Manulife

2019
Report to policyholders

The Manufacturers Life Insurance Company

Annual Meeting
May 7, 2020

Important information for policyholders
Your participation is important. Please take a few minutes to read this document and vote.

The Manufacturers Life Insurance Company

The Manufacturers Life Insurance Company ("MLI") is a Canadian life insurance company and a wholly owned subsidiary of Manulife Financial Corporation ("MFC"), a publicly traded company. MLI and its subsidiaries (collectively "Manulife" or the "Company") is a leading international financial services group that helps people make their decisions easier and lives better. The Company provides financial advice, insurance, and wealth and asset management solutions for individuals, groups, and institutions. The Company's principal operations in Asia, Canada, and the United States are where we have served customers for more than 100 years. The Company operates as Manulife across our offices in Canada, Asia, and Europe, and primarily as John Hancock in the United States.

Our Mission

Decisions made *easier*.
Lives made *better*.

Ratings

Financial strength is a key factor in generating new business, maintaining and expanding distribution relations, and providing a base for expansion, acquisition, and growth.

The Manufacturers Life Insurance Company's financial strength ratings are among the strongest in the life insurance industry.

As at December 31, 2019.

Rating Agency	Rating	
A.M. Best Company	A+	(Superior – 2nd of 13 ratings)
DBRS Limited	AA (low)	(Excellent – 4th of 22 ratings)
Fitch Ratings Inc.	AA-	(Very Strong – 4th of 21 ratings)
Moody's Investors Service Inc.	A1	(Low Credit Risk – 5th of 21 ratings)
S&P Global Ratings	AA-	(Very Strong – 4th of 21 Ratings)

Letter to policyholders from **John Cassaday** *Chairman of the Board*

To policyholders,

Your Board is committed to providing guidance and oversight to management in order to position Manulife for future success. We endeavour to ensure the company's strategic plans and priorities create value and align with our risk appetite. Always doing the right thing for our customers, policyholders, employees, and other stakeholders is job one.

Looking back on 2019, we are proud of the progress made by Roy Gori, President and CEO, and Manulife's Executive Leadership Team (ELT), who led the company through another year of successful transformation guided by our six core values. Indeed, their success was driven by the team's ability to consistently execute with excellence, delivering steady and significant progress against its strategy. We did what we said we would do.

Importantly, Manulife is keenly focused not just on what it achieves, but also on *how* it achieves success. Collectively, we are stressing a culture of acting with integrity and following words with actions. We are confident that this tone from the top is cascading through the organization.

Case in point of this leadership by example is how the company manages expenses, travel policies, and office plans. Roy and the team have made it clear that everyone plays a role in driving our efficiency initiatives and ensured that new policies put in place to manage expenses apply to employees at all levels; travel policies are common across the board; and Roy and the ELT were the first cohort to move to open-plan seating in our headquarters early last year when the company transitioned its real estate plans to foster collaboration and make even better use of space. That is leadership.

True and lasting progress is often made in small ways, and these examples give your Board the utmost confidence that Manulife is fostering the right culture and values as it navigates its business transformation—and importantly has the right people in place to succeed.

Your Board's activities throughout 2019

Your Board spent much of the year focused on examining the company's strategy, goals, and progress towards its bold ambition of becoming the most digital, customer-centric global company in our industry. This included frequent conversations with our Executive Leadership Team members to ensure we understood and could oversee all areas of the business effectively.

During our meetings with the team throughout the year, in addition to our regular business progress discussions, we increased time spent on environmental, social, and governance factors that impact the business. These factors continue to grow in prominence as more companies grapple with the impact their operations have on the world. As a responsible corporate citizen, Manulife is keenly aware of the need to deliver value to all stakeholders, including our communities, and to reduce our impact on the environment. To that end, Manulife Investment Management has signed its name to the UN-sponsored Principles for Responsible Investment. We are also a founding member of Climate Action 100+, a five-year initiative that includes more than 370 investors from around the world responsible for more than US$35 trillion in investor capital, making it the largest investor-led collaborative initiative of its kind.

As noted earlier, an open, diverse, and inclusive culture, anchored around values that employees live and breathe every day, is a key driver of success. Your Board also dedicated significant time in 2019 to understanding how management is strengthening and nurturing that culture at Manulife. Along with ensuring that leadership is accountably signalling and modelling the right behaviour every day, we learned about the investments the company is making to ensure its employees have the right skills training and development opportunities available.

We onboarded two new directors in 2019 to ensure the Board continues to enhance and diversify its skillset and broaden its scope of experience. Julie Dickson, a former Superintendent of the Office of the Superintendent of Financial Institutions (OSFI), Canada's main financial services regulator, brings a depth of industry and risk management experience to your Board. Guy Bainbridge, a former partner with global professional services firm KPMG, has a wealth of audit expertise, having served as a key audit leader for several of the U.K.'s and Asia's largest financial institutions. We're honoured they've agreed to join our Board and look forward to their many contributions in service of our company.

Thank you

In closing, we would like to thank directors Tom Jenkins and Lesley Webster who will be retiring from our Board as of the end of this year's annual meeting. We appreciate the many contributions they both made during their terms.

We would also like to convey our deep appreciation to Roy and his leadership team. Their commitment to achieving success with accountability and integrity is critical in delivering on Manulife's mission of making decisions easier and lives better for the customers, communities, and employees we serve.

And, we would like to thank every Manulife employee around the world for the passion they've shown in rallying around our mission, strategy, and values, and for their daily contributions to our customers and our business.

As a new decade dawns, your Board would like to thank you, our policyholders, for your trust and support. Within the organization, there is a palpable sense of energy, excitement, and optimism about the future. We look forward to serving you in 2020 and beyond.

Sincerely,

John Cassaday
Chairman of the Board

Letter to policyholders from **Roy Gori**
President and Chief Executive Officer

Dear policyholders,

Our mission, "Decisions made easier. Lives made better," drives our 35,000 colleagues every day in serving our customers and supporting our communities. It's why we provide products that help people protect their families, live healthier lives, and save for a more secure future. But we know that having a mission statement that simply hangs on an office wall does not define success. We must *live* it every day.

Sometimes, that means helping customers file claims, submit forms, choose investments, and plan for major life events. Other times, it means being there in times of need for our customers, especially when they face unimaginable tragedy and loss.

That's what happened in the aftermath of the January 2020 plane crash of Ukrainian International Airlines Flight PS752, which took the lives of all 176 people on board. Manulife customers were among the passengers on that plane, and when the news broke, our teams took action to pay out claims as soon as possible.

As one of our employees said, a crisis like this really brings you to your knees. However, the emotion we felt was nothing compared to the overwhelming grief felt by those who had lost family members that day. We quickly searched our databases to get a full view of the impacted customers and their policies. Then, we reached out directly to their families to let them know we had everything in hand.

Kourosh Doustshenas lost his fiancée, Dr. Forough Khadem, and shared this after speaking with our team: "She brought so much life and joy into the world. I was relieved that I had help in dealing with her affairs during such a heartbreaking time. It has been a true gift."

We may not be able to ease the pain felt by our customers in moments like this. However, supporting them by sharing our humanity and always being there when we're needed most—that's an example of how our mission comes to life and how we strive to be a caring, trustworthy, values-driven organization that does what it says and delivers on its promises.

Looking back on 2019, I'm proud to share we posted another year of solid results. We delivered on our commitments across our five strategic priorities and demonstrated our ability to consistently execute as we transform Manulife into the most digital, customer-centric global company in our industry.

Serving our customers

We proudly served nearly 30 million customers globally in 2019 as we continued to provide compelling ways to meet their needs. A great example is the expansion of our behavioural insurance offerings, Manulife *Vitality*, John Hancock Vitality, and ManulifeMOVE. These products embody our focus on making lives better as they reward our customers for healthy habits, like exercising and eating well. In Asia, we introduced ManulifeMOVE in Vietnam and Cambodia, and doubled enrollment across the region. The introduction of Manulife *Vitality* to our Individual Health and Group Benefits customers in Canada was met with great enthusiasm. And in the U.S., we are changing the lives of people with diabetes with the launch of John Hancock Aspire, which combines financial protection with personalized diabetes support.

In our Global Wealth and Asset Management business, we entered into a joint venture agreement with Mahindra Finance in India, with the goal of becoming a leading provider of retail investment solutions in that country. And we launched an industry-first, voice-enabled retirement product using Alexa for customers in the U.S.

We also made steady progress in how we are supporting our customers. In Canada, we saw 3.9 million more claims submitted digitally, and with our Group Benefits business also moving to paperless claims, we are on track to eliminate 4.2 million cheques and benefits statements as well. In Asia, we launched Hong Kong's first all-digital cashless service, which enables customers to obtain speedy pre-approval for most common claims, and we expanded our eClaims platform across the region. What's most gratifying is our customers' feedback, with the Net Promoter Scores in Asia increasing as a result of these changes.

We set an ambitious goal of improving our Net Promoter Scores (NPS) by 30 points across the company by 2022, knowing that passionate customers are more likely to recommend Manulife and stay with us. As we closed the year, we were pleased to see our NPS up 7 points from our 2017 levels. By leveraging human-centred design and technology, we'll continue to enhance our customer experience.

> "We know the key to continued success is consistency and executional excellence in all we do. It's why we will remain steadfastly focused on the five strategic priorities we set out at the start of our transformation."

Engaging our employees

I am exceptionally proud of the commitment and winning mindset of our colleagues, as it's their enthusiasm for delivering for our customers that is fuelling our success. As I shared with you last year, we've been challenging ourselves to bring an insurgent mindset to all we do. Instead of asking, "Does this process, product, or policy work for our customers?" we are asking, "Does this work as well as it possibly can or is there a better way?" This future-focused approach is encouraging all of us to look for ways to continuously improve what we do and we're investing in helping our colleagues build new skills and capabilities to do that. Our focus on making the future better is resonating with our team, as we saw increased engagement across the company last year.

Actively cultivating a diverse and inclusive workplace is also a key contributor to engagement. When all employees are inspired to bring their authentic and whole selves to work, they get the opportunity to thrive personally and professionally. Through our employee resource groups, we are sponsoring activities that enable us to build closer connections, to learn about each others' perspectives, and to live our "Share your humanity" value every day. Our efforts earned us recognition as one of Canada's Best Diversity Employers for the past two years.

Tata, one of our colleagues in Indonesia, had limited education, no work experience, and was coping with a physical disability when she applied for a direct marketing position with Manulife. Her great attitude and desire to assert her independence in life made her a standout candidate and she was invited to join our team. Since she's been with us, Tata has received numerous awards, including being nominated as a top colleague four times in a row. In her own words, "To be able to work in Manulife Indonesia is truly a dream come true for me."

Her story shows what's possible when passion meets opportunity to create a unique company culture, and I firmly believe our people and the teamwork we're building will continue to be a competitive advantage for us globally.

Caring for our communities

There is no denying the impact of climate change is significant and has implications for every community and business globally. To bring about sustained change, it's clear this will require all stakeholders to work together. We're proud to be doing our part, with our colleagues taking steps to make progress on many fronts, and we know much still remains to be done.

We established a climate change working group that reports to our Executive Sustainability Council, whose mandate includes identifying climate change risks and opportunities across the organization. We are proud to have served as a leading arranger and provider of financing for the renewable power sector in North America, having invested over $13.6 billion in wind and solar energy and energy efficiency since 2002. We're also sustainably managing our real estate, timber, and agriculture assets. For example, over 48 million square feet, or 80%, of our global real estate portfolio has been certified to a green building standard.

Our commitment to sustainability extends beyond environmental considerations. From helping underserved communities in Canada, to providing support for deserving students through our Martin Luther King

Our five *strategic priorities*

Portfolio Optimization

We are actively managing our legacy businesses to improve returns and cash generation while reducing risk.

Expense Efficiency

We are getting our cost structure into fighting shape and simplifying and digitizing our processes to position us for efficient growth.

Accelerate Growth

We are accelerating growth in our highest-potential businesses.

Digital, Customer Leader

We are improving our customer experiences, using digitization and innovation to put customers first.

High-Performing Team

We are building a culture that drives our priorities.

scholarships in the U.S., to improving financial literacy in the Philippines, we are involved in a range of efforts designed to help people learn and grow to fulfill their aspirations. We're also proud of the work we have done globally in support of important community needs, directly making or helping to raise over $46 million in community contributions, along with our employees and agents volunteering approximately 66,000 hours of service to make a difference. Identifying ways to help make the world a better place will continue to be a key focus for us. It's also a personal passion for me, our leadership team, and our Board, so we are looking forward to continuing to build on our progress in the year to come.

Delivering strong results

Despite significant market volatility, global trade tensions, and other geopolitical events, we continued to sustainably grow net income, free up capital so it can be put to best use, and grow our highest-potential businesses while maintaining discipline on costs.

We released a total of $5.1 billion of capital from our legacy businesses by the end of 2019 and are pleased to have achieved our 2022 target three years ahead of schedule.

Thanks to the ongoing trust and confidence of our customers around the world, our assets continued to grow, finishing the year at $1.2 trillion of assets under management and administration. This is up 13% from last year.

Our results in 2019 were strong. We are working hard to deliver on our bold ambition and transform Manulife into the most digital, customer-centric global company in our industry.

Thank you

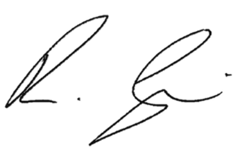
One of our values, "Get it done together," is an apt description for how we have been able to accomplish so much in 2019. I am incredibly grateful for the leadership, positive mindset, and adaptability of our team. We are also so fortunate to have the counsel and support of our distinguished Board members, whose experience and guidance have helped us on many fronts.

I want to extend a special thank you to our Chairman of the Board, John Cassaday, for his continued dedication, candor, and sound advice. I'd also like to thank you, our policyholders, for your ongoing trust and confidence in Manulife and our team.

Looking ahead, we are excited to build on the momentum of our strong achievements. We know the key to continued success is consistency and executional excellence in all we do. It's why we will remain steadfastly focused on the five strategic priorities we set out at the start of our transformation.

Our goal remains a bold one: to lead our industry. It will require us to continue to have an insurgent mindset, challenge ourselves to look for new ways to support our customers and our communities, all while adapting as needed to address new challenges and opportunities. We remain confident that we have the right plan, the right team, and the right mindset to achieve our ambition.

Sincerely,



Roy Gori
President and Chief Executive Officer

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The Manufacturers Life Insurance Company

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Report to Policyholders **2019**

Notice of annual meeting of policyholders and the sole shareholder

You're invited to attend our 2020 annual meeting of policyholders and the sole shareholder

When
May 7, 2020
11 a.m. (Eastern time)

Where
This year we will be holding our meeting by electronic means. Please see page 12 "How to vote" for details.

Four items of business

- Receiving the consolidated financial statements and auditors' reports for the year ended December 31, 2019
- Receiving the information for our participating policyholders set out in the report to policyholders
- Electing directors
- Appointing the auditors

We'll consider any other matters that are properly brought before the meeting, but we are not aware of any at this time. The annual meeting for Manulife Financial Corporation will be held at the same time.

We continue to actively monitor COVID-19 developments and directions from public health and government authorities, and have been taking a series of precautionary measures to help support the health and well-being of our employees, customers and the general public. This degree of care and concern extends to all of our stakeholders, and for that reason we have made the decision to hold our annual meeting solely by electronic means instead of in-person.

Policyholders are encouraged to vote and submit proxies prior to the meeting. Note that the form of proxy distributed to policyholders is still valid and may continue to be used to vote. For more information on voting in advance of the meeting, refer to page 12 "How to vote".

Policyholders will not be able to attend the meeting in person but are invited to view the live broadcast at manulife.com. By following the instructions on page 12 "How to vote at the meeting", policyholders and their duly appointed proxyholders will be able to ask questions and vote during the live broadcast. In order to participate in the meeting, policyholders must be connected to the internet.

By order of the board of directors,

Antonella Deo
Corporate Secretary

March 11, 2020

About this report to policyholders

We've sent this report to policyholders to you because you were a participating policyholder of The Manufacturers Life Insurance Company as of the close of business on February 14, 2020 or the sole shareholder of MLI as of the close of business on March 11, 2020.

