk that actual impairments will exceed the assumed level of impairments in the future and earnings could be adversely impacted.

Defaults and downgrade charges on our invested assets were generally in line with our historical average in 2016; however, we still expect volatility on a quarterly basis and losses could potentially rise above long-term expected levels. Net impaired fixed income assets were \$224 million, representing 0.07% of total general fund invested assets as at December 31, 2016, compared with \$161 million, representing 0.05% of total general fund invested assets as at December 31, 2015.

If a counterparty fails to fulfill its obligations, we may be exposed to risks we had sought to mitigate.

- The Company uses derivative financial instruments to mitigate exposures to public equity, foreign currency, interest rate and other market risks arising from on-balance sheet financial instruments, guarantees related to variable annuity products, selected anticipated transactions and certain other guarantees. The Company may be exposed to counterparty risk if a counterparty fails to pay amounts owed to us or otherwise perform its obligations to us. Counterparty risk increases during economic downturns because the probability of default increases for most counterparties. If any of these counterparties default, we may not be able to recover the amounts due from that counterparty. As at December 31, 2016, the largest single counterparty exposure without taking into account the impact of master netting agreements or the benefit of collateral held, was \$3,891 million (2015 – \$4,155 million). The net exposure to this counterparty, after taking into account master netting agreements and the fair value of collateral held, was nil (2015 – nil). As at December 31, 2016, the total maximum credit exposure related to derivatives across all counterparties, without taking into account the impact of master netting agreements and the benefit of collateral held, was \$24,603 million (2015 – \$25,332 million) compared with \$190 million after taking into account master netting agreements and the benefit of fair value of collateral held (2015 – \$68 million). The exposure to any counterparty would grow if, upon the counterparty's default, markets moved such that our derivatives with that counterparty gain in value. Until we are able to replace that derivative with another counterparty, the gain on the derivatives subsequent to the counterparty's default would not be backed by collateral.
- The Company reinsures a portion of the business we enter into; however, we remain legally liable for contracts that we had reinsured. In the event that any of our reinsurance providers were unable or unwilling to fulfill their contractual obligations related to the liabilities we cede to them, we would need to increase actuarial reserves, adversely impacting our net income attributed to shareholders and capital position. In addition, the Company has over time sold certain blocks of business to third-party purchasers using reinsurance. To the extent that the reinsured contracts are not subsequently novated to the purchasers, we remain legally liable to the insureds. Should the purchasers be unable or unwilling to fulfill their contractual obligations under the reinsurance agreement, we would need to increase policy liabilities resulting in a charge to net income attributed to shareholders. To reduce credit risk, the Company may require purchasers to provide collateral for their reinsurance liabilities.
- We participate in a securities lending program whereby blocks of securities are loaned to third parties, primarily major brokerage firms and commercial banks. Collateral, which exceeds the market value of the loaned securities, is retained by the Company until the underlying security has been returned. If any of our securities lending counterparties default and the value of the collateral is insufficient, we would incur losses. As at December 31, 2016, the Company had loaned securities (which are included in invested assets) valued at approximately \$1,956 million, compared with \$648 million at December 31, 2015.

The determination of allowances and impairments on our investments is subjective and changes could materially impact our results of operations or financial position.

- The determination of allowances and impairments is based upon a periodic evaluation of known and inherent risks associated with the respective security. Management considers a wide range of factors about the security and uses its best judgment in evaluating the cause of the decline, in estimating the appropriate value for the security and in assessing the prospects for near-term recovery. Inherent in management's evaluation of the security are assumptions and estimates about the operations of the issuer and its future earnings potential. Considerations in the impairment evaluation process include: (i) the severity of the impairment; (ii) the length of time and the extent to which the market value of a security has been below its carrying value; (iii) the financial condition of the issuer; (iv) the potential for impairments in an entire industry sector or sub-sector; (v) the potential for impairments in certain economically depressed geographic locations; (vi) the potential for impairments of securities where the issuer, series of issuers or industry has suffered a catastrophic type of loss or has exhausted natural resources; (vii) our ability and intent to hold the security for a period of time sufficient to allow for the recovery of its value to an amount equal to or greater than cost or amortized cost; (viii) unfavourable changes in forecasted cash flows on mortgage-backed and asset-backed securities; and (ix) other subjective factors, including concentrations and information obtained from regulators and rating agencies.
- Such evaluations and assessments are revised as conditions change and new information becomes available. We update our evaluations regularly and reflect changes in allowances and impairments as such evaluations warrant. The evaluations are inherently subjective, and incorporate only those risk factors known to us at the time the evaluation is made. There can be no assurance that management has accurately assessed the level of impairments that have occurred. Additional impairments will likely need to be taken or allowances provided for in the future as conditions evolve. Historical trends may not be indicative of future impairments or allowances.

Insurance Risk Factors

We make a variety of assumptions related to the future level of claims, policyholder behaviour, expenses and sales levels when we design and price products, and when we establish policy liabilities. Assumptions for future claims are generally based on both Company and industry experience, and assumptions for future policyholder behaviour and expenses are generally based on Company experience. Assumptions for future policyholder behaviour include assumptions related to the retention rates for insurance and wealth products. Assumptions for expenses include assumptions related to future maintenance expense levels and volume of the business.

Losses may result should actual experience be materially different than that assumed in the valuation of policy liabilities.

- Such losses could have a significant adverse effect on our results of operations and financial condition. In addition, we periodically review the assumptions we make in determining our policy liabilities and the review may result in an increase in policy liabilities and

a decrease in net income attributed to shareholders. Such assumptions require significant professional judgment, and actual experience may be materially different than the assumptions we make. (see “Critical Accounting and Actuarial Policies” above)

We may be unable to obtain necessary price increases on our in-force long-term care business, or may face delays in implementation.

- We continue to seek state regulatory approvals for price increases on existing long-term care business in the United States. We cannot be certain whether or when each approval will be granted. Our policy liabilities reflect our estimates of the impact of these price increases, but should we be less successful than anticipated in obtaining them, then policy liabilities could increase accordingly and reduce net income attributed to shareholders.

Evolving legislation related to genetic testing could adversely impact our underwriting abilities.

- Current or future legislation in jurisdictions where Manulife operates may restrict its right to underwrite based on access to genetic test results. Without the obligation of disclosure, the asymmetry of information shared between applicant and insurer could increase anti-selection in both new business and in-force policyholder behaviour. The impact of restricting insurers’ access to this information and the associated problems of anti-selection becomes more acute where genetic technology leads to advancements in diagnosis of life threatening conditions that are not matched by improvements in treatment. We cannot predict the potential financial impact that this would have on the Company or the industry as a whole. In addition, there may be further unforeseen implications as genetic testing continues to evolve and becomes more established in mainstream medical practice.