You're entitled to receive notice of our 2020 annual meeting of policyholders and the sole shareholder.

You're entitled to vote at our 2020 annual meeting of policyholders and the sole shareholder if you were a participating policyholder of MLI as of the close of business on April 27, 2020 or the sole shareholder of MLI as of the close of business on March 11, 2020.

This report to policyholders includes important information about the meeting, the items of business to be covered and how to vote.

In this document:

- *we, us, our, company* and *MLI* mean The Manufacturers Life Insurance Company
- *you, your* and *policyholders* refer to participating policyholders of MLI
- *meeting* means our annual meeting of participating policyholders and the sole shareholder on May 7, 2020

Information in this report to policyholders is as at February 28, 2020 and in Canadian dollars, unless indicated otherwise. Any information contained in, or otherwise accessible through, websites mentioned in this report to policyholders does not form a part of this document.

Who can vote

If you were a participating policyholder as of 5 p.m. (Eastern time) on February 14, 2020 (the notice record date), you're entitled to receive notice of the meeting and if you were a participating policyholder as of 5 p.m. (Eastern time) on April 27, 2020 (the voting record date), you're entitled to vote at our 2020 annual meeting. As of February 14, 2020, we had approximately 466,193 voting policyholders and as of March 11, 2020, we had 5,638,986,460 common shares outstanding and eligible to be voted by the sole shareholder and each share carries one vote.

How to vote

There are two ways to vote – by proxy or at the meeting.

Vote by proxy You or your authorized representative must sign the proxy form. If you're a corporation or other legal entity, your authorized representative must sign the form.	You can vote in one of four ways: On the internet – Go to the website indicated on your proxy form. You'll need the personal identification/control number on the form. By phone (Canada and U.S. only) – Call the toll-free number on the proxy form and follow the instructions. You'll need the personal identification/control number on the form. By mail – Complete your proxy form and return it in the envelope provided. On your smartphone – Use the QR code found on your proxy form. Your proxy must be received by **5 p.m. (Eastern time) on May 5, 2020** for your vote to be counted. If you're mailing your proxy form, be sure to allow enough time for the envelope to be delivered. The deadline for the deposit of proxies can be waived by the Chairman at his discretion, without notice. If the meeting is adjourned, your proxy must be received by **5 p.m. (Eastern time) two business days before the meeting is reconvened.**
Vote at the meeting How policyholders can join the meeting, vote and ask questions.	Log in online at https://web.lumiagm.com/121039121. To allow policyholders the opportunity to test their internet connectivity, the link will be accessible one hour in advance of the meeting start time. Click "I have a login" and then enter the Control Number (see below) and Password "manulife2020" (Note: password is case sensitive). Voting during the live broadcast: The Control Number will allow policyholders and proxyholders to log in, vote and ask questions during the live broadcast. Any vote properly cast at the meeting will automatically revoke any proxy previously submitted. Policyholders and proxyholders who do not wish to revoke a previously submitted proxy should not vote during the live broadcast. Without a Control Number policyholders and proxyholders will only be able to log in to the meeting as a guest and will not be able to vote or ask questions (see below). Policyholders: The Control Number is located on the form of proxy included with the meeting materials. Proxyholders: As is the case for an in-person meeting, proxyholders who wish to vote and ask questions during the live broadcast must carefully follow the instructions on page 13 "More about proxy voting" and on their form of proxy to appoint themselves (or another person) as proxyholder in order to vote and ask questions during the live broadcast. The person appointed as proxyholder must then also contact AST Trust Company (Canada) at 1-866-751-6315 by 9:00 a.m. (Eastern Time) on May 6, 2020, to request a Control Number for the meeting. How guests can join the live broadcast: Log in online at https://web.lumiagm.com/121039121. To allow guests the opportunity to test their internet connectivity, the link will be accessible one hour in advance of the meeting start time. Click "I am a guest" and then complete the required fields.

Changing your vote
You can revoke your proxy form if you change your mind about how you want to vote.

Sending new instructions with a later date on how you wish to vote will revoke the instructions you previously submitted.

You can send a new proxy on the internet, by phone or by mail, by following the instructions above.

Or send a notice in writing, signed by you or your authorized representative to: Corporate Secretary, The Manufacturers Life Insurance Company, 200 Bloor Street East, Toronto, Canada M4W 1E5.

Your new proxy must be received by **5 p.m. (Eastern time) on May 5, 2020** for your vote to be counted. If you're mailing your new proxy form, be sure to allow enough time for the envelope to be delivered.

If the meeting is adjourned, your proxy must be received by **5 p.m. (Eastern time) two business days before the meeting is reconvened**.

If you miss the deadline, you can vote during the meeting by following the "Vote at the meeting" instructions above. Voting at the meeting will revoke any proxy previously submitted.

More about voting by proxy

Voting by proxy is the easiest way to vote. It means you're giving someone else (your proxyholder) the authority to attend the meeting and vote for you according to your instructions.

Roy Gori, President and Chief Executive Officer or, failing him, John M. Cassaday, Chairman (with full power of substitution) have agreed to act as MLI proxyholders to vote at the meeting according to your instructions.

About confidentiality and voting results
Our transfer agent independently counts and tabulates the votes to maintain confidentiality. A proxy form is only referred to us if it's clear that an MLI policyholder wants to communicate with the board or management, the validity of the form is in question, or the law requires it.

If you do not name a different proxyholder when you sign your form, you're authorizing Mr. Gori or Mr. Cassaday to act as your proxyholder to vote for you at the meeting according to your instructions.

If you do not indicate on the form how you want to vote your shares, Mr. Gori or Mr. Cassaday will vote:
- FOR the election of the 13 nominated directors in this report to policyholders
- FOR the appointment of Ernst & Young LLP as auditors

You can also appoint someone else to be your proxyholder – that individual does not need to be an MLI policyholder. Print the person's name in the blank space provided on the proxy form and return the form as indicated. The person appointed as proxyholder must then also contact AST Trust Company (Canada) at 1-866-751-6315 by 9:00 a.m. (Eastern Time) on May 6, 2020, to request a Control Number for the meeting. The Control Number will allow proxyholders to log in, vote and ask questions during the live broadcast. Refer to page 12 "Vote at the meeting" for details of how to log in and participate at the meeting.

If there are amendments to the items to be voted on or any other matters that are properly brought before the meeting or any adjournment, your proxyholder can vote as they see fit.

What the meeting will cover

The meeting will cover four items of business.

1. Financial statements

We'll present our 2019 consolidated financial statements and the auditors' reports on those financial statements.

2. Receive the information for participating policyholders set out in the report to policyholders

We'll present the information for our participating policyholders contained in this report to policyholders.

3. Electing directors (see page 15)

13 directors will stand for election to serve on our board until either the end of next year's annual meeting of policyholders and the sole shareholder, or earlier if they leave the board. All 13 nominated directors currently serve on the board. You can read about the nominated directors beginning on page 16. The board recommends that you vote FOR the election of each nominated director.

Policyholders' and Shareholder's Directors

The Insurance Companies Act (Canada) requires that at least one-third of the board of MLI be elected by the participating policyholders as policyholders' directors. The remaining members of the board are elected by our sole shareholder, Manulife Financial Corporation, as the sole shareholder's directors.

The 13 director nominees for the board are:

Policyholders' Director Nominees

Joseph P. Caron
John M. Cassaday
Susan F. Dabarno
Sheila S. Fraser
Andrea S. Rosen

Shareholder's Director Nominees

Ronalee H. Ambrose
Guy L.T. Bainbridge
Julie E. Dickson
Roy Gori
Tsun-yan Hsieh
Donald R. Lindsay
John R.V. Palmer
C. James Prieur

4. Appointing the auditors

Ernst & Young LLP (Ernst & Young) (or a predecessor) have acted as external auditors to MLI or an entity within the MLI group of entities since 1905. The audit committee has recommended that the board re-appoint them as our auditors for fiscal 2020 to serve until the end of our next annual meeting.

We maintain independence from the external auditors through audit committee oversight, a robust regulatory framework in Canada, including the requirement to rotate the lead audit partner at least every five years, and Ernst & Young's own internal independence procedures. The audit committee also conducts a formal review of the external auditors every year and a more comprehensive review every five years.

The audit committee believes there are benefits to having long-tenured auditors, including higher work quality because of the auditors' institutional knowledge of our business and favourable fee structures because of the efficiencies gained from experience. In addition, if we brought in new auditors, we would spend significantly more time and resources helping them become familiar with the business.

About the directors

Read about the nominated directors before you vote.

This year, 13 directors have been nominated for election to the board for a one-year term. All nominated directors were elected at our 2019 meeting, except Guy Bainbridge and Julie Dickson, who were appointed to the board in August 2019. Tom Jenkins and Lesley Webster will retire from the board on May 7, 2020.

This group of directors has the mix of skills, experience and qualifications necessary for proper oversight and effective decision-making.

Appropriate size

Number of directors

is within appropriate range for healthy debate and effective decision-making

Independent

All

the directors are independent, except the CEO

All board committee members are independent

Financially literate

100%

of the independent directors are financially literate

Qualified

All

directors bring a mix of the competencies and experience necessary for effective oversight of the company

Diverse

42%

of the independent directors are women

65

average age of the independent directors

8.3 years

average tenure of the independent directors

< 5 years 3
5-10 years 7
> 10 years 2

Key things about the board

Gender diversity

We promote gender diversity on our board and have a long-standing board diversity policy that covers age, gender, ethnicity, disability, sexual orientation and geographic representation.

> 42% of this year's nominated independent directors are women.

The board has an objective that at least 30% of the independent directors should be women, a goal we've met since 2013, and aims to achieve gender parity among the independent directors.

Term limits

Independent directors can serve on the board for up to 12 years to balance the benefit of experience with the need for new perspectives. We introduced this policy in 2013, and at the same time eliminated the mandatory retirement age of 72. The board chair can be in the role for a full five-year term regardless of the number of years the individual has been a director.

2019 attendance

The table below shows the number of board and committee meetings held in 2019 and overall attendance. Quorum for board meetings is a majority of the directors and directors are expected to attend all meetings of the board and the committees they're members of, unless there are extenuating circumstances. All directors on the board at the time attended our 2019 annual meeting of policyholders and the sole shareholder.

	Number of meetings	Overall meeting attendance
Board	6	100%
Audit committee	5	100%
Corporate governance and nominating committee	5	100%
Management resources and compensation committee	5	100%
Risk committee	5	100%

Director profiles

John M. Cassaday (Chairman)

Toronto, ON, Canada ■ Age 66 ■ Independent

Key competencies and experience

- Talent management/Executive compensation
- Technology/Operations
- Public company executive/Director
- Digital transformation/Sales/Marketing

Mr. Cassaday has strong business and senior executive experience and also serves on other public company boards. This experience qualifies him to serve as the chair of Manulife's board.

John Cassaday was appointed as Chairman of the Board on May 4, 2018. Mr. Cassaday was previously President and Chief Executive Officer of Corus Entertainment Inc., a position he held since its inception in 1999 until his retirement on March 31, 2015. Prior to Corus, Mr. Cassaday was Executive Vice President of Shaw Communications, President and Chief Executive Officer of CTV Television Network and President of Campbell Soup Company in Canada and the United Kingdom. Mr. Cassaday also serves on the board of Irving Oil Ltd. (non-public company).

Mr. Cassaday is a Fellow of the Institute of Corporate Directors, has an MBA from the Rotman School of Management at the University of Toronto as well as an Honorary Doctor of Laws from the University of Toronto, and is a Member of the Order of Canada.

2019 meeting attendance

As Chairman, Mr. Cassaday is not a member of the audit, management resources and compensation or risk committees but attends at the invitation of the respective committee chair

Board	6 of 6	100%
Board committees		
Audit	5 of 5	100%
Corporate governance and nominating	5 of 5	100%
Management resources and compensation	5 of 5	100%
Risk	5 of 5	100%

Director since April 1993

Term limit: 2023

2019 votes for: 95.22%

Public company boards
(last five years)

- Sleep Country Canada Holdings Inc., 2015-present
- Sysco Corporation, 2004-present
- Spin Master Corp., 2015-2018
- Gibraltar Growth Corporation, 2015-2017
- Corus Entertainment Inc., 1999-2015

Hon. Ronalee H. Ambrose

Calgary, AB, Canada ■ Age 50 ■ Independent

Key competencies and experience

- Finance/Accounting
- Risk management
- Technology/Operations
- Government relations/Public policy/Regulatory
- Public company executive/Director

Ms. Ambrose's extensive government sector and business experience qualify her to serve on our board and as a member of the audit committee and the corporate governance and nominating committee.

Ronalee Ambrose has been a corporate director since retiring as a Member of Parliament of Canada in July 2017. Ms. Ambrose is a former Leader of Canada's Official Opposition in the House of Commons and a former leader of the Conservative Party of Canada. She worked as Minister across nine Canadian government departments, and her service included the role of Vice Chair of the Treasury Board and chair of the cabinet committee for public safety, justice and aboriginal issues. She also served as the Minister responsible for the Status of Women, and is a recognized champion for the rights of women and girls.

In addition to serving as a corporate director, Ms. Ambrose is a Global Fellow at the Wilson Center's Canada Institute in Washington, D.C., focusing on Canada-U.S. bilateral trade and North American competitiveness issues. She also serves on the board of Coril Holdings Ltd. (a private company) and the advisory board of the Canadian Global Affairs Institute.

Ms. Ambrose has a Bachelor of Arts from the University of Victoria and a Master of Arts from the University of Alberta. She is also a graduate of the Harvard Kennedy School of Government Senior Leaders Program.

2019 meeting attendance

Board	6 of 6	100%
Board committees		
Audit	5 of 5	100%
Corporate governance and nominating	5 of 5	100%

Director since September 2017

Term limit: 2030

2019 votes for: 100%

Public company boards
(last five years)

- Andlauer Healthcare Group Inc., 2019-present
- TransAlta Corporation, 2017-present

Guy L. T. Bainbridge

Edinburgh, Midlothian, United Kingdom ■ Age 59 ■ Independent

Key competencies and experience

- Finance/Accounting
- Insurance/Reinsurance/Investment management
- Risk management
- Asia experience

Mr. Bainbridge's extensive financial and audit experience qualify him to serve on our board and as a member of the audit committee and the corporate governance and nominating committee.

Mr. Bainbridge is a former partner with KPMG LLP. He has acted as the key audit leader of several of the UK and world's largest financial institutions and served on KPMG's UK and Europe boards.

Mr. Bainbridge also serves as the audit committee chair of each of Yorkshire Building Society and ICE Clear Europe Limited (non-public companies). Mr. Bainbridge is a member of the Institute of Chartered Accountants in England and Wales and holds a Master of Arts from the University of Cambridge.

Director since August 2019

Term limit: 2032

Public company boards
(last five years)
- None

2019 meeting attendance

Board	3 of 3	100%
Board committees		
Audit	2 of 2	100%
Corporate governance and nominating	2 of 2	100%

Mr. Bainbridge joined the board on August 7, 2019.

Joseph P. Caron

West Vancouver, BC, Canada ■ Age 72 ■ Independent

Key competencies and experience

- Talent management/Executive compensation
- Asia experience
- Government relations/Public policy/Regulatory
- Public company executive/Director

Mr. Caron brings business, government and international experience to the board, providing a well rounded perspective that positions him well to serve on our board, and as a member of the audit committee and the corporate governance and nominating committee.

Joseph Caron is the former Principal and Founder of Joseph Caron Incorporated, a consulting business established in 2010 to provide strategic counsel to Asian businesses seeking to grow in Canada and Canadian businesses and organizations focused on development in Asia. His experience includes four years with HB Global Advisors Corporation, the international consulting firm of Heenan Blaikie LLP (2010 to 2013), and almost four decades with the Government of Canada where he served in a number of key diplomatic posts, including Ambassador to the People's Republic of China (2001 to 2005), Ambassador to Japan (2005 to 2008) and High Commissioner to the Republic of India (2008 to 2010). He also serves on the board of the Vancouver International Airport.

Mr. Caron holds a Bachelor of Arts in Political Science from the University of Ottawa. He holds honorary degrees from York University and Meiji Gakuin University, and has been named a Distinguished Fellow of the Asia Pacific Foundation and an Honorary Research Associate of the University of British Columbia's Institute of Asian Research.

Director since October 2010

Term limit: 2023

2019 votes for: 94.32%

Public company boards
(last five years)
- Westport Innovations Inc., 2013-2016

2019 meeting attendance

Board	6 of 6	100%
Board committees		
Audit	5 of 5	100%
Corporate governance and nominating	5 of 5	100%

Susan F. Dabarno

Bracebridge, ON, Canada ■ Age 67 ■ Independent

Key competencies and experience

- Finance/Accounting
- Insurance/Reinsurance/Investment management
- Talent management/Executive compensation
- Technology/Operations
- Asia experience
- Public company executive/Director
- Digital transformation/Sales/Marketing

Ms. Dabarno brings extensive global wealth management and financial services experience to the board and her roles in various executive capacities and accounting background qualify her to serve on our board, and as a member of the management resources and nominating committee and the risk committee.

Susan Dabarno has been a corporate director since 2011. She has extensive wealth management and distribution expertise and served from 2009 to 2010 as Executive Chair, and from 2003 to 2009 as President and Chief Executive Officer, of Richardson Partners Financial Limited, an independent wealth management services firm. Before joining Richardson Partners Financial Limited, Ms. Dabarno was President and Chief Operating Officer at Merrill Lynch Canada Inc.

She is a former director of the Toronto Waterfront Revitalization Corporation (government funded organization) and Bridgepoint Health Foundation (not-for-profit).

Ms. Dabarno is a Fellow of Chartered Professional Accountants (FCPA) and holds a Class II Diploma from McGill University.

Director since March 2013

Term limit: 2025

2019 votes for: 95.25%

Public company boards
(last five years)

- Cenovus Energy Inc., 2017-present

2019 meeting attendance

Board	6 of 6	100%
Board committees		
Management resources and compensation	5 of 5	100%
Risk	5 of 5	100%

Julie E. Dickson

Ottawa, ON, Canada ■ Age 62 ■ Independent

Key competencies and experience

- Finance/Accounting
- Insurance/Reinsurance/Investment management
- Risk management
- Government relations/Public policy/Regulatory

Ms. Dickson's extensive financial, risk and regulatory experience qualify her to serve on our board and as a member of the risk committee and the management resources and compensation committee.

Ms. Dickson is a former Superintendent of Financial Institutions, Canada, Canada's main financial services regulator. She currently serves on the Canadian Public Accountability Board, and the boards of the Dubai Financial Services Authority and the Global Risk Institute. Ms. Dickson is an Officer of the Order of Canada and holds a Bachelor of Arts from the University of New Brunswick and a Masters of Economics from Queen's University.

Director since August 2019

Term limit: 2032

Public company boards
(last five years)

- None

2019 meeting attendance

Board	3 of 3	100%
Board committees		
Management resources and compensation	1 of 1	100%
Risk	2 of 2	100%

Ms. Dickson joined the board on August 7, 2019.

Sheila S. Fraser

Ottawa, ON, Canada ■ Age 69 ■ Independent

Key competencies and experience

- Finance/Accounting
- Risk management
- Talent management/Executive compensation
- Government relations/Public policy/Regulatory
- Public company executive/Director

Ms. Fraser's extensive professional experience and her contributions to the accounting and auditing profession qualify her to serve on our board, as a member of the corporate governance and nominating committee and as chair of the audit committee. Her other board experience and international work provide an added perspective to her board and committee work.

Sheila Fraser is currently a corporate director. Ms. Fraser served as Auditor General of Canada from 2001 to 2011 and, prior to joining the Office of the Auditor General in 1999 as Deputy Auditor General, she was a partner at Ernst & Young LLP for 18 years.

Ms. Fraser's contributions to the accounting and auditing profession include her former role as a Trustee of the International Financial Reporting Standards (IFRS) Foundation and her current role as a Director on the Canadian Public Accountability Board. She has also chaired two committees of the International Organization of Supreme Audit Institutions as well as the Public Sector Accounting Board of the Canadian Institute of Chartered Accountants and was a member of the International Federation of Accountants-International Public Sector Accounting Standards Board.

She also serves on the board of the International Institute for Sustainable Development – Experimental Lakes Area (not-for-profit) as well as the board of the International Federation of Accountants (IFAC). Ms. Fraser holds a Bachelor of Commerce from McGill University. She is an Officer of the Order of Canada and is a Fellow of the Institute of Chartered Professional Accountants of Ontario and the Ordre des comptables professionnels agréés du Québec.

Director since November 2011

Term limit: 2024

2019 votes for: 95.10%

Public company boards
(last five years)

- Bombardier Inc., 2012-2017

2019 meeting attendance

Board	6 of 6	100%
Board committees		
Audit (chair)	5 of 5	100%
Corporate governance and nominating	5 of 5	100%

Roy Gori (President and Chief Executive Officer)

Toronto, ON, Canada ■ Age 50 ■ Not independent (management)

Key competencies and experience

- Finance/Accounting
- Insurance/Reinsurance/Investment management
- Risk management
- Talent management/Executive compensation
- Technology/Operations
- Asia experience
- Public company executive/Director
- Digital transformation/Sales/Marketing

Roy Gori is the President and Chief Executive Officer of Manulife, Canada's largest insurance company, and one of the largest insurance and asset management companies in the world. Appointed in 2017, Roy's early tenure as CEO has been marked by the introduction of a clear strategy and values that build on Manulife's strong foundations to include sharper focus on the customer and a shift to digital innovation, in line with the company's mission to make customers' decisions easier, and lives better.

As a champion for diversity and inclusion, Roy is the Chair of Manulife's D&I Council. He is also a passionate advocate for health and wellness, promoting the benefits of behavioural insurance through award-winning products like Manulife Vitality and Manulife MOVE.

Roy joined Manulife as President and Chief Executive Officer for Asia in 2015. In that role, he was responsible for operations in 12 markets across Asia, driving Manulife's rapidly growing business in the region. Roy started his career at Citibank in 1989, where he held progressively senior roles and was finally responsible for the company's Asia Pacific retail business, which included its insurance and wealth management business.

Roy holds a Bachelor of Economics and Finance from The University of New South Wales, and an MBA from the University of Technology, Sydney. He serves on the Board of the Business Council of Canada and is a member of the Geneva Association. A native Australian, Roy has worked and lived in Sydney, Singapore, Thailand, and Hong Kong, and is now based in Toronto.

Director since October 2017

Term limit: applies to independent directors only

2019 votes for: 100%

Public company boards
(last five years)

- None

2019 meeting attendance

Board	6 of 6	100%
Board committees		
Mr. Gori is not a member of any of the board committees but attends at the invitation of the Chairman and/or committee chair		

Tsun-yan Hsieh

Singapore, Singapore ■ Age 67 ■ Independent

Key competencies and experience

- Finance/Accounting
- Talent management/Executive compensation
- Technology/Operations
- Asia experience
- Government relations/Public policy/Regulatory
- Public company executive/Director
- Digital transformation/Sales/Marketing

Mr. Hsieh's extensive management leadership, management consulting and academic experience, combined with his Asia perspective, qualifies him to serve on our board, and as a member of the management resources and compensation committee and the risk committee.

Tsun-yan Hsieh is Chairman of LinHart Group PTE Ltd., a firm he founded in 2010 to provide leadership services internationally.

Mr. Hsieh, a resident of Singapore, has extensive consulting experience in business strategy, leadership development and corporate transformation. Mr. Hsieh joined McKinsey & Company in 1980 and was elected a director from 1990 to 2008, when he retired. During his tenure, he served as Managing Director of Canada and ASEAN practices and led McKinsey's Organization and Leadership Practice globally.

Mr. Hsieh is a director on the following non-public boards: LinHart Group PTE Ltd., Manulife US Real Estate Management Pte Ltd., the Singapore Institute of Management and the National University of Singapore (NUS) Business School. He also serves as Provost Chair Professor at the NUS Business School and the Lee Kuan Yew School of Public Policy.

Mr. Hsieh has a Bachelor of Science in Mechanical Engineering from the University of Alberta and an MBA from Harvard Business School.

2019 meeting attendance

Board	6 of 6	100%
Board committees		
Management resources and compensation	5 of 5	100%
Risk	5 of 5	100%

Director since October 2011

Term limit: 2024

2019 votes for: 100%

Public company boards
(last five years)

- Singapore Airlines, 2012-present

Donald R. Lindsay

Vancouver, BC, Canada ■ Age 61 ■ Independent

Key competencies and experience

- Finance/Accounting
- Insurance/Reinsurance/Investment management
- Risk management
- Talent management/Executive compensation
- Technology/Operations
- Asia experience
- Public company executive/Director

Mr. Lindsay's CEO and international business experience, and nearly two decades of experience in senior executive roles in investment and corporate banking and global financial services, qualify him to serve on our board, as a member of the risk committee and as chair of the management resources and compensation committee.

Donald Lindsay is President and CEO of Teck Resources Limited, Canada's largest diversified mining, mineral processing and metallurgical company, a position he has held since 2005.

Mr. Lindsay's experience includes almost two decades with CIBC World Markets Inc., where he ultimately served as President after periods as Head of Investment and Corporate Banking and Head of the Asia Pacific Region.

Mr. Lindsay earned a Bachelor of Science in Mining Engineering from Queen's University and holds an MBA from Harvard Business School.

2019 meeting attendance

Board	6 of 6	100%
Board committees		
Management resources and compensation (chair)	5 of 5	100%
Risk	5 of 5	100%

Director since August 2010

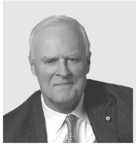
Term limit: 2023

2019 votes for: 100%

Public company boards
(last five years)

- Teck Resources Limited, 2005-present

John R.V. Palmer



Toronto, ON, Canada ■ Age 76 ■ Independent

Key competencies and experience

- Finance/Accounting
- Risk management
- Talent management/Executive compensation
- Asia experience
- Government relations/Public policy/Regulatory
- Public company executive/Director

Mr. Palmer's experience with regulators in different jurisdictions, including seven years as Superintendent of Financial Institutions, Canada, and his accounting background qualify him to serve on our board, the audit committee and the corporate governance and nominating committee.

John Palmer was Chairman and a founding director of the Toronto Leadership Centre, an organization focused on leadership in financial supervision, until June 2018. Mr. Palmer was the Superintendent of Financial Institutions, Canada from 1994 to 2001, following his career at KPMG LLP (Canada) where he held senior positions, including Managing Partner and Deputy Chairman. He was also the Deputy Managing Director of the Monetary Authority of Singapore and has advised other regulators including the Australian Prudential Regulation Authority.

He serves on the boards of the following non-public companies: Sageco Advisory Services Inc. and Tenaugust Properties Inc.

Mr. Palmer holds a Bachelor of Arts from the University of British Columbia. He is a Fellow of the Institutes of Chartered Professional Accountants of Ontario and British Columbia, and a Member of the Order of Canada.

2019 meeting attendance

Board	6 of 6	100%
Board committees		
Audit	5 of 5	100%
Corporate governance and nominating	5 of 5	100%

Director since November 2009

Term limit: 2022

2019 votes for: 100%

Public company boards
(last five years)

- Fairfax Financial Holdings Limited, 2012-present

C. James Prieur

Chicago, IL, U.S.A. ■ Age 68 ■ Independent

Key competencies and experience

- Finance/Accounting
- Insurance/Reinsurance/Investment management
- Risk management
- Talent management/Executive compensation
- Technology/Operations
- Asia experience
- Public company executive/Director

Mr. Prieur's strong financial background and his wealth of senior executive experience in the insurance business in Canada, the U.S. and globally qualify him to serve on our board, the management resources and compensation committee and as chair of the risk committee.

James Prieur has been a corporate director since 2011 and, prior to that time, Mr. Prieur served as Chief Executive Officer and director of CNO Financial Group, Inc. from 2006 until his retirement in 2011. CNO Financial Group is a life insurance holding company focused on the senior middle income market in the U.S. Prior to joining CNO Financial Group, Mr. Prieur was President and Chief Operating Officer of Sun Life Financial, Inc. from 1999 to 2006 where he had previously led operations in Asia, Canada, U.S., and the UK.

He serves on the board of the Alberta Investment Management Corporation, a Crown corporation of the Province of Alberta, and is a member of the President's Circle of the Chicago Council on Global Affairs, a not-for-profit organization.

Mr. Prieur is a Chartered Financial Analyst and holds an MBA from the Richard Ivey School at Western University and a Bachelor of Arts from the Royal Military College of Canada.

2019 meeting attendance

Board	6 of 6	100%
Board committees		
Management resources and compensation	5 of 5	100%
Risk (chair)	5 of 5	100%

Director since January 2013

Term limit: 2025

2019 votes for: 100%

Public company boards
(last five years)

- Ambac Financial Group, Inc., 2016-present

Andrea S. Rosen

Toronto, ON, Canada ■ Age 65 ■ Independent

Key competencies and experience

- Finance/Accounting
- Risk management
- Insurance/Reinsurance/Investment management
- Talent management/Executive compensation
- Public company executive/Director

Ms. Rosen's experience as a global financial services executive with particular experience in investment banking, wholesale and retail banking, risk management, human resources management and executive compensation qualify her to serve on our board, as a member of the audit committee and as chair of the corporate governance and nominating committee.

Andrea Rosen has been a corporate director since 2006. Prior to January 2005, her experience includes more than a decade with TD Bank Financial Group, where she ultimately served as Vice Chair, TD Bank Financial Group and President of TD Canada Trust. Earlier in her career, she held progressively senior positions at Wood Gundy Inc. and was Vice President at Varity Corporation.

She serves on the board of the Institute of Corporate Directors (not-for-profit).

Ms. Rosen has an LLB from Osgoode Hall Law School, an MBA from the Schulich School of Business at York University and a Bachelor of Arts from Yale University.

2019 meeting attendance

Board	6 of 6	100%
Board committees		
Audit	5 of 5	100%
Corporate governance and nominating (chair)	5 of 5	100%

Director since August 2011

Term limit: 2024

2019 votes for: 95.30%

Public company boards
(last five years)

- Ceridian HCM Holding Inc., 2018-present
- Element Fleet Management Corp., 2019-present
- Emera Inc., 2007-present
- Hiscox Limited, 2006-2015

INFORMATION FOR PARTICIPATING POLICYHOLDERS

Summary of Participating Policyholder Dividend Policy

The Board of Directors has established a Dividend Policy pursuant to the *Insurance Companies Act* (Canada) (the "ICA") that is applicable to all of the participating policies of The Manufacturers Life Insurance Company ("MLI" or the "Company") other than participating policies transferred to subsidiaries of MLI by assumption or indemnity reinsurance. The Dividend Policy does not apply to participating policies of subsidiaries of Manufacturers Life.

The Dividend Policy complies with Manufacturers Life's Fair Treatment of Customers Policy.

MLI maintains a separate account in respect of its participating policies pursuant to Section 456 of the ICA (the "Participating Account"). Ten sub-accounts exist (as listed below) reflecting both the structure created when Manufacturers Life demutualized pursuant to a Plan of Demutualization effective September 23, 1999 ("the "Demutualization Date"), the continued issuance of participating policies between Demutualization and 2009, the later amalgamation of Manufacturers Life and MFC Insurance Company Limited (formerly Commercial Union which included the business of The Maritime Life Assurance Company), the assumption reinsurance by Manufactures Life of all the policy liabilities of Manulife Canada Limited ("MCL") (formerly the Zurich Life Insurance Company of Canada), and the re-opening to new participating policies after 2017:

- (i) The Closed Block Sub-Account, which includes most dividend-paying participating policies issued prior to the Demutualization Date, other than universal life policies;
- (ii) The UL Block Sub-Account, which includes all participating universal life policies issued prior to the Demutualization Date;
- (iii) The Ancillary Block Sub-Account, which includes the rest of the participating policies issued prior to the Demutualization Date as well as additional statutory liabilities associated with sub-accounts (i) and (ii) above;
- (iv) The Open Block (Pre-2009) Sub-Account, which includes all participating policies issued between the Demutualization Date and 2008;
- (v) The Open Block (Post 2017) Sub-Account, which includes participating policies issued after 2017;
- (vi) The Maritime Sub-Account;
- (vii) The Aetna Sub-Account;
- (viii) The Royal and Sun Alliance Financial (RSAF) Sub-Account;
- (ix) The Commercial Union (CU) Sub-Account; and
- (x) The Zurich Sub-Account (MCL).