Life and health insurance claims may be impacted unexpectedly by changes in the prevalence of diseases or illnesses, medical and technology advances, lifestyle changes, natural disasters, large-scale man-made disasters and acts of terrorism.

- The cost of health insurance benefits may be impacted by unforeseen trends in the incidence, termination and severity rates of claims. The ultimate level of lifetime benefits paid to policyholders may be increased by an unexpected increase in life expectancy. For example, advances in technology could lead to longer lives through better medical treatment or better disease prevention. Policyholder behaviour including premium payment patterns, policy renewals, lapse rates and withdrawal and surrender activity are influenced by many factors including market and general economic conditions, and the availability and relative attractiveness of other products in the marketplace. For example, a weak or declining economic environment could increase the value of guarantees associated with variable annuities or other embedded guarantees and contribute to adverse policyholder behaviour experience. As well, adverse claims experience could result from systematic anti-selection, which could arise from the development of investor owned and secondary markets for life insurance policies, anti-selective lapse behaviour, underwriting process failures, or other factors.

External market conditions determine the availability, terms and cost of the reinsurance protection for new business.

- We purchase reinsurance protection on certain risks underwritten by our various business segments. Typically, reinsurance agreements are intended to bind the reinsurer for the term of the business reinsured at a fixed price but circumstances may call for increases to be agreed upon. Accordingly, we may incur additional costs for reinsurance or may not be able to obtain sufficient reinsurance on acceptable terms. This could result in accounting charges and the assumption of more risk on business already reinsured and could adversely affect our ability to write future business or result in the assumption of more risk with respect to those policies we issue.

Operational Risk Factors

Operational risk is naturally present in all of our business activities and encompasses a broad range of risks, including regulatory compliance failures, legal disputes, technology failures, business interruption, information security and privacy breaches, human resource management failures, processing errors, modelling errors, business integration, theft and fraud, and damage to physical assets. Exposures can take the form of financial losses, regulatory sanctions, loss of competitive positioning, or damage to our reputation. Operational risk is also embedded in all the practices we use to manage other risks; therefore, if not managed effectively, operational risk can impact our ability to manage other key risks such as credit risk, market risk, liquidity risk and insurance risk.

Adverse publicity, litigation or regulatory action resulting from our business practices or actions by our employees, representatives and/or business partners, could erode our corporate image and damage our franchise value and/or create losses.

- Manulife’s reputation is one of its most valuable assets. Harm to a company’s reputation is often a consequence of risk control failure, whether associated with complex financial transactions or relatively routine operational activities. Manulife’s reputation could also be harmed by the actions of third parties with whom we do business. Our representatives include affiliated broker-dealers, agents, wholesalers and independent distributors, such as broker-dealers and banks, whose services and representations our customers rely on. Business partners include, among others, third parties to whom we outsource certain functions and that we rely on to fulfill various obligations.
- If any of these representatives or business partners fail to adequately perform their responsibilities, or monitor its own risk, these failures could affect our business reputation and operations. While we seek to maintain adequate internal risk management policies and procedures and protect against performance failures, events may occur that could cause us to lose customers or suffer legal or regulatory sanctions, which could have a material adverse effect on our reputation, our business, and our results of operations. For

further discussion of government regulation and legal proceedings refer to “Government Regulation” in MFC’s Annual Information Form dated February 9, 2017 and “Legal and Regulatory Proceedings” below.

If we are not able to attract, motivate and retain agency leaders and individual agents, our competitive position, growth and profitability will suffer.

- We must attract and retain sales representatives to sell our products. Strong competition exists among financial services companies for efficient and effective sales representatives. We compete with other financial services companies for sales representatives primarily on the basis of our financial position, brand, support services and compensation and product features. Any of these factors could change either because we change the Company or our products, or because our competitors change theirs and we are unable or unwilling to adapt. If we are unable to attract and retain sufficient sales representatives to sell our products, our ability to compete and revenues from new sales would suffer, which could have a material adverse effect on our business, results of operations and financial condition.

If we are unable to complete key projects on time, on budget, and capture planned benefits, our business strategies and plans, and operations may be impaired.

- We must successfully deliver a number of key projects in order to implement our business strategies and plans. If we are unable to complete these projects in accordance with planned schedules, and to capture projected benefits, there could be a material adverse effect on our business and financial condition.

The inter-connectedness of our operations and risk management strategies could expose us to risk if all factors are not appropriately considered and communicated.

- Our business operations, including strategies and operations related to risk management, asset liability management and liquidity management, are interconnected and increasingly complex. Changes in one area may have a secondary impact in another area of our operations. For example, risk management actions, such as the increased use of interest rate swaps, could have implications for the Company’s Investment Division or its Treasury function, as this strategy could result in the need to post additional amounts of collateral. Failure to appropriately consider these inter-relationships, or effectively communicate changes in strategies or activities across our operations, could have a negative impact on the strategic objectives or operations of another group. Further, failure to consider these inter-relationships in our modeling and financial and strategic decision making processes could have a negative impact on our operations.

Our risk management policies, procedures and strategies may leave us exposed to unidentified or unanticipated risks, which could negatively affect our business, results of operations and financial condition.

- We have devoted significant resources to develop our risk management policies, procedures and strategies and expect to continue to do so in the future. Nonetheless, our policies, procedures and strategies may not be comprehensive. Many of our methods for measuring and managing risk and exposures are based upon the use of observed historical market behaviour or statistics based on historical models. Future behavior may be very different from past behavior, especially if there are some fundamental changes that affect future behavior. As an example, the increased occurrence of negative interest rates can make it difficult to model future interest rates as interest rate models have been generally developed for an environment of positive interest rates. As a result, these methods may not fully predict future exposures, which can be significantly greater than our historical measures indicate. Other risk management methods depend upon the evaluation and/or reporting of information regarding markets, clients, client transactions, catastrophe occurrence or other matters publicly available or otherwise accessible to us. This information may not always be accurate, complete, up-to-date or properly evaluated or reported.

We are subject to tax audits, tax litigation or similar proceedings, and as a result we may owe additional taxes, interest and penalties in amounts that may be material.