Under this dividend policy, the Board of Directors determines both the amount of retained earnings to be distributed and the basis of allocating dividends to policyholders. In determining the amount to be distributed in the Sub-Accounts, the Board of Directors will consider many factors. These include trends in the experience of participating policies, the overall soundness of the sub-accounts and their respective surpluses, and the need to ensure the continuing financial strength of MLI. Since actual levels of experience cannot be known in advance, dividends cannot be guaranteed. It is possible for experience to deteriorate over time and dividends may be reduced as a result.

Participating policies are grouped into classes with common experience related to such factors as mortality, investment returns, expenses, tax and persistency. Separate and unique classes are established for policies of each geographic region, for policies assigned to closed blocks on demutualization and for policies of blocks acquired since demutualization. The dividend allocation process followed by the Company recognizes the relative contribution to retained earnings made by each policy class in order to achieve reasonable equity between classes and generations of participating policies. Dividend scales are established by the Board of Directors and are reviewed annually.

This dividend policy is subject to change from time to time, and, if and when changed, may, at the discretion of the Board of Directors, become applicable to all then existing participating policies. Factors which might cause the Board of Directors to review this policy would include the acquisition of a block of participating business, a change in the Company's structure, a decision to stop selling new participating business or a change in the regulatory environment.

A full copy of the Company's dividend policy is available upon request to the Corporate Secretary.

Summary of Participating Account Management Policy

The Board of Directors has established a participating account management policy pursuant to the Insurance Companies Act (Canada) (the "ICA") that is applicable to all of the participating policies of The Manufacturers Life Insurance Company ("MLI" or the "Company") other than participating policies transferred to subsidiaries of MLI by assumption or indemnity reinsurance. The Participating Account Management Policy does not apply to participating policies of subsidiaries of Manufactures Life.

The Participating Account Management Policy complies with Manufacturers Life's Fair Treatment of Customers Policy.

MLI maintains a separate account in respect of its participating policies pursuant to Section 456 of the ICA (the "Participating Account"). Ten sub-accounts exist as described above in the "Summary of Participating Policyholder Dividend Policy".

All the sub-accounts are closed to new business except for the Open Block (Post-2017) Sub-Account.

Each of the sub-accounts is supported by a distinct asset segment except for the Closed Block sub-account, Open Block (Pre-2009) sub-account, and the Open Block (Post-2017) sub-account where assets are combined. This commingling provides these sub-Accounts with access to more diverse range of investable assets than would be available if invested separately. The effects of commingling of assets between different par sub-accounts are reviewed annually to ensure that such commingling continues to be fair to policyholders.

Investment strategies are established at the asset segment level. Assets supporting participating policies are managed to achieve a target return, designed to maximize dividends, subject to established risk tolerances. The target return investment strategy utilizes fixed income assets, including public and private debt securities and commercial mortgages, and in some segments alternative long-duration assets, including equities and real estate. Alternative long-duration assets are included to enhance long-term investment returns and reduce aggregate risk through diversification. Fixed income assets are managed to specified target return fixed income benchmarks.

Investment income for the participating segments is a direct pass through of the return on the participating asset funds supporting those segments. Where an asset segment is supporting more than one participating sub-account, allocation of investment income is on a pro-rata basis in proportion to assets.

As described in the Plan of Demutualization, the policy maintenance expense amounts for the Closed Block sub-account and UL Block sub-account are fixed per policy amounts as of the Date of Demutualization that can only be increased consistent with the Canadian Consumer Price Index. For other participating sub-accounts, the maintenance expense allocation is based upon expense studies that are reviewed at least triennially.

The total income tax expense for the participating sub-accounts is determined based on the standalone taxable income for the sub-accounts. Investment income tax and premium tax are charged directly as the calculation identifies all those policies affected and the related charge.

The Closed Block sub-account and UL Block sub-account are managed in accordance with the Plan of Demutualization. The sub-accounts were funded initially with assets sufficient to support their policies' future policy cash flows, including amounts for reasonable dividend expectations. The Company expects these sub-accounts to be self-sustaining and theoretically to be exhausted as the last policy obligations mature; therefore, no surplus existed in these funds as of the Date of Demutualization. On an ongoing basis, dividend scales are set with the objective of minimizing tontine effects[1], in accordance with the Company's obligation from demutualization.

The other sub-accounts exist separately with each subject to separate accounting. There is no commingling or adjustment to the undistributed surplus for each account. Dividend scales are managed with the objective of passing through experience within a reasonable period of time, while managing the overall capital adequacy position of these sub-accounts, and ensuring policyholders are treated equitably. For sub-accounts that are closed to new business, dividend scales are managed with the objective of minimizing tontine effects. This objective does not take precedence over the need to maintain dividend scales that meet policyholders' reasonable expectations and other explicit commitments, which may cause dividends to deviate from this objective. Surplus is expected to be exhausted as the last policy obligations mature.

Shareholder transfers from the Closed Block sub-account, the UL Block sub-account and the Ancillary Block sub-account are subject to the special rules and guidelines established as part of the Plan of Demutualization. The remaining sub-accounts are subject to normal rules for transfers to the shareholder's account from participating accounts within a stock life company, as defined in the ICA.

This participating account management policy is subject to amendment from time to time, and, if and when amended, may, at the discretion of the Board of Directors, become applicable to all then existing participating policies. Factors which might cause the Board of Directors to review this policy would include the acquisition or disposition of a block of participating business, a change in MLI's structure, a decision to stop selling new participating business or legislative or regulatory changes.

A full copy of the Company's participating account management policy is available upon request to the Corporate Secretary.

[1] A tontine effect occurs when participating experience is not returned to policyholders within a reasonable time, allowing for a build-up of gains or losses that accrues to a small number of surviving policyholders.

Investment Management

The portfolio's assets are managed to meet the long-term needs of the participating policyholders. The stable nature of the cash flows associated with participating life products permits asset investment in longer term holdings, specifically public and private debt securities, and in some segments equities and real estate. These assets are usually limited to Canadian investments. Diversification has historically proven to be the appropriate strategy to provide long-term growth for our policyholders while effectively managing the short-term volatility of the investment market.

Bonds & Private Debt
Bond investments are managed by Manulife's General Account investment team. Their investment philosophy emphasized acquiring the best value assets through high quality sector, credit and security selection. This asset category also includes private debt.

Equities
The public equity portion of the par account is managed by Manulife Asset Management. The fund's investment style is to mimic the S&P/TSX Composite Index and is rebalanced as required. Certain sub-accounts also invest in private equity. Typical investments are private common stock and private equity/venture capital funds. Manulife has a long history of strategic investment in private equities. Certain sub-accounts also invest in Oil and Gas. These investments are managed by NAL Resources Management Ltd, a wholly owned subsidiary of Manulife Financial. The group actively manages these investments with an emphasis on maintaining steady income through development activities in mature and stable properties.

Real estate
Real estate is managed by Manulife Financial's Real Estate Division. The portfolio focuses on top quality office buildings located in superior downtown and large suburban markets across Canada. The portfolio is diversified by location and property type. The real estate operation tracks the total yield of all real estate and then allocates the yield to Manulife's different asset segments. This results in more stability in returns since specific buildings are not allocated to specific investment accounts. Certain sub-accounts also invest in Timber and Agriculture. These investments are managed by the Hancock Natural Resource Group, a wholly owned subsidiary of Manulife Financial. The approach to timber investment is to acquire large, high-quality timberland properties in key regions, managing a geographically diverse portfolio, while practicing good forest stewardship and producing superior returns. Agriculture investments generally consist of direct management for permanent cropland and cash leasing for row cropland.

Mortgages
The mortgage segment is managed by Manulife Financial's Mortgage Division. The segment consists of commercial mortgages and is diversified by location and property type and consists almost entirely of first mortgages.

The following shows the asset mix of each participating sub-accounts as at December 31, 2019:

<table>
<tr><th>As at December 31, 2019</th><th colspan="2">Closed Block and Open (Pre-2009) and Open (Post 2017</th><th colspan="2">UL Block</th><th colspan="2">Maritime</th><th colspan="2">Aetna</th></tr>
<tr><td></td><td>Actual</td><td>Target</td><td>Actual</td><td>Target</td><td>Actual</td><td>Target</td><td>Actual</td><td>Target</td></tr>
<tr><td>Bonds</td><td>34%</td><td>26% - 50%</td><td>49%</td><td>46% - 68%</td><td>53%</td><td>39% - 67%</td><td>54%</td><td>46% - 67%</td></tr>
<tr><td>Private Debt</td><td>8%</td><td rowspan="2">18% - 26%</td><td>11%</td><td rowspan="2">20% - 36%</td><td>17%</td><td rowspan="2">33% - 61%</td><td>17%</td><td rowspan="2">33% - 49%</td></tr>
<tr><td>Mortgages</td><td>16%</td><td>22%</td><td>30%</td><td>29%</td></tr>
<tr><td>Equities</td><td>20%</td><td rowspan="2">32% - 48%</td><td>17%</td><td rowspan="2">12% - 18%</td><td>0%</td><td rowspan="2">0% - 5%</td><td>0%</td><td rowspan="2">0% - 5%</td></tr>
<tr><td>Real estate</td><td>22%</td><td>1%</td><td>0%</td><td>0%</td></tr>
</table>

<table>
<tr><th>As at December 31, 2019</th><th colspan="2">RSAF</th><th colspan="2">CU</th><th colspan="2">MCL</th></tr>
<tr><td></td><td>Actual</td><td>Target</td><td>Actual</td><td>Target</td><td>Actual</td><td>Target</td></tr>
<tr><td>Bonds</td><td>68%</td><td>65% - 77%</td><td>49%</td><td>48% - 66%</td><td>56%</td><td>48% - 66%</td></tr>
<tr><td>Private Debt</td><td>15%</td><td rowspan="2">23% - 35%</td><td>9%</td><td rowspan="2">18% - 28%</td><td>8%</td><td rowspan="2">18% - 28%</td></tr>
<tr><td>Mortgages</td><td>17%</td><td>18%</td><td>15%</td></tr>
<tr><td>Equities</td><td>0%</td><td rowspan="2">0%</td><td>23%</td><td rowspan="2">16% - 24%</td><td>20%</td><td rowspan="2">16% - 24%</td></tr>
<tr><td>Real estate</td><td>0%</td><td>1%</td><td>1%</td></tr>
</table>

Changes in the Participating Account

The changes in surplus for the participating sub-accounts, for financial years ended December 31, 2019 and 2018 were as follows:

For the year ended December 31, 2019 (C$ in millions)	Closed Block	UL Block	Ancillary Block	Open (Pre-2009) Block	Open (Post 2017) Block	Maritime	Aetna	RSAF	CU	MCL	Total
Opening surplus	$ –	$ –	$ –	$ 256.6	$ 20.5	$ 47.1	$ (33.6)	$ 12.9	$ (52.7)	$ (68.3)	$ 182.5
Net earnings before taxes and policyholder dividends	96.9	(1.9)	(109.1)	4.3	51.3	6.3	4.8	4.2	3.6	(86.1)	(25.7)
Policyholder dividends	(101.3)	(1.6)	–	(144.0)	(2.4)	(7.9)	(8.7)	(3.4)	(12.5)	(4.0)	(285.8)
Taxes	4.4	3.5	29.2	(61.8)	(13.2)	0.5	1.2	(0.2)	6.8	25.3	119.3
Transfers to shareholder under ICA Section 461	–	–	–	(4.2)	–	(0.2)	(0.3)	(0.1)	–	(0.1)	(4.9)
Other Transfers	–	–	79.9	–	–	–	–	–	–	–	79.9
Closing surplus	$ –	$ –	$ –	$ 174.5	$ 56.2	$ 45.8	$ (36.6)	$ 13.4	$ (54.8)	$ (133.2)	$ 65.3
Total assets as at December 31, 2019[(1)]	$ 4,643.6	$ 395.8	$ (409.8)	$ 4,511.6	$ (91.4)	$ 608.3	$ 549.8	$ 281.0	$ 495.2	$ 878.5	$ 11,862.6

For the year ended December 31, 2018 (C$ in millions)	Closed Block	UL Block	Ancillary Block	Open (pre-2009) Block	Open (post 2018) Block	Maritime	Aetna	RSAF	CU	MCL	Total
Opening surplus	$ –	$ –	$ –	$ 121.0	$ –	$ 30.7	$ (58.2)	$ 9.0	$ (56.4)	$ (96.4)	$ (50.3)
Net earnings before taxes and policyholder dividends	67.9	1.2	59.1	326.3	28.0	30.3	42.5	8.7	16.2	40.6	620.8
Policyholder dividends	(100.0)	(1.7)	–	(135.7)	–	(7.6)	(8.6)	(3.2)	(11.9)	(4.0)	(272.7)
Taxes	32.1	0.5	(15.8)	(51.0)	(7.5)	(6.1)	(9.0)	(1.5)	(0.6)	(8.4)	(67.3)
Transfers to shareholder under ICA Section 461	–	–	–	(4.0)	–	(0.2)	(0.3)	(0.1)	–	(0.1)	(4.7)
Other Transfers	–	–	(43.3)	–	–	–	–	–	–	–	(43.3)
Closing surplus	$ –	$ –	$ –	$ 256.6	$ 20.5	$ 47.1	$ (33.6)	$ 12.9	$ (52.7)	$ (68.3)	$ 182.5
Total assets as at December 31, 2018[(1)]	$ 4,501.3	$ 362.4	$ (502.2)	$ 4,129.8	$ (46.6)	$ 586.7	$ 497.4	$ 262.9	$ 423.6	$ 790.2	$ 11,005.5

[(1)] Total assets are exclusive of associated reinsurance assets.

The change in "Net earnings before taxes and policyholder dividends" from 2018 to 2019 was due to the following reasons:

Ancillary Block earnings decreased due to annual review of actuarial methods and assumptions.
Open Block (Post-2017) increased due to continued strong new business sales. Maritime, Aetna, RSAF, CU and Zurich sub-accounts earnings decreased due to unfavorable investment experience.

Open Block (Pre-2009) earnings and surplus decreased in 2019 due to re-allocation of surplus to support capital requirements for the block. We expect that this surplus will be distributed to policyholders via dividends over time should experience emerge according to best-estimate assumptions.

Since 2012, there has been a shortfall in the CU sub-account assets compared to the best-estimate insurance contract liabilities. If there are insufficient funds in the CU sub-account to meet the in-force policyholder obligations, the funds are to be made available from the shareholder account. To recognize this potential obligation, the Company currently holds a contingent liability of $49.4 million in the shareholder account with an offsetting contingent receivable in the CU sub-account. The amount may change over time. If future experience is more favourable or unfavourable than anticipated, insurance contract liabilities will be decreased or increased as will the amount estimated to be covered by the shareholder account. A new contingent liability of $28.5 million for the Aetna sub-account was set up in 2019 due to deteriorating investment outlook.

MLI started selling new participating life insurance again in 2018. By re-entering the participating life insurance market in Canada, the Company will increase its premium volumes, and allow fixed expenses to be spread over a larger base of policyholders, which reduces the expense charged per policy. This helps to produce higher policy values for participating policyholders, and better returns for MLI's shareholders over time. New business premiums will be invested in the same fund as the Open block (Pre-2009), which was previously closed to new business in 2008. This commingling provides these sub-Accounts with access to more diverse range of investable assets than would be available if invested separately. The effects of commingling of assets between different par sub-accounts are reviewed annually to ensure that such commingling continues to be fair to policyholders.

The Company will ensure fairness to policyholders by managing surplus separately for the Open block (Pre-2009) and Open block (Post-2017) sub-accounts. Existing surplus in the Open (Pre-2009) block will not be shared with new policyholders. Where possible, surplus for each block is managed in order to support capital requirements for that block. This results in increased par surplus, which will then be gradually released as the block matures. The Company will review annually that the continued use of a combined fund remains appropriate and consistent with commitments made at demutualization and policyholder reasonable expectations. Any concerns regarding the potential emergence of inappropriate cross-subsidies between the blocks can be adequately managed through the dividend allocation process. Further detail on the dividend allocation process can be found in the Participating Policyholder Dividend Policy.

All blocks are managed with the objective of avoiding tontine effects, so that as the number of remaining policyholders diminishes, the amount of gain/loss to pass back through dividends is similarly reduced. At demutualization, the tontine threshold for Closed UL and Closed Trad was set at 50% of dividends, so that if any surplus/deficit exceeded limit, dividend adjustments must be accelerated. In 2019, that limit was changed to 2.7% of the cash surrender value of the block, which is a more stable limit and still consistent with the objective set at demutualization. This update has no immediate impact on policyholder dividends, as current scales already comply with the new limit. Any breaches in this new limit will be remedied in a timely manner.

Transfers to Shareholder

Transfers have been made to the shareholder account in accordance with Section 461 of the ICA. The percentage that these amounts represent of total amounts paid to the shareholder and policyholders for financial years ended December 31, 2019 and 2018 are shown in the tables below. Section 461 transfers do not apply to the Closed Block and UL Block sub-accounts and associated Ancillary Block sub-account resulting from demutualization.

For the year ended December 31, 2019 (C$ in millions)	Closed Block	UL Block	Ancillary Block	Open (Pre-2009) Block	Open (Post 2017) Block	Maritime	Aetna	RSAF	CU	MCL	Total
Transfers to shareholder under ICA Section 461	**–**	**–**	**–**	**4.2**	**–**	**0.2**	**0.3**	**0.1**	**–**	**0.1**	**4.9**
Policyholder dividends	**101.3**	**1.6**	**–**	**144.0**	**2.4**	**7.9**	**8.7**	**3.4**	**12.5**	**4.0**	**285.8**
Total Amount Paid	**$ 101.3**	**$ 1.6**	**$ –**	**$ 148.2**	**$ 2.4**	**$ 8.1**	**$ 9.0**	**$ 3.5**	**$ 12.5**	**$ 4.1**	**$ 290.7**
Shareholder transfer as percentage of total amounts paid	**–**	**–**	**–**	**2.9%**	**–**	**2.9%**	**2.9%**	**2.9%**	**–**	**2.9%**	**1.7%**

For the year ended December 31, 2018 (C$ in millions)	Closed Block	UL Block	Ancillary Block	Open (Pre-2009) Block	Open (Post 2017) Block	Maritime	Aetna	RSAF	CU	MCL	Total
Transfers to shareholder under ICA Section 461	–	–	–	4.0	–	0.2	0.3	0.1	–	0.1	4.7
Policyholder dividends	100.0	1.7	–	135.7	–	7.6	8.6	3.2	11.9	4.0	272.2
Total Amount Paid	$ 100.0	$ 1.7	$ –	$ 139.7	$ –	$ 7.8	$ 8.9	$ 3.3	$ 11.9	$ 4.1	$ 277.4
Shareholder transfer as percentage of total amounts paid	–	–	–	2.8%	–	2.8%	2.8%	2.8%	–	2.8%	1.7%

Responsibility for Financial Reporting

The accompanying consolidated financial statements of The Manufacturers Life Insurance Company are the responsibility of management and have been approved by the Board of Directors.

The consolidated financial statements have been prepared by management in accordance with International Financial Reporting Standards and the accounting requirements of the Office of the Superintendent of Financial Institutions, Canada. When alternative accounting methods exist, or when estimates and judgment are required, management has selected those amounts that present the Company's financial position and results of operations in a manner most appropriate to the circumstances.

Appropriate systems of internal control, policies and procedures have been maintained to ensure that financial information is both relevant and reliable. The systems of internal control are assessed on an ongoing basis by the Company's internal audit department.

The actuary appointed by the Board of Directors (the "Appointed Actuary") is responsible for ensuring that assumptions and methods used in the determination of policy liabilities are appropriate to the circumstances and that reserves will be adequate to meet the Company's future obligations under insurance and annuity contracts.

The Board of Directors is responsible for ensuring that management fulfills its responsibility for financial reporting and is ultimately responsible for reviewing and approving the consolidated financial statements. These responsibilities are carried out primarily through an Audit Committee of unrelated and independent directors appointed by the Board of Directors.

The Audit Committee meets periodically with management, the internal auditors, the external auditors and the Appointed Actuary to discuss internal control over the financial reporting process, auditing matters and financial reporting issues. The Audit Committee reviews the consolidated financial statements prepared by management, and then recommends them to the Board of Directors for approval. The Audit Committee also recommends to the Board of Directors and shareholder the appointment of external auditors and approval of their fees.

The consolidated financial statements have been audited by the Company's external auditors, Ernst & Young LLP, in accordance with Canadian generally accepted auditing standards. Ernst & Young LLP has full and free access to management and the Audit Committee.

Roy Gori
President and Chief Executive Officer

Philip Witherington
Chief Financial Officer

Toronto, Canada

February 12, 2020

Appointed Actuary's Report to the Policyholders and Shareholder

I have valued the policy liabilities and reinsurance recoverables of The Manufacturers Life Insurance Company for its Consolidated Statements of Financial Position as at December 31, 2019 and 2018 and their change in the Consolidated Statements of Income for the years then ended in accordance with actuarial practice generally accepted in Canada, including selection of appropriate assumptions and methods.

In my opinion, the amount of policy liabilities net of reinsurance recoverables makes appropriate provision for all policyholder obligations and the consolidated financial statements fairly present the results of the valuation.

Steven Finch
Appointed Actuary

Toronto, Canada

February 12, 2020

Independent Auditor’s Report

To the Policyholders, Shareholder and Board of Directors of The Manufacturers Life Insurance Company

Opinion on the Consolidated Financial Statements

We have audited the consolidated financial statements of The Manufacturers Life Insurance Company (the “Company”), which comprise the Consolidated Statements of Financial Position as at December 31, 2019 and 2018, and the Consolidated Statements of Income, Consolidated Statements of Comprehensive Income, Consolidated Statements of Changes in Equity and Consolidated Statements of Cash Flows for the years then ended, and notes to the consolidated financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying consolidated financial statements present fairly, in all material respects, the consolidated financial position of the Company as at December 31, 2019 and 2018, and its consolidated financial performance and its consolidated cash flows for the years then ended in accordance with International Financial Reporting Standards.

Basis for Opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards. Our responsibilities under those standards are further described in the *Auditor’s Responsibilities for the Audit of the Consolidated Financial Statements* section of our report. We are independent of the Company in accordance with the ethical requirements that are relevant to our audit of the consolidated financial statements in Canada, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Key Audit Matters

Key audit matters are those matters that, in our professional judgment, were of most significance in our audit of the consolidated financial statements of the current period. These matters were addressed in the context of the audit of the consolidated financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on these matters. For each matter below, our description of how our audit addressed the matter is provided in that context.

We have fulfilled the responsibilities described in the *Auditor’s Responsibilities for the Audit of the Consolidated Financial Statements* section of our report, including in relation to these matters. Accordingly, our audit included the performance of procedures designed to respond to our assessment of the risks of material misstatement of the consolidated financial statements. The results of our audit procedures, including the procedures performed to address the matters below, provide the basis for our audit opinion on the accompanying consolidated financial statements.

Valuation of Insurance Contract Liabilities

Key Audit Matter

The Company recorded insurance contract liabilities of $351.2 billion at December 31, 2019 on its consolidated statement of financial position. Insurance contract liabilities are reported gross of reinsurance ceded and represent management’s estimate of the amount which, together with estimated future premiums and net investment income, will be sufficient to pay estimated future benefits, policyholder dividends and refunds, taxes (other than income taxes) and expenses on insurance policies in-force. Insurance contract liabilities are determined using the Canadian Asset Liability Method (CALM), as required by the Canadian Institute of Actuaries. The valuation of insurance contract liabilities is based on an explicit projection of cash flows using current assumptions for each material cash flow item. Cash flows related to insurance contract liabilities have two major components: a best estimate assumption and a provision for adverse deviation. Best estimate assumptions are made with respect to mortality, morbidity, investment returns, policy termination rates, premium persistency, expenses, and taxes. A provision for adverse deviation is recorded to reflect the inherent uncertainty related to the timing and amount of the best estimate assumptions. Disclosures on this matter are found in Note 1 ‘Nature of Operations and Significant Accounting Policies’ and Note 6 ‘Insurance Contract Liabilities and Reinsurance Assets’ of the consolidated financial statements.

Auditing the valuation of insurance contract liabilities was complex and required the application of significant auditor judgement due to the complexity of the cash flow models, the selection and use of best estimate assumptions, and the interrelationship of these variables in measuring insurance contract liabilities. The audit effort involved professionals with specialized skill and knowledge to assist in evaluating the audit evidence obtained.

How Our Audit Addressed the Key Audit Matter

We obtained an understanding, evaluated the design, and tested the operating effectiveness of management’s controls over the valuation of insurance contract liabilities. The controls we tested related to, among other areas, actuarial methodology, integrity of data used, controls over relevant information technology, and the assumption setting and implementation processes used by management.

To test the valuation of insurance contract liabilities, our audit procedures included, among other procedures, involving our actuarial specialists to assess the methodology and assumptions with respect to compliance with the Company’s policies, Canadian Institute of Actuaries guidance and industry practice. We performed audit procedures over a sample of assumptions, including the implementation of those assumptions into the models. These procedures included testing underlying support and documentation, including testing a sample of experience studies supporting specific assumptions, challenging the nature and timing of changes recorded, and assessing whether individual changes were errors or refinements of estimates. We also performed independent recalculation procedures on a sample of insurance policies to evaluate management's recorded reserves. In addition, we assessed the adequacy of the disclosures provided in the notes to the consolidated financial statements.

Valuation of Invested Assets with Significant Non-Market Observable Inputs

Key Audit Matter

The Company recorded invested assets of $17.0 billion at December 31, 2019 on its consolidated statement of financial position which are both (a) measured at fair value and (b) subject to a valuation estimate that includes significant non-market observable inputs. These assets are valued based on internal models or third-party pricing sources that incorporate assumptions with a high-level of subjectivity. Examples of such assumptions include interest rates, yield curves, credit ratings and related spreads, expected future cash flows and transaction prices of comparable assets. These invested assets are classified as level 3 within the Company's hierarchy of fair value measurements. Disclosures on this matter are found in Note 1 'Nature of Operations and Significant Accounting Policies' and Note 3 'Invested Assets and Investment Income' of the consolidated financial statements.

Auditing the valuation of these invested assets was complex and required the application of significant auditor judgment in assessing the valuation methodology and non-observable inputs used. The valuation of these assets is sensitive to the significant non-market observable inputs described above, which are inherently forward-looking and could be affected by future economic and market conditions. The audit effort involved professionals with specialized skill and knowledge to assist in evaluating the audit evidence obtained.

How Our Audit Addressed the Key Audit Matter

We obtained an understanding, evaluated the design, and tested the operating effectiveness of management's controls over the investment valuation process. The controls we tested related to, among other areas, management's determination and approval of assumptions and methodologies used in model-based valuations and management's review of valuations provided by third-party pricing sources.

To test the valuation of these invested assets, our audit procedures included, among other procedures, involving our valuation specialists to assess the methodologies and significant assumptions used by the Company. These procedures included assessing the valuation methodologies used with respect to the Company's policies, valuation guidelines, and industry practice and comparing a sample of valuation assumptions used against benchmarks, including comparable transactions and independent pricing sources where available. We also performed independent investment valuations on a sample of investments to evaluate management's recorded values. In addition, we assessed the adequacy of the disclosures provided in the notes to the consolidated financial statements.

Other Information

Management is responsible for the other information. The other information comprises:

- The information, other than the consolidated financial statements and our auditor's report thereon, in the Report to Policyholders.

Our opinion on the consolidated financial statements does not cover the other information and we do not express any form of assurance conclusion thereon.

In connection with our audit of the consolidated financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the consolidated financial statements or our knowledge obtained in the audit or otherwise appears to be materially misstated.

The Report to Policyholders is expected to be made available to us after the date of the auditor's report. If based on the work we will perform on this other information, we conclude there is a material misstatement of other information, we are required to report that fact to those charged with governance.

Responsibilities of Management and Those Charged with Governance for the Consolidated Financial Statements

Management is responsible for the preparation and fair presentation of the consolidated financial statements in accordance with International Financial Reporting Standards, and for such internal control as management determines is necessary to enable the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated financial statements, management is responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Company or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the Company's financial reporting process.

Auditor's Responsibilities for the Audit of the Consolidated Financial Statements

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Canadian generally accepted auditing standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated financial statements.

As part of an audit in accordance with Canadian generally accepted auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the consolidated financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Company to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated financial statements represent the underlying transactions and events in a manner that achieves fair presentation.
- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Company to express an opinion on the consolidated financial statements. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our audit opinion.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide those charged with governance with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

From the matters communicated with those charged with governance, we determine those matters that were of most significance in the audit of the consolidated financial statements of the current period and are therefore the key audit matters. We describe these matters in our independent auditor's report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in our report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

The engagement partner on the audit resulting in this independent auditor's report is Sean Musselman.

Ernst & Young LLP

Chartered Professional Accountants
Licensed Public Accountants

Toronto, Canada

February 12, 2020

Consolidated Statements of Financial Position

As at December 31, (Canadian $ in millions)	**2019**	2018
Assets		
Cash and short-term securities	**$ 20,270**	$ 16,186
Debt securities	**198,122**	185,594
Public equities	**22,851**	19,179
Mortgages	**49,376**	48,363
Private placements	**37,979**	35,754
Policy loans	**6,471**	6,446
Loans to bank clients	**1,740**	1,793
Real estate	**12,928**	12,777
Other invested assets	**28,759**	27,540
Total invested assets (note 3)	**378,496**	353,632
Other assets		
Accrued investment income	**2,455**	2,466
Outstanding premiums	**1,385**	1,369
Derivatives (note 4)	**19,453**	13,703
Reinsurance assets (notes 6 and 7)	**41,446**	43,053
Deferred tax assets (note 15)	**4,509**	4,273
Goodwill and intangible assets (note 5)	**9,975**	10,097
Note receivable from related parties (note 19)	**306**	156
Miscellaneous	**8,245**	8,406
Total other assets	**87,774**	83,523
Segregated funds net assets (note 21)	**343,108**	313,209
Total assets	**$ 809,378**	$ 750,364
Liabilities and Equity		
Liabilities		
Insurance contract liabilities (note 6)	**$ 351,161**	$ 328,654
Investment contract liabilities (note 7)	**3,104**	3,265
Deposits from bank clients	**21,488**	19,684
Derivatives (note 4)	**10,500**	8,092
Deferred tax liabilities (note 15)	**1,972**	1,814
Note payable to related parties (note 19)	**89**	92
Other liabilities	**16,106**	14,987
	404,420	376,588
Capital instruments (notes 9 and 19)	**3,843**	5,374
Segregated funds net liabilities (note 21)	**343,108**	313,209
Total liabilities	**751,371**	695,171
Equity		
Preferred shares (note 10)	**1**	1
Common shares (note 10)	**34,446**	34,446
Contributed surplus	**4,990**	4,890
Shareholder's retained earnings	**11,252**	8,308
Shareholder's accumulated other comprehensive income (loss):		
Pension and other post-employment plans	**(350)**	(426)
Available-for-sale securities	**1,503**	(273)
Cash flow hedges	**(238)**	(218)
Real estate revaluation surplus	**31**	20
Translation of foreign operations	**5,404**	7,258
Total shareholder's equity	**57,039**	54,006
Participating policyholders' equity	**(243)**	94
Non-controlling interests	**1,211**	1,093
Total equity	**58,007**	55,193
Total liabilities and equity	**$ 809,378**	$ 750,364

The accompanying notes are an integral part of these Consolidated Financial Statements.