- We are subject to income and other taxes in the jurisdictions in which we do business. In determining our provisions for income taxes and our accounting for tax-related matters in general, we are required to exercise judgment. We regularly make estimates where the ultimate tax determination is uncertain. There can be no assurance that the final determination of any tax audit, appeal of the decision of a taxing authority, tax litigation or similar proceedings will not be materially different from that reflected in our historical financial statements. The assessment of additional taxes, interest and penalties could be materially adverse to our current and future results of operations and financial condition.

Our non-North American operations face political, legal, operational and other risks that could negatively affect those operations or our results of operations and financial condition.

- A substantial portion of our revenue and net income attributed to shareholders is derived from our operations outside of North America, primarily in key Asian markets. Some of these key geographical markets are developing and are rapidly growing countries and markets that present unique risks that we do not face, or are negligible, in our operations in Canada or the United States. Our operations outside of North America face the risk of discriminatory regulation, political and economic instability, market volatility and significant inflation, limited protection for, or increased costs to protect intellectual property rights, inability to protect and/or enforce contractual or legal rights, nationalization or expropriation of assets, price controls and exchange controls or other restrictions that prevent us from transferring funds from these operations out of the countries in which they operate or converting local currencies we hold into Canadian or U.S. dollars. Failure to manage these risks could have a significant negative impact on our operations and profitability.

- We are currently planning to expand our global operations in markets where we operate and potentially in new markets. This may require considerable management time, as well as start-up expenses for market development before any significant revenues and earnings are generated. Operations in new foreign markets may achieve low margins or may be unprofitable, and expansion in existing markets may be affected by local economic and market conditions.

We are regularly involved in litigation.

- We are regularly involved in litigation, both as a plaintiff or defendant. These cases could result in an unfavourable resolution, and could have a material adverse effect on our results of operations and financial condition.

A technology failure, cyber-attack, information security or privacy breach of ours or of a third party, as well as other types of business disruptions such as natural or man-made disasters, could significantly disrupt our business, impede our ability to conduct business and adversely impact our business, results of operations, financial condition, and reputation.

- Technology is used in virtually all aspects of our business and operations; in addition, part of our strategy involves the expansion of our digital customer interfaces. Our technology infrastructure, information services and applications are governed and managed according to policies and standards for operational integrity, resiliency, data integrity, confidentiality and information security. Disruption, privacy breaches, or security breaches due to system failure, denial of service attacks, human errors, natural disasters, man-made disasters, criminal activity, fraud, cyber-attacks, pandemics, or other events beyond our control, could prevent us from effectively operating our business, subject us to regulatory sanctions and legal claims, lead to a loss of customers, assets and revenues, result in unauthorized disclosures of personal or confidential information, or otherwise adversely affect us from a financial, operational and reputational perspective.
- It is possible that the Company may not be able to anticipate or to implement effective preventive measures against all disruptions or privacy and security breaches, especially because the techniques used change frequently, generally increase in sophistication, often are not recognized until launched, and because cyber-attacks can originate from a wide variety of sources, including organized crime, hackers, terrorists, activists, and other external parties, including parties sponsored by hostile foreign governments. Those parties may also attempt to fraudulently induce employees, customers, third-party service providers or other users of the Company's systems to disclose sensitive information in order to gain access to the Company's data or that of its customers or clients. We, our customers, regulators and other third parties have been subject to, and are likely to continue to be the target of, cyber-attacks, including computer viruses, malicious or destructive code, phishing attacks, denial of service and other security incidents, that could result in the unauthorized release, gathering, monitoring, misuse, loss or destruction of personal, confidential, proprietary and other information of the Company, our employees, our customers or of third parties, or otherwise materially disrupt our or our customers' or other third parties' network access or business operations. The Company maintains cyber risk insurance, but this insurance may not cover all costs associated with the financial, operational and reputational consequences of personal, confidential or proprietary information being compromised.
- In particular, our computer networks are subject to the risk of so-called Advanced Persistent Threats ("APT"). An APT attack is a type of sophisticated attack that has become more pervasive and frequent within the financial services sector. An APT attack is a network attack in which an unauthorized person or persons attempt(s) to gain undetected access to a network and maintain that access over a period of time. The intention of an APT attack is to steal data rather than to cause other damage to the network or organization. APT attacks target organizations in sectors with high-value information, such as national defense, manufacturing and the financial industry. The Company has an Information Risk Management Program, which includes information and cyber security defenses, to protect our networks and systems from attacks; however, there can be no assurance that these counter measures will be successful in every instance in protecting our networks against APT or other types of attacks. An APT attack that results in access to our network could adversely impact us from a financial, operational and reputational perspective.
- DDoS (Distributed Denial of Service) attacks are increasing in frequency and severity, and are gaining recognition as a top method of business disruption. They leverage the massive, distributed, and stolen computing power from infected computers to flood target web servers with traffic. The goal of a DDoS attack is to disrupt the online operations of the target organization by consuming all available network bandwidth and server resources. DDoS attacks are now common occurrences, with some research labs reporting thousands of attacks per day. A DDoS attack that results in a disruption of our online operations may result in financial, operational or reputational damage to us.
- Ransomware has become a common attack vector in the financial services sector. It is a type of malware that prevents or limits users from accessing their system, either by locking the system's screen or by locking the users' files, and requires a ransom payment to unlock these files. Critical data could be lost if it became unavailable due to a ransomware attack, which could cause a disruption to our business and could impact us from a financial, operational, and reputational perspective.

Competition for the best people is intense and an inability to recruit qualified individuals may negatively impact our ability to execute on business strategies or to conduct our operations.

- We compete with other insurance companies and financial institutions for qualified executives, employees and agents. We must attract and retain top talent to maintain our competitive advantage. Failure to attract and retain the best people could adversely impact our business.

Model risk may arise from the inappropriate use or interpretation of models or their output, or the use of deficient models, data or assumptions.

- We are relying on some highly complex models for pricing, valuation and risk measurement, and for input to decision making. Consequently, the risk of inappropriate use or interpretation of our models or their output, or the use of deficient models, could have a material adverse effect on our business.
- We have embarked on a multi-year initiative to enhance our valuation models and processes across the organization. We do not expect this initiative to result in significant reserve adjustments. However, as we systematically review our models, there could be updates to our assumptions and methodologies that result in reserve changes.

Environmental risk may arise related to our commercial mortgage loan portfolio and owned property or from our business operations.