Roy Gori
President and Chief Executive Officer

John Cassaday
Chairman of the Board of Directors

Consolidated Statements of Income

For the years ended December 31, (Canadian $ in millions)	2019	2018
Revenue		
Premium income		
Gross premiums	**$ 41,059**	$ 39,150
Premiums ceded to reinsurers	**(5,481)**	(15,138)
Net premiums	**35,578**	24,012
Investment income (note 3)		
Investment income	**15,544**	13,581
Realized and unrealized gains (losses) on assets supporting insurance and investment contract liabilities and on the macro hedge program	**18,200**	(9,028)
Net investment income (loss)	**33,744**	4,553
Other revenue (note 12)	**10,389**	10,429
Total revenue	**79,711**	38,994
Contract benefits and expenses		
To contract holders and beneficiaries		
Gross claims and benefits (note 6)	**28,660**	27,878
Increase (decrease) in insurance contract liabilities (note 6)	**33,727**	2,907
Increase (decrease) in investment contract liabilities (note 7)	**170**	35
Benefits and expenses ceded to reinsurers	**(5,373)**	(5,153)
(Increase) decrease in reinsurance assets (note 6)	**(1,269)**	(9,733)
Net benefits and claims	**55,915**	15,934
General expenses	**7,665**	7,939
Investment expenses (note 3)	**1,763**	1,713
Commissions	**6,293**	6,173
Interest expense	**983**	940
Net premium taxes	**389**	406
Total contract benefits and expenses	**73,008**	33,105
Income before income taxes	**6,703**	5,889
Income tax expense (note 15)	**(840)**	(726)
Net income	**$ 5,863**	$ 5,163
Net income (loss) attributed to:		
Non-controlling interests	**$ 233**	$ 214
Participating policyholders	**(333)**	(127)
Shareholder	**5,963**	5,076
	$ 5,863	$ 5,163

The accompanying notes are an integral part of these Consolidated Financial Statements.

Consolidated Statements of Comprehensive Income

For the years ended December 31, (Canadian $ in millions)	2019	2018
Net income	**$ 5,863**	$ 5,163
Other comprehensive income (loss) ("OCI"), net of tax:		
Items that may be subsequently reclassified to net income:		
Foreign exchange gains (losses) on:		
Translation of foreign operations	**(1,931)**	3,085
Net investment hedges	**76**	(190)
Available-for-sale financial securities:		
Unrealized gains (losses) arising during the year	**2,212**	(458)
Reclassification of net realized (gains) losses and impairments to net income	**(433)**	13
Cash flow hedges:		
Unrealized gains (losses) arising during the year	**(32)**	(62)
Reclassification of realized losses to net income	**12**	16
Share of other comprehensive income (losses) of associates	**1**	(1)
Total items that may be subsequently reclassified to net income	**(95)**	2,403
Items that will not be reclassified to net income:		
Change in pension and other post-employment plans	**76**	(62)
Real estate revaluation reserve	**11**	(1)
Total items that will not be reclassified to net income	**87**	(63)
Other comprehensive income (loss), net of tax	**(8)**	2,340
Total comprehensive income (loss), net of tax	**$ 5,855**	$ 7,503
Total comprehensive income (loss) attributed to:		
Non-controlling interests	**$ 237**	$ 212
Participating policyholders	**(334)**	(127)
Shareholder	**5,952**	7,418

Income Taxes included in Other Comprehensive Income

For the years ended December 31, (Canadian $ in millions)	2019	2018
Income tax expense (recovery) on:		
Unrealized foreign exchange gains/losses on translation of foreign operations	**$ (1)**	$ 1
Unrealized foreign exchange gains/losses on net investment hedges	**30**	(67)
Unrealized gains/losses on available-for-sale financial securities	**557**	(151)
Reclassification of realized gains/losses and recoveries/impairments to net income on available-for-sale financial securities	**(140)**	26
Unrealized gains/losses on cash flow hedges	**(11)**	36
Reclassification of realized gains/losses to net income on cash flow hedges	**4**	4
Change in pension and other post-employment plans	**18**	4
Real estate revaluation reserve	**–**	1
Total income tax expense (recovery)	**$ 457**	$ (146)

The accompanying notes are an integral part of these Consolidated Financial Statements.

Consolidated Statements of Changes in Equity

For the years ended December 31, (Canadian $ in millions)	2019	2018
Preferred shares		
Balance, beginning and end of year	**$ 1**	$ 1
Common shares		
Balance, beginning of year	**34,446**	33,596
Issued (note 10)	**–**	850
Balance, end of year	**34,446**	34,446
Contributed surplus		
Balance, beginning of year	**4,890**	4,797
Stock option expense, net	**(1)**	(1)
Impact of deferred tax asset rate change	**–**	–
Transfer of subsidiaries	**101**	106
Acquisition of non-controlling interest	**–**	(12)
Balance, end of year	**4,990**	4,890
Shareholder's retained earnings		
Balance, beginning of year	**8,308**	5,932
Opening adjustment at adoption of IFRS 16 (note 2)	**(19)**	–
Net income attributed to shareholder	**5,963**	5,076
Common share dividends	**(3,000)**	(2,700)
Balance, end of year	**11,252**	8,308
Shareholder's accumulated other comprehensive income (loss) ("AOCI")		
Balance, beginning of year	**6,361**	4,019
Change in unrealized foreign exchange gains (losses) of net foreign operations	**(1,854)**	2,895
Change in actuarial gains (losses) on pension and other post-employment plans	**76**	(62)
Change in unrealized gains (losses) on available-for-sale financial securities	**1,775**	(443)
Change in unrealized gains (losses) on derivative instruments designated as cash flow hedges	**(20)**	(46)
Change in real estate revaluation reserve	**11**	(1)
Share of other comprehensive income (losses) of associates	**1**	(1)
Balance, end of year	**6,350**	6,361
Total shareholder's equity, end of year	**57,039**	54,006
Participating policyholders' equity		
Balance, beginning of year	**94**	221
Opening adjustment at adoption of IFRS 16 (note 2)	**(3)**	–
Net income (loss) attributed to participating policyholders	**(333)**	(127)
Other comprehensive income attributed to policyholders	**(1)**	–
Balance, end of year	**(243)**	94
Non-controlling interests		
Balance, beginning of year	**1,093**	929
Net income attributed to non-controlling interests	**233**	214
Other comprehensive income (loss) attributed to non-controlling interests	**4**	(2)
Contributions (distributions/disposal), net	**(119)**	(48)
Balance, end of year	**1,211**	1,093
Total equity, end of year	**$ 58,007**	$ 55,193

The accompanying notes are an integral part of these Consolidated Financial Statements.

Consolidated Statements of Cash Flows

For the years ended December 31, (Canadian $ in millions)	2019	2018
Operating activities		
Net income	**$ 5,863**	$ 5,163
Adjustments:		
Increase (decrease) in insurance contract liabilities	**33,727**	2,907
Increase in investment contract liabilities	**170**	35
(Increase) decrease in reinsurance assets excluding coinsurance transactions (note 6)	**(557)**	893
Amortization of (premium) discount on invested assets	**117**	212
Other amortization	**622**	743
Net realized and unrealized (gains) losses and impairment on assets	**(20,336)**	8,761
Deferred income tax expense (recovery)	**(332)**	1,024
Stock option expense	**(1)**	(1)
Cash provided by operating activities before undernoted items	**19,273**	19,737
Changes in policy related and operating receivables and payables	**1,798**	(371)
Cash provided by (used in) operating activities	**21,071**	19,366
Investing activities		
Purchases and mortgage advances	**(80,610)**	(100,831)
Disposals and repayments	**65,322**	81,764
Change in investment broker net receivables and payables	**1,159**	(128)
Net cash flows from acquisition and disposal of subsidiaries and businesses	**288**	187
Cash provided by (used in) investing activities	**(13,841)**	(19,008)
Financing activities		
Change in repurchase agreements and securities sold but not yet purchased	**266**	(189)
Redemption of capital instruments (note 9)	**(1,500)**	(450)
Secured borrowing from securitization transactions	**107**	250
Changes in deposits from Bank clients, net	**1,819**	1,490
Lease payments (note 2)	**(117)**	–
Note receivable from related parties	**(150)**	(102)
Note payable to related parties	**(3)**	16
Shareholder's dividends paid in cash	**(3,000)**	(2,700)
Contributions from (distributions to) non-controlling interests, net	**(22)**	(60)
Common shares issued, net (note 10)	**–**	850
Cash provided by (used in) financing activities	**(2,600)**	(895)
Cash and short-term securities		
Increase (decrease) during the year	**4,630**	(537)
Effect of foreign exchange rate changes on cash and short-term securities	**(465)**	821
Balance, beginning of year	**15,353**	15,069
Balance, December 31	**19,518**	15,353
Cash and short-term securities		
Beginning of year		
Gross cash and short-term securities	**16,186**	15,936
Net payments in transit, included in other liabilities	**(833)**	(867)
Net cash and short-term securities, January 1	**15,353**	15,069
End of year		
Gross cash and short-term securities	**20,270**	16,186
Net payments in transit, included in other liabilities	**(752)**	(833)
Net cash and short-term securities, December 31	**$ 19,518**	$ 15,353
Supplemental disclosures on cash flow information		
Interest received	**$ 11,622**	$ 10,982
Interest paid	**962**	881
Income taxes paid (refund)	**104**	520

The accompanying notes are an integral part of these Consolidated Financial Statements.

Notes to Consolidated Financial Statements

Notes to Consolidated Financial Statements

(Canadian $ in millions unless otherwise stated)

Note 1 Nature of Operations and Significant Accounting Policies

(a) Reporting entity

The Manufacturers Life Insurance Company ("MLI") is a Canadian life insurance company and a wholly owned subsidiary of Manulife Financial Corporation ("MFC"), a publicly traded company. MLI and its subsidiaries (collectively "Manulife" or the "Company") is a leading financial services group with principal operations in Asia, Canada and the United States. Manulife's international network of employees, agents and distribution partners offers financial protection and wealth management products and services to personal and business clients as well as asset management services to institutional customers. The Company operates as Manulife in Canada and Asia and as John Hancock in the United States.

MLI is domiciled in Canada and incorporated under the Insurance Companies Act (Canada) ("ICA"). These Consolidated Financial Statements have been prepared in accordance with International Financial Reporting Standards ("IFRS") as issued by the International Accounting Standards Board ("IASB") and the accounting requirements of the Office of the Superintendent of Financial Institutions, Canada ("OSFI").

These Consolidated Financial Statements as at and for the year ended December 31, 2019 were authorized for issue by MLI's Board of Directors on February 12, 2020.

(b) Basis of preparation

The preparation of Consolidated Financial Statements in conformity with IFRS requires management to make judgments, estimates and assumptions that affect the application of accounting policies and the reported amounts of assets and liabilities, and the disclosure of contingent assets and liabilities as at the date of the Consolidated Financial Statements, and the reported amounts of revenue and expenses during the reporting periods. Actual results may differ from these estimates. The most significant estimation processes relate to assumptions used in measuring insurance and investment contract liabilities, assessing assets for impairment, determining of pension and other post-employment benefit obligation and expense assumptions, determining income taxes and uncertain tax positions and fair valuation of certain invested assets. Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognized in the year in which the estimates are revised and in any future years affected. Although some variability is inherent in these estimates, management believes that the amounts recorded are appropriate. The significant accounting policies used and the most significant judgments made by management in applying these accounting policies in the preparation of these Consolidated Financial Statements are summarized below.

(c) Fair value measurement

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction (not a forced liquidation or distress sale) between market participants at the measurement date, that is, an exit value.

When available, quoted market prices are used to determine fair value. If quoted market prices are not available, fair value is typically based upon alternative valuation techniques such as discounted cash flows, matrix pricing, consensus pricing services and other techniques. Broker quotes are generally used when external public vendor prices are not available.

The Company has a process in place that includes a review of price movements relative to the market, a comparison of prices between vendors, and a comparison to internal matrix pricing which uses predominately external observable data. Judgment is applied in adjusting external observable data for items including liquidity and credit factors.

The Company categorizes its fair value measurements according to a three-level hierarchy. The hierarchy prioritizes the inputs used by the Company's valuation techniques. A level is assigned to each fair value measurement based on the lowest level input significant to the fair value measurement in its entirety. The three levels of the fair value hierarchy are defined as follows:

Level 1 – Fair value measurements that reflect unadjusted, quoted prices in active markets for identical assets and liabilities that the Company can access at the measurement date reflecting market transactions.

Level 2 – Fair value measurements using inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly or indirectly. These include quoted prices for similar assets and liabilities in active markets, quoted prices for identical or similar assets and liabilities in inactive markets, inputs that are observable that are not prices (such as interest rates, credit risks, etc.) and inputs that are derived from or corroborated by observable market data. Most debt securities are classified within Level 2. Also, included in the Level 2 category are derivative instruments that are priced using models with observable market inputs, including interest rate swaps, equity swaps, and foreign currency forward contracts.

Level 3 – Fair value measurements using significant non-market observable inputs. These include valuations for assets and liabilities that are derived using data, some or all of which is not market observable, including assumptions about risk. Level 3 securities include less liquid securities such as real estate investment property, other invested assets, timber investments held within segregated funds, certain long-duration bonds and other securities that have little or no price transparency. Certain derivative financial instruments are also included in Level 3.

(d) Basis of consolidation

MLI consolidates the financial statements of all entities, including certain structured entities that it controls. Subsidiaries are entities controlled by the Company. The Company has control over an entity when the Company has the power to govern the financial and operating policies of the entity, is exposed to variable returns from its activities which are significant in relation to the total variable returns of the entity and the Company is able to use its power over the entity to affect its share of variable returns. In assessing control, significant judgment is applied while considering all relevant facts and circumstances. When assessing decision-making power, the Company considers the extent of its rights relative to the management of an entity, the level of voting rights held in an entity which are potentially or presently exercisable, the existence of any contractual management agreements which may provide the Company with power over an entity's financial and operating policies and to the extent of other parties' ownership in an entity, if any, the possibility for de facto control being present. When assessing returns, the Company considers the significance of direct and indirect financial and non-financial variable returns to the Company from an entity's activities in addition to the proportionate significance of such returns. The Company also considers the degree to which its interests are aligned with those of other parties investing in an entity and the degree to which it may act in its own interest.

The financial statements of subsidiaries are included in MLI's consolidated results from the date control is established and are excluded from consolidation from the date control ceases. The initial control assessment is performed at inception of the Company's involvement with the entity and is reconsidered at a later date if the Company acquires or loses power over key operating and financial policies of the entity; acquires additional interests or disposes of interests in the entity; the contractual arrangements of the entity are amended such that the Company's proportionate exposure to variable returns changes; or if the Company's ability to use its power to affect its variable returns from the entity changes.

The Company's Consolidated Financial Statements have been prepared using uniform accounting policies for like transactions and events in similar circumstances. Intercompany balances, and income and expenses arising from intercompany transactions, have been eliminated in preparing the Consolidated Financial Statements.

Non-controlling interests are interests of other parties in the equity of MLI's subsidiaries and are presented within total equity, separate from the equity of MLI's shareholder. Non-controlling interests in the net income and other comprehensive income ("OCI") of MLI's subsidiaries are included in total net income and total OCI, respectively. An exception to this occurs where the subsidiary's shares are required to be redeemed for cash on a fixed or determinable date, in which case other parties' interests in the subsidiary's capital are presented as liabilities of the Company and other parties in the subsidiary's income and OCI are recorded as expenses of the Company.

The equity method of accounting is used to account for entities over which the Company has significant influence or joint control ("associates" or "joint ventures"), whereby the Company records its share of the associate's or joint venture's net assets and financial results using uniform accounting policies for similar transactions and events. Significant judgment is used to determine whether voting rights, contractual management and other relationships with the entity, if any, provide the Company with significant influence or joint control over the entity. Gains and losses on the sale of associates or joint ventures are included in income when realized, while impairment losses are recognized immediately when there is objective evidence of impairment. Gains and losses on commercial transactions with associates or joint ventures are eliminated to the extent of the Company's interest in the associate or joint venture. Investments in associates or joint ventures are included in other invested assets on the Company's Consolidated Statements of Financial Position.