- Environmental risk may originate from investment properties that are subject to natural or man-made environmental risk. Real estate assets may be owned, leased and/or managed, as well as mortgaged by Manulife and we might enter into the chain of liability due to foreclosure ownership when in default.
- Liability under environmental protection laws resulting from our commercial mortgage loan portfolio and owned property (including commercial real estate, oil and gas, timberland and farmland properties) may adversely impact our reputation, results of operations and financial condition. Under applicable laws, contamination of a property with hazardous materials or substances may give rise to a lien on the property to secure recovery of the costs of cleanup. In some instances, this lien has priority over the lien of an existing mortgage encumbering the property. The environmental risk may result from on-site or off-site (adjacent) due to migration of regulated pollutants or contaminants with financial or reputational environmental risk and liability consequences by virtue of strict liability. Environmental risk could also arise from natural disasters (e.g., weather, fire, earthquake, floods, pests) or human activities (use of chemicals, pesticides) conducted within the site or when impacted from adjacent sites.
- Additionally, as lender, we may incur environmental liability (including without limitation liability for clean-up, remediation and damages incurred by third parties) similar to that of an owner or operator of the property, if we or our agents exercise sufficient control over the operations at the property. We may also have liability as the owner and/or operator of real estate for environmental conditions or contamination that exist or occur on the property, or affecting other property.
- In addition, failure to adequately prepare for the potential impacts of climate change may have a negative impact on our financial position or our ability to operate. Potential impacts may be direct or indirect and may include business losses or disruption resulting from extreme weather conditions; the impact of changes in legal or regulatory framework made to address climate change; or increased mortality or morbidity resulting from environmental damage or climate change.

Additional Risk Factors That May Affect Future Results

- Other factors that may affect future results include changes in government trade policy, monetary policy or fiscal policy; political conditions and developments in or affecting the countries in which we operate; technological changes; public infrastructure disruptions; changes in consumer spending and saving habits; the possible impact on local, national or global economies from public health emergencies, such as an influenza pandemic, and international conflicts and other developments including those relating to terrorist activities. Although we take steps to anticipate and minimize risks in general, unforeseen future events may have a negative impact on our business, financial condition and results of operations.

We caution that the preceding discussion of risks that may affect future results is not exhaustive. When relying on our forward-looking statements to make decisions with respect to our Company, investors and others should carefully consider the foregoing risks, as well as other uncertainties and potential events, and other external and Company specific risks that may adversely affect the future business, financial condition or results of operations of our Company.

Controls and Procedures

Disclosure Controls and Procedures

Our disclosure controls and procedures are designed to provide reasonable assurance that information required to be disclosed by us is recorded, processed, summarized, and reported accurately and completely and within the time periods specified under Canadian and U.S. securities laws. Our process includes controls and procedures that are designed to ensure that information is accumulated and communicated to management, including the CEO and CFO, to allow timely decisions regarding required disclosure.

As of December 31, 2016, management evaluated the effectiveness of its disclosure controls and procedures as defined under the rules adopted by the U.S. Securities and Exchange Commission and the Canadian securities regulatory authorities. This evaluation was performed under the supervision of the Audit Committee, the CEO and CFO. Based on that evaluation, the CEO and CFO concluded that our disclosure controls and procedures were effective as at December 31, 2016.

MFC's Audit Committee has reviewed this MD&A and the 2016 Consolidated Financial Statements and MFC's Board of Directors approved these reports prior to their release.

Management's Report on Internal Control over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting. The Company's internal control system was designed to provide reasonable assurance to management and the Board of Directors regarding the preparation and fair presentation of published financial statements in accordance with generally accepted accounting principles. All internal control systems, no matter how well designed, have inherent limitations due to manual controls. Therefore, even those systems determined to be effective can provide only reasonable assurance with respect to financial statement preparation and presentation.

Management maintains a comprehensive system of controls intended to ensure that transactions are executed in accordance with management's authorization, assets are safeguarded, and financial records are reliable. Management also takes steps to ensure that information and communication flows are effective and to monitor performance, including performance of internal control procedures.

Management assessed the effectiveness of the Company's internal control over financial reporting as of December 31, 2016 based on the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO") 2013 framework in Internal Control – Integrated Framework. Based on this assessment, management believes that, as of December 31, 2016, the Company's internal control over financial reporting is effective.

The effectiveness of the Company's internal control over financial reporting as of December 31, 2016 has been audited by Ernst & Young LLP, the Company's independent registered public accounting firm that also audited the Consolidated Financial Statements of the Company for the year ended December 31, 2016. Their report expressed an unqualified opinion on the effectiveness of the Company's internal control over financial reporting as of December 31, 2016.

Changes in Internal Control over Financial Reporting

No changes were made in our internal control over financial reporting during the year ended December 31, 2016 that have significantly affected, or are reasonably likely to significantly affect, our internal control over financial reporting.

Performance and Non-GAAP Measures

We use a number of non-GAAP financial measures to measure overall performance and to assess each of our businesses. A financial measure is considered a non-GAAP measure for Canadian securities law purposes if it is presented other than in accordance with generally accepted accounting principles used for the Company's audited financial statements. Non-GAAP measures include: Core Earnings (Loss); Core ROE; Diluted Core Earnings per Common Share; Core Earnings Before Income Taxes, Depreciation and Amortization ("core EBITDA"); Core Investment Gains, Constant Currency Basis (measures that are reported on a constant currency basis include percentage growth in Sales, Gross Flows, Premiums and Deposits, Core EBITDA, New Business Value, and Assets under Management and Administration); Assets under Administration; Premiums and Deposits; Assets under Management and Administration; Assets under Management; Capital; Embedded Value; New Business Value, Sales; Gross Flows and Net Flows. Non-GAAP financial measures are not defined terms under GAAP and, therefore, are unlikely to be comparable to similar terms used by other issuers. Therefore, they should not be considered in isolation or as a substitute for any other financial information prepared in accordance with GAAP.

Core earnings (loss) is a non-GAAP measure which we believe aids investors in better understanding the long-term earnings capacity and valuation of the business. Core earnings allows investors to focus on the Company's operating performance by excluding the direct impact of changes in equity markets and interest rates, changes in actuarial methods and assumptions as well as a number of other items, outlined below, that we believe are material, but do not reflect the underlying earnings capacity of the business. For example, due to the long-term nature of our business, the mark-to-market movements of equity markets, interest rates, foreign currency exchange rates and commodity prices from period-to-period can, and frequently do, have a substantial impact on the reported amounts of our assets, liabilities and net income attributed to shareholders. These reported amounts are not actually realized at the time and may never be realized if the markets move in the opposite direction in a subsequent period. This makes it very difficult for investors to evaluate how our businesses are performing from period-to-period and to compare our performance with other issuers.