(e) Invested assets

Invested assets that are considered financial instruments are classified as fair value through profit or loss ("FVTPL"), loans and receivables, or as available-for-sale ("AFS") financial assets. The Company determines the classification of its financial assets at initial recognition. Invested assets are recognized initially at fair value plus, in the case of investments not at FVTPL, directly attributable transaction costs. Invested assets are classified as financial instruments at FVTPL if they are held for trading, if they are designated by management under the fair value option, or if they are designated by management when they include one or more embedded derivatives. Invested assets classified as AFS are non-derivative financial assets that do not fall into any of the other categories described above.

Valuation methods for the Company's invested assets are described above. All fair value valuations are performed in accordance with IFRS 13 "Fair Value Measurement". Disclosure of financial instruments carried at fair value with the three levels of the fair value hierarchy and the disclosure of the fair value for financial instruments not carried at fair value on the Consolidated Statements of Financial Position are presented in note 3. Fair value valuations are performed by the Company and by third-party service providers. When third-party service providers are engaged, the Company performs a variety of procedures to corroborate pricing information. These procedures may include, but are not limited to, inquiry and review of valuation techniques, inputs to the valuation and vendor controls reports.

Cash and short-term securities comprise of cash, current operating accounts, overnight bank and term deposits, and fixed income securities held for meeting short-term cash commitments. Short-term securities are carried at fair value. Short-term securities are comprised of investments due to mature within one year of the date of purchase. Commercial paper and discount notes are classified as Level 2 because these securities are typically not actively traded. Net payments in transit and overdraft bank balances are included in other liabilities.

Debt securities are carried at fair value. Debt securities are generally valued by independent pricing vendors using proprietary pricing models incorporating current market inputs for similar instruments with comparable terms and credit quality (matrix pricing). The significant inputs include, but are not limited to, yield curves, credit risks and spreads, prepayment rates and volatility of these inputs. These debt securities are classified as Level 2 but can be Level 3 if significant inputs are market unobservable. Realized gains and losses on sale of debt securities and unrealized gains and losses on debt securities designated as FVTPL are recognized in investment income immediately. Unrealized gains and losses on AFS debt securities are recorded in OCI, except for unrealized gains and losses on foreign currency translation which are included in income. Impairment losses on AFS debt securities are recognized in income on an individual security basis when there is objective evidence of impairment. Impairment is considered to have occurred, based on management's judgment, when it is deemed probable that the Company will not be able to collect all amounts due according to the debt security's contractual terms.

Equities are comprised of common and preferred equities and are carried at fair value. Equities are generally classified as Level 1, as fair values are normally based on quoted market prices. Realized gains and losses on sale of equities and unrealized gains and losses on equities designated as FVTPL are recognized in investment income immediately. Unrealized gains and losses on AFS equities are recorded in OCI. Impairment losses on AFS equities are recognized in income on an individual security basis when there is objective evidence of impairment. Impairment is considered to have occurred when fair value has declined below cost by a significant amount or for a prolonged period of time. Judgment is applied in determining whether the decline is significant or prolonged.

Mortgages are carried at amortized cost and are classified as Level 3 for fair value purposes due to the lack of market observability of certain significant valuation inputs. Realized gains and losses are recorded in investment income immediately. Impairment losses are recorded on mortgages when there is no longer reasonable assurance as to the timely collection of the full amount of principal and interest and are measured based on the discounted value of expected future cash flows at the original effective interest rates inherent in the mortgage. Expected future cash flows of impaired mortgages are typically determined with reference to the fair value of collateral security underlying the mortgage, net of expected costs of realization and including any applicable insurance recoveries. Significant judgment is applied in the determination of impairment including the timing and amount of future collections.

The Company accounts for insured and uninsured mortgage securitizations as secured financing transactions since the criteria for sale accounting are not met. For these transactions, the Company continues to recognize the mortgages and records a liability in other liabilities for the amounts owed at maturity. Interest income from these mortgages and interest expense on the borrowings are recorded using the effective interest rate method.

Private placements, which include corporate loans for which there is no active market, are carried at amortized cost and are generally classified as Level 2 for fair value disclosure purposes or as Level 3 if significant inputs are market unobservable. Realized gains and losses are recorded in income immediately. Impairment losses are recorded on private placements when there is no longer assurance as to the timely collection of the full amount of principal and interest. Impairment is measured based on the discounted value of expected future cash flows at the original effective interest rate inherent in the loan. Significant judgment is applied in the determination of impairment including the timing and amount of future collections.

Policy loans are carried at an amount equal to their unpaid balances and are classified as Level 2 for fair value disclosure purposes. Policy loans are fully collateralized by the cash surrender value of the underlying policies.

Loans to Manulife Bank of Canada ("Manulife Bank" or "Bank") clients are carried at amortized cost and are classified as Level 2 for fair value disclosure purposes. A loan to a Bank client is considered impaired when there is objective evidence of impairment because of one or more loss events that have occurred after initial recognition, with a negative impact on the estimated future cash flows of the loan.

Once established, allowances for impairment of mortgages, private placements and loans to Bank clients are reversed only if the conditions that caused the impairment no longer exist. Reversals of impairment charges on AFS debt securities are only recognized in income to the extent that increases in fair value can be attributed to events after the impairment loss being recorded. Impairment losses for AFS equity instruments are not reversed through income. On disposition of an impaired asset, any allowance for impairment is released.

In addition to impairments and provisions for loan losses (recoveries) reported in investment income, the measurement of insurance contract liabilities, via investment return assumptions, includes expected future credit losses on fixed income investments. Refer to note 6(d).

Interest income is recognized on debt securities, mortgages, private placements, policy loans and loans to Bank clients as it accrues and is calculated using the effective interest rate method. Premiums, discounts and transaction costs are amortized over the life of the underlying investment using the effective yield method for all debt securities as well as mortgages and private placements.

The Company records purchases and sales of invested assets on a trade date basis, except for loans originated by the Company, which are recognized on a settlement date basis.

Real estate consists of both own use and investment property. Own use property is carried at cost less accumulated depreciation and any accumulated impairment losses. Depreciation is calculated based on the cost of an asset less its residual value and is recognized in income on a straight-line basis over the estimated useful life ranging from 30 to 60 years. Impairment losses are recorded in income to the extent the recoverable amount is less than the carrying amount. Where own use property is included in assets backing insurance contract liabilities, the fair value of the property is used in the valuation of insurance contract liabilities. Own use property is classified as Level 3 for fair value disclosure purposes.

An investment property is a property held to earn rental income, for capital appreciation, or both. Investment properties are measured at fair value, with changes in fair value recognized in income. Fair value is determined using external appraisals that are based on the highest and best use of the property. The valuation techniques include discounted cash flows, the direct capitalization method as well as comparable sales analysis and include both observable and unobservable inputs. Inputs include existing and assumed tenancies, market data from recent comparable transactions, future economic outlook and market risk assumptions, capitalization rates and internal rates of return. Investment properties are classified as Level 3 for fair value disclosure purposes.

When a property changes from own use to investment property, any gain or loss arising on the remeasurement of the property to fair value at the date of transfer is recognized in OCI, to the extent that it is not reversing a previous impairment loss. Reversals of impairment losses are recognized in income.

Other invested assets include private equity and property investments held in infrastructure and timber, as well as in agriculture and oil and gas sectors. Private equity investments are accounted for as associates or joint ventures using the equity method (as described in note 1(d) above) or are classified as FVTPL or AFS and carried at fair value. Investments in oil and gas exploration and evaluation activities are measured on the cost basis using the "successful efforts" method. Timber and agriculture properties are measured at fair value with changes in fair value recognized in income, except for buildings, equipment and bearer plants which are measured at amortized cost. The fair value of other invested assets is determined using a variety of valuation techniques as described in note 3. Other invested assets that are measured or disclosed at fair value are classified as Level 3.

Other invested assets also include investments in leveraged leases, which are accounted for using the equity method. The carrying value under the equity method reflects the amortized cost of the lease receivable and related non-recourse debt using the effective yield method.

(f) Goodwill and intangible assets

Goodwill represents the difference between the fair value of purchase consideration of an acquired business and the Company's proportionate share of the net identifiable assets acquired. It is initially recorded at cost and subsequently measured at cost less any accumulated impairment.

Goodwill is tested for impairment at least annually and whenever events or changes in circumstances indicate that the carrying amounts may not be recoverable at the cash generating unit ("CGU") or group of CGUs level. The Company allocates goodwill to CGUs or groups of CGUs for impairment testing based on the lowest level within the entity in which the goodwill is monitored for internal management purposes. The allocation is made to those CGUs or groups of CGUs that are expected to benefit from the business combination in which the goodwill arose. Any potential impairment of goodwill is identified by comparing the recoverable amount with the carrying value of a CGU or group of CGUs. Goodwill is reduced by the amount of deficiency, if any. If the deficiency exceeds the carrying amount of goodwill, the carrying values of the remaining assets in the CGU or group of CGUs are subject to being reduced by the excess on a pro-rata basis.

The recoverable amount of a CGU is the higher of the estimated fair value less costs to sell or the value-in-use of the CGU. In assessing value-in-use, estimated future cash flows are discounted using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset. In some cases, the most recent detailed calculation made in a prior period of the recoverable amount of a CGU is used in the testing of impairment of goodwill in the current period. This is the case only if there are no significant changes to the CGU, the likelihood of impairment is remote based on the analysis of current events and circumstances, and the most recently calculated recoverable amount substantially exceeds the current carrying amount of the CGU.

Intangible assets with indefinite useful lives include the John Hancock brand name, certain investment management contracts and agricultural water rights. The indefinite useful life assessment for brand is based on the brand name being protected in markets where branded products are sold by trademarks, which are renewable indefinitely, and for certain investment management contracts due to the ability to renew these contracts indefinitely. In addition, there are no legal, regulatory or contractual provisions that limit the useful lives of these intangible assets. An intangible asset with an indefinite useful life is not amortized but is subject to an annual impairment test which is performed more frequently if an indication that it is not recoverable arises.

Intangible assets with finite useful lives include acquired distribution networks, customer relationships, capitalized software, certain investment management contracts and other contractual rights. Distribution networks, customer relationships, and other finite life intangible assets are amortized over their estimated useful lives, six to 68 years, either based on straight-line or in relation to other asset consumption metrics. Software intangible assets are amortized on a straight-line basis over their estimated useful lives of three to five years. Finite life intangible assets are assessed for indicators of impairment at each reporting period. If any indication of impairment exists, these assets are subject to an impairment test.

(g) Miscellaneous assets

Miscellaneous assets include assets held in a rabbi trust with respect to unfunded defined benefit obligations, defined benefit assets, if any (refer to note 1(o)), deferred acquisition costs and capital assets. Deferred acquisition costs are carried at cost less accumulated amortization. These costs are recognized over the period where redemption fees may be charged or over the period revenue is earned. Capital assets are carried at cost less accumulated amortization computed on a straight-line basis over their estimated useful lives, which vary from two to 10 years.

(h) Segregated funds

The Company manages segregated funds on behalf of policyholders. The investment returns on these funds are passed directly to policyholders. In some cases, the Company has provided guarantees associated with these funds.

Segregated funds net assets are measured at fair value and include investments in mutual funds, debt securities, equities, cash, short-term investments and other investments. With respect to the consolidation requirement of IFRS, in assessing the Company's degree of control over the underlying investments, the Company considers the scope of its decision-making rights, the rights held by other parties, its remuneration as an investment manager and its exposure to variability of returns. The Company has determined that it does not have control over the underlying investments as it acts as an agent on behalf of segregated fund policyholders.

The methodology applied to determine the fair value of investments held in segregated funds is consistent with that applied to invested assets held by the general fund, as described above in note 1(e). Segregated funds liabilities are measured based on the value of the segregated funds net assets. Investment returns on segregated funds assets belong to policyholders and the Company does not bear the risk associated with these assets outside of guarantees offered on certain variable life and annuity products, for which the underlying investments are held within segregated funds. Accordingly, investment income earned by segregated funds and expenses incurred by segregated funds are offset and are not separately presented in the Consolidated Statements of Income. Fee income earned by the Company for managing the segregated funds is included in other revenue.

Liabilities related to guarantees associated with certain segregated funds, as a result of certain variable life and annuity contracts, are recorded within the Company's insurance contract liabilities. The Company holds assets supporting these guarantees in the general fund, which are included in invested assets according to their investment type.

(i) Insurance and investment contract liabilities

Most contracts issued by the Company are considered insurance, investment or service contracts. Contracts under which the Company accepts significant insurance risk from a policyholder are classified as insurance contracts in the Consolidated Financial Statements. A contract is considered to have significant insurance risk if, and only if, an insured event could cause an insurer to make significant additional payments in any scenario, excluding scenarios that lack commercial substance at the inception of the contract. Contracts under which the Company does not accept significant insurance risk are either classified as investment contracts or considered service contracts and are accounted for in accordance with IAS 39 "Financial Instruments: Recognition and Measurement" or IFRS 15 "Revenue from Contracts with Customers", respectively.

Once a contract has been classified as an insurance contract it remains an insurance contract even if the insurance risk reduces significantly. Investment contracts can be reclassified as insurance contracts if insurance risk subsequently becomes significant.

Insurance contract liabilities, net of reinsurance assets, represent the amount which, together with estimated future premiums and net investment income, will be sufficient to pay estimated future benefits, policyholder dividends and refunds, taxes (other than income taxes) and expenses on policies in-force. Insurance contract liabilities are presented gross of reinsurance assets on the Consolidated Statements of Financial Position. The Company's Appointed Actuary is responsible for determining the amount of insurance contract liabilities in accordance with standards established by the Canadian Institute of Actuaries. Insurance contract liabilities, net of reinsurance assets, have been determined using the Canadian Asset Liability Method ("CALM") as permitted by IFRS 4 "Insurance Contracts". Refer to note 6.

Investment contract liabilities include contracts issued to retail and institutional investors that do not contain significant insurance risk. Investment contract liabilities and deposits are measured at amortized cost or at fair value by election. The election reduces accounting mismatches between assets supporting these contracts and the related policy liabilities. Investment contract liabilities are derecognized when the contract expires, is discharged or is cancelled.

Derivatives embedded within insurance contracts are separately accounted for as derivatives if they are not considered to be closely related to the host insurance contract and do not meet the definition of an insurance contract. These embedded derivatives are presented separately in other assets or other liabilities and are measured at fair value with changes in fair value recognized in income.

(j) Reinsurance assets

The Company uses reinsurance in the normal course of business to manage its risk exposure. Insurance ceded to a reinsurer does not relieve the Company from its obligations to policyholders. The Company remains liable to its policyholders for the portion reinsured to the extent that any reinsurer does not meet its obligations for reinsurance ceded to it under a reinsurance agreement.

Reinsurance assets represent the benefit derived from reinsurance agreements in-force at the reporting date, considering the financial condition of the reinsurer. Amounts recoverable from reinsurers are estimated in accordance with the terms of the relevant reinsurance contract.

Gains or losses on reinsurance transactions are recognized in income immediately on the transaction date and are not amortized. Premiums ceded and claims reimbursed are presented on a gross basis on the Consolidated Statements of Income. Reinsurance assets are not offset against the related insurance contract liabilities and are presented separately on the Consolidated Statements of Financial Position. Refer to note 6(a).

(k) Other financial instruments accounted for as liabilities

The Company issues a variety of other financial instruments classified as liabilities, including notes payable, term notes, senior notes, senior debentures, subordinated notes, surplus notes and preferred shares. These financial liabilities are measured at amortized cost, with issuance costs deferred and amortized using the effective interest rate method.

(l) Income taxes

The provision for income taxes is calculated based on income tax laws and income tax rates substantively enacted as at the date of the Consolidated Statements of Financial Position. The income tax provision is comprised of current income taxes and deferred income taxes. Current and deferred income taxes relating to items recognized in OCI and directly in equity are similarly recognized in OCI and directly in equity, respectively.

Current income taxes are amounts expected to be payable or recoverable for the current year and any adjustments to taxes payable in respect of previous years.