We believe that core earnings better reflects the underlying earnings capacity and valuation of our business. We use core earnings as the basis for management planning and reporting and, along with net income attributable to shareholders, as a key metric used in our short and mid-term incentive plans at the total Company and operating segment level.

While core earnings is relevant to how we manage our business and offers a consistent methodology, it is not insulated from macro-economic factors which can have a significant impact. See "Quarterly Financial Information" below for reconciliation of core earnings to net income attributed to shareholders.

Any other future changes to the core earnings definition referred to below, will be disclosed.

Items included in core earnings:

1. Expected earnings on in-force policies, including expected release of provisions for adverse deviation, fee income, margins on group business and spread business such as Manulife Bank and asset fund management.
2. Macro hedging costs based on expected market returns.
3. New business strain.
4. Policyholder experience gains or losses.
5. Acquisition and operating expenses compared with expense assumptions used in the measurement of policy liabilities.
6. Up to \$400 million of net favourable investment-related experience reported in a single year, which are referred to as "core investment gains". This means up to \$100 million in the first quarter, up to \$200 million on a year-to-date basis in the second quarter, up to \$300 million on a year-to-date basis in the third quarter and up to \$400 million on a full year basis in the fourth quarter. Any investment-related experience losses reported in a quarter will be offset against the net year-to-date investment-related experience gains with the difference being included in core earnings subject to a maximum of the year-to-date core investment gains and a minimum of zero, which reflects our expectation that investment-related experience will be positive through-the-business cycle. To the extent any investment-related experience losses cannot be fully offset in a quarter they will be carried forward to be offset against investment-related experience gains in subsequent quarters in the same year, for purposes of determining core investment gains. The \$400 million threshold represents our through-the-business cycle estimate of net favourable investment-related experience that we reasonably expect to achieve annually based on historical experience even if we exceed or do not achieve this threshold in any given period. We monitor the appropriateness of the threshold and would adjust it, either to a higher or lower amount, in the future if we believed that our investment-related experience warranted such an adjustment. See also item 2 in "Items excluded from core earnings" below.
7. Earnings on surplus other than mark-to-market items. Gains on available-for-sale ("AFS") equities and seed money investments are included in core earnings.
8. Routine or non-material legal settlements.
9. All other items not specifically excluded.
10. Tax on the above items.
11. All tax related items except the impact of enacted or substantially enacted income tax rate changes.

Items excluded from core earnings:

1. The direct impact of equity markets and interest rates and variable annuity guarantee liabilities includes the items listed below.
 - The earnings impact of the difference between the net increase (decrease) in variable annuity liabilities that are dynamically hedged and the performance of the related hedge assets. Our variable annuity dynamic hedging strategy is not designed to completely offset the sensitivity of insurance and investment contract liabilities to all risks or measurements associated with the guarantees embedded in these products for a number of reasons, including; provisions for adverse deviation, fund performance, the portion of the interest rate risk that is not dynamically hedged, realized equity and interest rate volatilities and changes to policyholder behaviour.
 - Gains (charges) on variable annuity guarantee liabilities not dynamically hedged.
 - Gains (charges) on general fund equity investments supporting policy liabilities and on fee income.
 - Gains (charges) on macro equity hedges relative to expected costs. The expected cost of macro hedges is calculated using the equity assumptions used in the valuation of insurance and investment contract liabilities.
 - Gains (charges) on higher (lower) fixed income reinvestment rates assumed in the valuation of insurance and investment contract liabilities.
 - Gains (charges) on sale of AFS bonds and open derivatives not in hedging relationships in the Corporate and Other segment.
2. Net favourable investment-related experience in excess of \$400 million per annum or net unfavourable investment-related experience on a year-to-date basis. As noted above, the \$400 million threshold represents our through-the-business cycle estimate of net favourable investment-related experience we reasonably expect to achieve annually based on historical experience. Investment-related experience relates to fixed income trading, alternative long-duration asset returns, credit experience and asset mix changes. This favourable and unfavourable investment-related experience is a combination of reported investment experience as well as the impact of investing activities on the measurement of our policy liabilities.
3. Mark-to-market gains or losses on assets held in the Corporate and Other segment other than gains on AFS equities and seed money investments in new segregated or mutual funds.
4. Changes in actuarial methods and assumptions. As noted in the Critical Accounting and Actuarial Policies section above, policy liabilities for IFRS are valued in Canada under standards established by the Actuarial Standards Board. The standards require a comprehensive review of actuarial methods and assumptions to be performed annually. The review is designed to reduce the Company's exposure to uncertainty by ensuring assumptions for both asset related and liability related risks remain appropriate and is accomplished by monitoring experience and selecting assumptions which represent a current best estimate view of expected future experience, and margins that are appropriate for the risks assumed. By excluding the results of the annual reviews, core earnings assists investors in evaluating our operational performance and comparing our operational performance from period to period with other global insurance companies because the associated gain or loss is not reflective of current year performance and not reported in net income in most actuarial standards outside of Canada.
5. The impact on the measurement of policy liabilities of changes in product features or new reinsurance transactions, if material.
6. Goodwill impairment charges.
7. Gains or losses on disposition of a business.
8. Material one-time only adjustments, including highly unusual/extraordinary and material legal settlements or other items that are material and exceptional in nature.
9. Tax on the above items.
10. Impact of enacted or substantially enacted income tax rate changes.

Core return on common shareholders' equity ("core ROE") is a non-GAAP profitability measure that presents core earnings available to common shareholders as a percentage of the capital deployed to earn the core earnings. The Company calculates core ROE using average common shareholders' equity.

Diluted core earnings per common share is core earnings available to common shareholders expressed per diluted weighted average common share outstanding.

The Company also uses financial performance measures that are prepared on a **constant currency basis**, which are non-GAAP measures that exclude the impact of currency fluctuations (from local currency to Canadian dollars at a total company level and from local currency to U.S. dollars in Asia). Amounts stated on a constant currency basis in this report are calculated, as appropriate, using the income statement and balance sheet exchange rates effective for the fourth quarter of 2016. Measures that are reported on a constant currency basis include growth in sales, gross flows and assets under management and administration.

Premiums and deposits is a non-GAAP measure of top line growth. The Company calculates premiums and deposits as the aggregate of (i) general fund premiums, net of reinsurance, reported as premiums on the Consolidated Statements of Income and investment contract deposits, (ii) segregated fund deposits, excluding seed money, ("deposits from policyholders"), (iii) mutual fund deposits, (iv) deposits into institutional advisory accounts, (v) premium equivalents for "administration services only" group benefit contracts ("ASO premium equivalents"), (vi) premiums in the Canadian Group Benefits reinsurance ceded agreement, and (vii) other deposits in other managed funds.

Premiums and deposits

(\$ millions)	Quarterly Results		Full Year Results	
	4Q16	4Q15	2016	2015
Net premium income and investment contract deposits	\$ 7,019	\$ 6,740	\$ 27,795	\$ 24,125
Deposits from policyholders	7,620	7,740	30,504	30,495
Mutual fund deposits	20,806	18,361	75,040	66,104
Institutional advisory account deposits	10,711	5,972	18,280	22,148
ASO premium equivalents	833	833	3,318	3,325
Group Benefits ceded premiums	1,095	1,051	4,693	4,296
Other fund deposits	143	140	536	510
Total premiums and deposits	48,227	40,837	160,166	151,003
Currency impact	–	35	473	4,073
Constant currency premiums and deposits	\$ 48,227	\$ 40,872	\$ 160,639	\$ 155,076

Assets under management and administration (“AUMA”) is a non-GAAP measure of the size of the Company. It is comprised of the non-GAAP measures assets under management (“AUM”), which includes both assets of general account and external client assets for which we provide investment management services, and assets under administration (“AUA”), which includes assets for which we provide administrative services only. Assets under management and administration is a common industry metric for WAM businesses.

Assets under management and administration

As at December 31, (\$ millions)	2016	2015
Total invested assets	\$ 321,869	\$ 307,506
Segregated funds net assets	315,177	313,249
Assets under management per financial statements	637,046	620,755
Mutual funds	170,930	160,020
Institutional advisory accounts (excluding segregated funds)	77,661	68,940
Other funds	8,985	7,552
Total assets under management	894,622	857,267
Other assets under administration	82,433	77,909
Currency impact	–	(17,459)
Constant currency assets under management and administration	\$ 977,055	\$ 917,717

Capital The definition we use for capital, a non-GAAP measure, serves as a foundation of our capital management activities at the MFC level. For regulatory reporting purposes, the numbers are further adjusted for various additions or deductions to capital as mandated by the guidelines used by OSFI. Capital is calculated as the sum of: (i) total equity excluding accumulated other comprehensive income (“AOCI”) on cash flow hedges; and (ii) liabilities for preferred shares and capital instruments.

Capital

As at December 31, (\$ millions)	2016	2015
Total equity	\$ 42,823	\$ 41,938
Adjusted for AOCI loss on cash flow hedges	(232)	(264)
Total equity excluding AOCI on cash flow hedges	43,055	42,202
Add liabilities for capital instruments	7,180	7,695
Total capital	\$ 50,235	\$ 49,897

Core EBITDA is a non-GAAP measure which Manulife uses to better understand the long-term earnings capacity and valuation of the business on a more comparable basis to how global asset managers are measured. Core EBITDA presents core earnings before the impact of interest, taxes, depreciation, and amortization. Core EBITDA was selected as a key performance indicator for WAM businesses, as EBITDA is widely used among asset management peers, and core earnings is a primary profitability metric for the Company overall.

Wealth and Asset Management

For the years ended December 31, (\$ millions)	2016	2015
Core EBITDA	\$ 1,167	\$ 1,224
Amortization of deferred acquisition costs and other depreciation	336	327
Amortization of deferred sales commissions	103	106
Core earnings before income taxes	728	791
Core income tax (expense) recovery	(99)	(161)
Core earnings	\$ 629	\$ 630

Embedded value (“EV”) is a measure of the present value of shareholders’ interests in the expected future distributable earnings on in-force business reflected in the Consolidated Statement of Financial Position of Manulife, excluding any value associated with future new business. EV is calculated as the sum of the adjusted net worth and the value of in-force business. The adjusted net worth is the IFRS shareholders’ equity adjusted for goodwill and intangibles, fair value of surplus assets, the carrying value of debt and preferred shares, and local statutory balance sheet, regulatory reserve, and capital for Manulife’s Asian business. The value of in-force business in Canada and the U.S. is the present value of expected future IFRS earnings on in-force business less the present value of the cost of holding capital to support the in-force business under the MCCR framework. The value of in-force business in Asia reflects local statutory earnings and capital requirements. The value of in-force excludes Manulife’s WAM, Bank and Property and Casualty Reinsurance businesses.

New business value (“NBV”) is the change in embedded value as a result of sales in the reporting period. NBV is calculated as the present value of shareholders’ interests in expected future distributable earnings, after the cost of capital, on actual new business sold in the period using assumptions that are consistent with the assumptions used in the calculation of embedded value. NBV excludes businesses with immaterial insurance risks, such as Manulife’s wealth and asset management businesses and Manulife Bank and the short-term Property and Casualty Reinsurance business. NBV is a useful metric to evaluate the value created by the Company’s new business franchise.

New business value margin is calculated as NBV divided by annualized premium equivalents (“APE”) excluding non-controlling interests. APE is calculated as 100% of annualized first year premiums for recurring premium products, and as 10% of single premiums for single premium products. Both NBV and APE used in the NBV margin calculation are after non-controlling interests and exclude wealth and asset management, Bank and Property and Casualty Reinsurance businesses. The NBV margin is a useful metric to help understand the profitability of our new business.

Sales are measured according to product type:

For individual insurance, sales include 100% of new annualized premiums and 10% of both excess and single premiums. For individual insurance, new annualized premiums reflect the annualized premium expected in the first year of a policy that requires premium payments for more than one year. Single premium is the lump sum premium from the sale of a single premium product, e.g. travel insurance. Sales are reported gross before the impact of reinsurance.

For group insurance, sales include new annualized premiums and administrative services only premium equivalents on new cases, as well as the addition of new coverages and amendments to contracts, excluding rate increases.

For Asia, annualized premium equivalent (“APE”) sales is comprised of 100% of regular premiums/deposits and 10% of single premiums/deposits for both insurance and other wealth products. APE sales are presented for our Asia division as this metric is widely used by insurance companies in Asia.

Other Wealth sales include all new deposits into variable and fixed annuity contracts. As we discontinued sales of new Variable Annuity contracts in the U.S. in 1Q13, subsequent deposits into existing U.S. Variable Annuity contracts are not reported as sales. Asia variable annuity deposits are included in APE sales.

Bank new lending volumes include bank loans and mortgages authorized in the period.

Gross flows is a new business measure presented for WAM businesses and includes all deposits into the Company’s mutual funds, college savings 529 plans, group pension/retirement savings products, private wealth and institutional asset management products. Gross flows is a common industry metric for WAM businesses as it provides a measure of how successful the businesses are at attracting assets.

Net flows is presented for our WAM businesses and includes gross flows less redemptions for our mutual funds, college savings 529 plans, group pension/retirement savings products, private wealth and institutional asset management products. Net flows is a common industry metric for WAM businesses as it provides a measure of how successful the businesses are at attracting and retaining assets.

Additional Disclosures

Contractual Obligations

In the normal course of business, the Company enters into contracts that give rise to obligations fixed by agreement as to the timing and dollar amount of payment.

As at December 31, 2016, the Company's contractual obligations and commitments are as follows:

Payments due by period (\$ millions)	Total	Less than 1 year	1 to 3 years	3 to 5 years	After 5 years
	Long-term debt ⁽¹⁾	\$ 10,139	\$ 299	\$ 1,522	\$ 1,076
Liabilities for capital instruments ⁽¹⁾	14,413	271	520	472	13,150
Investment commitments	7,505	2,933	2,164	1,312	1,096
Operating leases	966	135	188	138	505
Insurance contract liabilities ⁽²⁾	729,227	9,913	13,490	18,071	687,753
Investment contract liabilities ⁽¹⁾	5,575	301	558	519	4,197
Deposits from Bank clients	17,919	15,157	1,936	826	—
Other	3,599	408	350	2,632	209
Total contractual obligations	\$ 789,343	\$ 29,417	\$ 20,728	\$ 25,046	\$ 714,152

⁽¹⁾ The contractual payments include principal, interest and distributions. The contractual payments reflect the amounts payable from January 1, 2017 up to and including the final contractual maturity date. In the case of floating rate obligations, the floating rate index is based on the interest rates as at December 31, 2016 and is assumed to remain constant to the final contractual maturity date. The Company may have the contractual right to redeem or repay obligations prior to maturity and if such right is exercised, total contractual obligations paid and the timing of payment could vary significantly from the amounts and timing included in the table.

⁽²⁾ Insurance contract liabilities cash flows include estimates related to the timing and payment of death and disability claims, policy surrenders, policy maturities, annuity payments, minimum guarantees on segregated fund products, policyholder dividends, commissions and premium taxes offset by contractual future premiums on in-force contracts. These estimated cash flows are based on the best estimate assumptions used in the determination of insurance contract liabilities. These amounts are undiscounted and reflect recoveries from reinsurance agreements. Due to the use of assumptions, actual cash flows may differ from these estimates (see "Policy Liabilities"). Cash flows include embedded derivatives measured separately at fair value.

Legal and Regulatory Proceedings

The Company is regularly involved in legal actions, both as a defendant and as a plaintiff. The legal actions where the Company is a party ordinarily involve its activities as a provider of insurance protection and wealth management products, relating to reinsurance, or in its capacity as an investment adviser, employer and taxpayer. Other life insurers and asset managers, operating in the jurisdictions in which the Company does business, have been subject to a wide variety of other types of actions, some of which resulted in substantial judgments or settlements against the defendants; it is possible that the Company may become involved in similar actions in the future. In addition, government and regulatory bodies in Canada, the United States, Asia and other jurisdictions where the Company conducts business regularly make inquiries and, from time to time, require the production of information or conduct examinations concerning the Company's compliance with, among other things, insurance laws, securities laws, and laws governing the activities of broker-dealers.

Two class actions against the Company were certified and pending in Quebec and Ontario. The actions were based on allegations that the Company failed to meet its disclosure obligations related to its exposure to market price risk in its segregated funds and variable annuity guaranteed products. On January 31, 2017, we announced we reached an agreement to settle both of these class actions for a total payment of \$69 million. The entire payment is covered by insurance and the Company made no admission of liability. The settlement agreement is subject to approval by both the Ontario and Quebec Courts.

Two putative class actions against JHUSA are pending, one in New York and one in California in which claims are made that JHUSA breached, and continues to breach, the contractual terms of certain universal life policies issued between approximately 1990 and 2006 by including impermissible charges in its cost of insurance ("COI") calculations. The Company believes that its COI calculations have been, and continue to be, in accordance with the terms of the policies and intends to vigorously defend these actions. Both cases are in the discovery stage and it is premature to attempt to predict any likely outcome or range of outcomes for these matters.

Quarterly Financial Information

The following table provides summary information related to our eight most recently completed quarters:

As at and for the three months ended (\$ millions, except per share amounts or otherwise stated)	Dec 31, 2016	Sept 30, 2016	Jun 30, 2016	Mar 31, 2016	Dec 31, 2015	Sept 30, 2015	Jun 30, 2015	Mar 31, 2015
Revenue								
Premium income								
Life and health insurance	\$ 6,093	\$ 5,950	\$ 5,497	\$ 5,728	\$ 5,331	\$ 5,092	\$ 4,708	\$ 4,589
Annuities and pensions	908	1,247	1,209	1,000	1,381	1,141	869	814
Premiums ceded, net of ceded commission and additional consideration relating to Closed Block reinsurance transaction	–	–	–	–	–	(7,996)	–	–
Net premium income	7,001	7,197	6,706	6,728	6,712	(1,763)	5,577	5,403
Investment income	3,309	3,568	3,213	3,300	2,899	2,708	3,216	2,642
Realized and unrealized gains (losses) on assets supporting insurance and investment contract liabilities ⁽¹⁾	(16,421)	771	7,922	8,862	(1,916)	3,672	(10,161)	5,343
Other revenue	2,637	2,921	2,794	2,829	2,694	2,487	2,491	2,426
Total revenue	\$ (3,474)	\$ 14,457	\$ 20,635	\$ 21,719	\$ 10,389	\$ 7,104	\$ 1,123	\$ 15,814
Income (loss) before income taxes	\$ (285)	\$ 1,314	\$ 947	\$ 1,353	\$ 136	\$ 988	\$ 650	\$ 844
Income tax (expense) recovery	450	(117)	(231)	(298)	76	(316)	28	(116)
Net income	\$ 165	\$ 1,197	\$ 716	\$ 1,055	\$ 212	\$ 672	\$ 678	\$ 728
Net income attributed to shareholders	\$ 63	\$ 1,117	\$ 704	\$ 1,045	\$ 246	\$ 622	\$ 600	\$ 723
Reconciliation of core earnings to net income attributed to shareholders								
Total core earnings ⁽²⁾	\$ 1,287	\$ 996	\$ 833	\$ 905	\$ 859	\$ 870	\$ 902	\$ 797
Other items to reconcile net income attributed to shareholders to core earnings								
Investment-related experience in excess of amounts included in core earnings	–	280	60	(340)	(361)	(169)	77	(77)
Direct impact of equity markets, interest rates and variable annuity guarantee liabilities	(1,202)	414	(170)	474	(29)	232	(309)	13
Impact of major reinsurance transactions, in-force product changes and recapture of reinsurance treaties	–	–	–	–	(52)	–	–	12
Change in actuarial methods and assumptions	(10)	(455)	–	12	(97)	(285)	(47)	(22)
Net impact of acquisitions and divestitures	(25)	(23)	(19)	(14)	(39)	(26)	(54)	(30)
Tax-related items	(2)	2	–	1	2	–	31	30
Other items	15	(97)	–	7	(37)	–	–	–
Net income attributed to shareholders	\$ 63	\$ 1,117	\$ 704	\$ 1,045	\$ 246	\$ 622	\$ 600	\$ 723
Basic earnings per common share	\$ 0.01	\$ 0.55	\$ 0.34	\$ 0.51	\$ 0.11	\$ 0.30	\$ 0.29	\$ 0.36
Diluted earnings per common share	\$ 0.01	\$ 0.55	\$ 0.34	\$ 0.51	\$ 0.11	\$ 0.30	\$ 0.29	\$ 0.36
Segregated funds deposits	\$ 8,247	\$ 8,291	\$ 7,899	\$ 8,693	\$ 8,324	\$ 8,401	\$ 7,790	\$ 8,270
Total assets (in billions)	\$ 721	\$ 742	\$ 725	\$ 696	\$ 703	\$ 682	\$ 657	\$ 687
Weighted average common shares (in millions)	1,974	1,973	1,972	1,972	1,972	1,971	1,971	1,936
Diluted weighted average common shares (in millions)	1,980	1,976	1,976	1,976	1,977	1,977	1,992	1,959
Dividends per common share	\$ 0.185	\$ 0.185	\$ 0.185	\$ 0.185	\$ 0.170	\$ 0.170	\$ 0.170	\$ 0.155
CDN\$ to US\$1 – Statement of Financial Position	1.3426	1.3116	1.3009	1.2970	1.3841	1.3394	1.2473	1.2682
CDN\$ to US\$1 – Statement of Income	1.3343	1.3050	1.2889	1.3724	1.3360	1.3089	1.2297	1.2399

⁽¹⁾ For fixed income assets supporting insurance and investment contract liabilities and for equities supporting pass-through products and derivatives related to variable hedging programs, the impact of realized and unrealized gains (losses) on the assets is largely offset in the change in insurance and investment contract liabilities.

⁽²⁾ Core earnings is a non-GAAP measure. See "Performance and Non-GAAP Measures" above.

Selected Annual Financial Information

As at and for the years ended December 31,

(\$ millions, except per share amounts)

	2016	2015	2014
Revenue			
Asia Division	\$ 19,294	\$ 14,002	\$ 11,958
Canadian Division	12,707	10,065	13,773
U.S. Division	20,558	9,949	28,733
Corporate and Other	778	414	(76)
Total revenue	\$ 53,337	\$ 34,430	\$ 54,388
Total assets	\$ 720,681	\$ 702,871	\$ 579,406
Long-term financial liabilities			
Long-term debt	\$ 5,696	\$ 1,853	\$ 3,885
Liabilities for preferred shares and capital instruments	7,180	7,695	5,426
Total financial liabilities	\$ 12,876	\$ 9,548	\$ 9,311
Dividend per common share	\$ 0.74	\$ 0.665	\$ 0.57
Cash dividend per Class A Share, Series 1 ⁽¹⁾	–	0.5125	1.025
Cash dividend per Class A Share, Series 2	1.1625	1.1625	1.16252
Cash dividend per Class A Share, Series 3	1.125	1.125	1.125
Cash dividend per Class A Share, Series 4 ⁽²⁾	–	–	0.825
Cash dividend per Class 1 Share, Series 1 ⁽³⁾	–	–	1.05
Cash dividend per Class 1 Share, Series 3 ⁽⁴⁾	0.7973	1.05	1.05
Cash dividend per Class 1 Share, Series 4 ⁽⁴⁾	0.2431	–	–
Cash dividend per Class 1 Share, Series 5	1.10	1.10	1.10
Cash dividend per Class 1 Share, Series 7	1.15	1.15	1.15
Cash dividend per Class 1 Share, Series 9	1.10	1.10	1.10
Cash dividend per Class 1 Share, Series 11	1.00	1.00	1.00
Cash dividend per Class 1 Share, Series 13	0.95	0.95	0.95
Cash dividend per Class 1 Share, Series 15	0.975	0.975	0.792021
Cash dividend per Class 1 Share, Series 17	0.975	0.975	0.336575
Cash dividend per Class 1 Share, Series 19	0.95	0.9884	–
Cash dividend per Class 1 Share, Series 21 ⁽⁵⁾	1.1411	–	–
Cash dividend per Class 1 Share, Series 23 ⁽⁶⁾	–	–	–

⁽¹⁾ On June 19, 2015, MFC redeemed all of its 14 million outstanding Class A Shares Series 1.

⁽²⁾ On June 19, 2014, MFC redeemed all of its 18 million outstanding Class A Shares Series 4.

⁽³⁾ On September 19, 2014, MFC redeemed all of its 14 million outstanding Class 1 Shares Series 1.

⁽⁴⁾ 1,664,169 of 8,000,000 Series 3 Shares were converted, on a one-for-one basis, into Series 4 Shares on June 20, 2016. 6,335,831 Series 3 Shares remain outstanding.

⁽⁵⁾ On February 25, 2016, MFC issued 16 million of Series 21 Shares and on March 3, 2016, MFC issued an additional 1 million Series 21 Shares pursuant to the exercise in full by the underwriters of their option to purchase additional Series 21 Shares.

⁽⁶⁾ On November 22, 2016, MFC issued 19 million of Non-cumulative Rate Reset Class 1 Shares Series 23. No dividends were paid in 2016.

Additional Information Available

Additional information relating to Manulife, including MFC's Annual Information Form, is available on the Company's website at www.manulife.com and on SEDAR at www.sedar.com.

Outstanding Shares – Selected Information

Common Shares

As at February 3, 2017, MFC had 1,975,685,118 common shares outstanding.