Deferred income taxes are provided for using the liability method and result from temporary differences between the carrying values of assets and liabilities and their respective tax bases. Deferred income taxes are measured at the substantively enacted tax rates that are expected to be applied to temporary differences when they reverse.

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. Deferred tax assets and liabilities are offset if there is a legally enforceable right to offset current tax assets and liabilities and they relate to income taxes levied by the same tax authority on the same taxable entity.

Deferred tax liabilities are recognized for all taxable temporary differences, except in respect of taxable temporary differences associated with investments in subsidiaries, associates and joint ventures, where the timing of the reversal of the temporary differences can be controlled and it is probable that the temporary differences will not reverse in the foreseeable future.

The Company records liabilities for uncertain tax positions if it is probable that the Company will make a payment on tax positions due to examinations by tax authorities. These provisions are measured at the Company's best estimate of the amount expected to be paid. Provisions are reversed to income in the period in which management assesses they are no longer required or determined by statute.

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 current income taxes and deferred 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 year. The Company may be required to change its provision for income taxes or deferred income tax balances when the ultimate deductibility of certain items is successfully challenged by taxing authorities, or if estimates used in determining the amount of deferred tax balances to recognize change significantly, or when receipt of new information indicates the need for adjustment in the amount of deferred income taxes to be recognized. 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 taxes, deferred tax balances and the effective tax rate. Any such changes could materially affect the amounts reported in the Consolidated Financial Statements in the period these changes occur.

(m) Foreign currency translation

Items included in the financial statements of each of the Company's subsidiaries, joint ventures and associates are measured by each entity using the currency of the primary economic environment in which the entity operates (the "functional currency"). If their functional currency is other than Canadian dollar, these entities are foreign operations of the Company.

Transactions in a foreign currency are translated to the functional currency at the exchange rate prevailing at the date of the transaction. Assets and liabilities denominated in foreign currencies are translated to the functional currency at the exchange rate in effect at the reporting date. Revenue and expenses denominated in foreign currencies are translated at the average exchange rate prevailing during the quarter reported. Exchange gains and losses are recognized in income except for translation of net investments in foreign operations and the results of hedging these positions, and for non-monetary items designated as AFS. These foreign exchange gains and losses are recognized in OCI until such time that the foreign operation or non-monetary item is disposed of or control or significant influence over it is lost.

The Consolidated Financial Statements are presented in Canadian dollars. The financial statements of the Company's foreign operations are translated from their functional currencies to Canadian dollars; assets and liabilities are translated at the exchange rate at the reporting date, and revenue and expenses are translated using the average exchange rates for the period. These foreign exchange gains and losses are included in OCI.

(n) Stock-based compensation

The Company provides stock-based compensation to certain employees and directors as described in note 13. Compensation expense of equity instruments is accrued based on the best estimate of the number of instruments expected to vest, with revisions made to that estimate if subsequent information indicates that actual forfeitures are likely to differ from initial estimates, unless forfeitures are due to market-based conditions.

Stock options are expensed with a corresponding increase in contributed surplus. Restricted share units and deferred share units are expensed with a corresponding liability accrued based on the market value of MFC's common shares at the end of each quarter.

Performance share units are expensed with a corresponding liability accrued based on specific performance conditions and the market value of MFC's common shares at the end of each quarter. The change in the value of the awards resulting from changes in the market value of MFC's common shares or changes in the specific performance conditions and credited dividends is recognized in income, offset by the impact of total return swaps used to manage the variability of the related liability.

Stock-based compensation cost is recognized over the applicable vesting period, unless the employee is eligible to retire at the time of grant or will be eligible to retire during the vesting period. Compensation cost, attributable to stock options, restricted share units, and performance share units granted to employees who are eligible to retire on the grant date or who will become eligible to retire during the vesting period, is recognized at the grant date or over the period from the grant date to the date of retirement eligibility, respectively.

The Company's contributions to the Global Share Ownership Plan ("GSOP") (refer to note 13), are expensed as incurred. Under the GSOP, subject to certain conditions, the Company will match a percentage of an employee's eligible contributions to certain maximums. All contributions are used by the plan's trustee to purchase MFC common shares in the open market.

(o) 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 and disability welfare plans that are typically not funded.

The Company's obligation in respect of defined benefit pension and other post-employment benefits is calculated for each plan as the estimated present value of future benefits that eligible employees have earned in return for their service up to the reporting date using the projected benefit method. The discount rate used is based on the yield, as at the reporting date, of high-quality corporate debt securities that have approximately the same term as the obligations and that are denominated in the same currency in which the benefits are expected to be paid.

To determine the Company's net defined benefit asset or liability, the fair value of plan assets is deducted from the defined benefit obligations. When this calculation results in a surplus, the asset that can be recognized is limited to the present value of future economic benefit available in the form of future refunds from the plan or reductions in future contributions to the plan (the asset limit). Defined benefit assets are included in other assets and defined benefit liabilities are included in other liabilities.

Changes in the net defined benefit asset or liability due to re-measurement of pension and retiree welfare plans are recorded in OCI in the period in which they occur and are not reclassified to income in subsequent periods. They consist of actuarial gains and losses, the impact of the asset limit, if any, and the return on plan assets, excluding amounts included in net interest income or expense. Changes in the net defined benefit asset or liability due to re-measurement of disability welfare plans are recorded in income in the period in which they occur.

The cost of defined benefit pension plans is recognized over the employee's years of service to retirement while the cost of retiree welfare plans is recognized over the employee's years of service to their date of full eligibility. The net benefit cost for the year is recorded in income and is calculated as the sum of the service cost in respect of the fiscal year, the net interest income or expense and any applicable administration expenses, plus past service costs or credits resulting from plan amendments or curtailments. The net interest income or expense is determined by applying the discount rate to the net defined benefit asset or liability. The current year cost of disability welfare plans is the year-over-year change in the defined benefit obligation, including any actuarial gains or losses.

The cost of defined contribution plans is the contribution provided by the Company and is recorded in income in the periods during which services are rendered by employees.

(p) Derivative and hedging instruments

The Company uses derivative financial instruments ("derivatives") including swaps, forward and futures agreements, and options to manage current and anticipated exposures to changes in interest rates, foreign exchange rates, commodity prices and equity market prices, and to replicate permissible investments. Derivatives embedded in other financial instruments are separately recorded as derivatives when their economic characteristics and risks are not closely related to those of the host instrument, the terms of the embedded derivative are the same as those of a standalone derivative and the host instrument itself is not recorded at FVTPL. Derivatives are recorded at fair value. Derivatives with unrealized gains are reported as derivative assets and derivatives with unrealized losses are reported as derivative liabilities.

A determination is made for each derivative as to whether to apply hedge accounting. Where hedge accounting is not applied, changes in the fair value of derivatives are recorded in investment income. Refer to note 3(c).

Where the Company has elected to apply hedge accounting, a hedging relationship is designated and documented at inception. Hedge effectiveness is evaluated at inception and throughout the term of the hedge. Hedge accounting is only applied when the Company expects that the hedging relationship will be highly effective in achieving offsetting changes in fair value or changes in cash flows attributable to the risk being hedged. The assessment of hedge effectiveness is performed at the end of each reporting period both prospectively and retrospectively. When it is determined that a hedging relationship is no longer effective, or the hedging instrument or the hedged item has been sold or terminated, the Company discontinues hedge accounting prospectively. In such cases, if the derivatives are not sold or terminated, any subsequent changes in fair value of the derivatives are recognized in investment income.

For derivatives that are designated as hedging instruments, changes in fair value are recorded according to the nature of the risks being hedged, as discussed below.

In a fair value hedging relationship, changes in fair value of the hedging instruments are recorded in investment income, offsetting changes in fair value of the hedged items, which would otherwise not be carried at fair value. Hedge ineffectiveness is recognized in investment income and arises from differences between changes in the fair values of hedging instruments and hedged items. When hedge accounting is discontinued, the carrying value of the hedged item is no longer adjusted and the cumulative fair value adjustments are amortized to investment income over the remaining term of the hedged item unless the hedged item is sold, at which time the balance is recognized immediately in investment income.

In a cash flow hedging relationship, the effective portion of the change in the fair value of the hedging instrument is recorded in OCI while the ineffective portion is recognized in investment income. Gains and losses in accumulated other comprehensive income ("AOCI") are recognized in income during the same periods as the variability in the hedged cash flows or the hedged forecasted transactions are recognized in income. The reclassifications from AOCI are made to investment income, except for total return swaps that hedge restricted share units, which are reclassified to general expenses.

Gains and losses on cash flow hedges in AOCI are reclassified immediately to investment income when the hedged item is sold or the forecasted transaction is no longer expected to occur. When a hedge is discontinued, but the hedged forecasted transaction is expected to occur, the amounts in AOCI are reclassified to investment income in the periods during which variability in the cash flows hedged or the hedged forecasted transaction is recognized in income.

In a net investment in foreign operations hedging relationship, gains and losses relating to the effective portion of the hedge are recorded in OCI. Gains and losses in AOCI are recognized in income during the periods when gains or losses on the underlying hedged net investment in foreign operations are recognized in income.

(q) Premium income and related expenses

Gross premiums for all types of insurance contracts, and contracts with limited mortality or morbidity risk, are generally recognized as revenue when due. Premiums are reported gross of reinsurance ceded (refer to note 6).

(r) Revenue from service contracts

The Company recognizes revenue from service contracts in accordance with IFRS 15. The Company's service contracts generally impose single performance obligations, each consisting of a series of similar related services for each customer. Revenue is recorded as performance obligations are satisfied over time because the customers simultaneously receive and consume the benefits of the services rendered, measured using an output method. Revenue for variable consideration is recognized to the extent that it is highly probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the uncertainty is subsequently resolved. Refer to note 12.

Note 2 Accounting and Reporting Changes

(a) Changes in accounting and reporting policy

(I) IFRS 16 "Leases"

Effective January 1, 2019, the Company adopted IFRS 16 "Leases" which was issued in January 2016 and replaces IAS 17 "Leases" and IFRIC 4 "Determining whether an arrangement contains a lease". IFRS 16 sets out principles for the recognition, measurement, presentation and disclosure of leases for both parties to a contract. The standard brings most leases on-balance sheet under a single model and eliminates the previous classifications of operating and finance leases. Exemptions to this treatment are for lease contracts with low value assets or leases with duration of less than one year. Lessor accounting largely remains unchanged with previous classifications of operating and finance leases continuing.

The Company adopted IFRS 16 using the modified retrospective method with no restatement of comparative information. Right-of-use assets of $381 and lease liabilities of $410 were recognized within miscellaneous assets and other liabilities in the Consolidated Statements of Financial Position, respectively. The net post-tax impact of these adjustments was $22, of which $19 was recognized in shareholder's retained earnings and $3 was recognized in participating policyholders' equity. The assets and liabilities arise primarily from real estate lease contracts.

The Company applied the practical expedient of not reviewing lease classification under IFRS 16 for contracts not previously classified as leases. In addition, the Company has elected to expense lease payments on a straight-line basis for all leases with lease term of 12 months or less or the underlying asset has a low value.

(II) IFRS Interpretation Committee ("IFRIC") Interpretation 23 "Uncertainty over Income Tax Treatments"

Effective January 1, 2019, the Company adopted IFRIC 23 "Uncertainty over Income Tax Treatments" which was issued in June 2017. IFRIC 23 was applied retrospectively. IFRIC 23 provides guidance on applying the recognition and measurement requirements in IAS 12 when there is uncertainty over income tax treatments including whether uncertain tax treatments should be considered together or separately based on which approach better predicts resolution of the uncertainty. Adoption of IFRIC 23 did not have a significant impact on the Company's Consolidated Financial Statements.

(III) Amendments to IAS 28 "Investments in Associates and Joint Ventures"

Effective January 1, 2019, the Company adopted the amendments to IAS 28 "Investments in Associates and Joint Ventures" which were issued in October 2017. The amendments were applied retrospectively. The amendments clarify that an entity applies IFRS 9 "Financial Instruments" to financial interests in an associate or joint venture, aside from investments in equity, to which the equity method is not applied. IAS 39 will be applied to these interests until IFRS 9 is adopted. Adoption of these amendments did not have a significant impact on the Company's Consolidated Financial Statements.

(IV) Annual Improvements 2015–2017 Cycle

Effective January 1, 2019, the Company adopted amendments issued within the Annual Improvements 2015 – 2017 Cycle which was issued in December 2017. The IASB issued four minor amendments to different standards as part of the Annual Improvements process, with the amendments to be applied prospectively. Adoption of these amendments did not have a significant impact on the Company's Consolidated Financial Statements.

(V) Amendments to IAS 19 "Employee Benefits"

Effective January 1, 2019, the Company adopted amendments to IAS 19 "Employee Benefits" which were issued in February 2018. The amendments were applied prospectively. The amendments address the accounting for a plan amendment, curtailment or settlement that occurs within a reporting period. Updated actuarial assumptions must be used to determine current service cost and net interest for the remainder of the reporting period after such an event. The amendments also address how the accounting for asset ceilings are affected by such an event. Adoption of these amendments did not have a significant impact on the Company's Consolidated Financial Statements.

(b) Future accounting and reporting changes

(I) 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. Additionally, the IASB issued amendments in October 2017 that are effective for annual periods beginning on or after January 1, 2019. In June 2019, the exposure draft published for IFRS 17 proposed to extend the deferral date of IFRS 9 by one year to January 1, 2022.

The standard 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 elected to defer IFRS 9 until January 1, 2021 as allowed under IFRS 4 "Insurance Contracts". The Company is assessing the impact of this standard.

(II) IFRS 17 "Insurance Contracts"

IFRS 17 was issued in May 2017 and is effective for years beginning on January 1, 2021, to be applied retrospectively. If full retrospective application to a group of contracts is impractical, the modified retrospective or fair value methods may be used. The standard will replace IFRS 4 "Insurance Contracts" and will materially change the recognition and measurement of insurance contracts and the corresponding presentation and disclosures in the Company's Financial Statements.

Exposure Draft Amendments to IFRS 17 was published in June 2019, which proposed a number of targeted amendments for public consultation. The proposed amendments include a deferral of the effective date of IFRS 17 by one year, to January 1, 2022. The proposed amendments are subject to IASB's re-deliberation process which is expected to conclude in mid-2020. The Company will continue to monitor IASB's future developments related to IFRS 17.

IFRS 17 requires entities to measure insurance contract liabilities on the balance sheet as the total of (a) the fulfillment cash flows – the current estimates of amounts that the Company expects to collect from premiums and pay out for claims, benefits and expenses, including an adjustment for the timing and risk for those amounts; and (b) the contractual service margin – the future profit for providing insurance coverage.

The principles underlying IFRS 17 differ from the CALM as permitted by IFRS 4. While there are many differences, the following outlines two of the key differences:

- Under IFRS 17, the discount rate used to estimate the present value of insurance liabilities is based on the characteristics of the liability, whereas under CALM, the Company uses the rates of returns for current and projected assets supporting policy liabilities to value the liabilities. The difference in the discount rate approach also impacts the timing of investment-related experience earnings emergence. Under CALM, investment-related experience includes investment experience and the impact of investing activities. The impact of investing activities is directly related to the CALM methodology. Under IFRS 17, the impact of investing activities will emerge over the life of the new asset.
- Under IFRS 17, new business gains are recorded on the Consolidated Statements of Financial Position and amortized into income as services are provided. Under CALM, new business gains (and losses) are recognized in income immediately.

The Company is assessing the implications of this standard including proposed amendments and expects that it will have a significant impact on the Company's Consolidated Financial Statements. In addition, in certain jurisdictions, including Canada, it could have a material effect on tax and regulatory capital positions and other financial metrics that are dependent upon IFRS accounting values.

(III) Amendments to IFRS 3 "Business Combinations"

Amendments to IFRS 3 "Business Combinations" were issued in October 2018 and are effective for business combinations occurring on or after January 1, 2020, with earlier application permitted. The amendments revise the definition of a business and permit a simplified assessment of whether an acquired set of activities and assets qualifies as a business. Application of the amendments are expected to result in fewer acquisitions qualifying as business combinations. Adoption of these amendments is not expected to have a significant impact on the Company's Consolidated Financial Statements.

(IV) Amendments to IAS 1 "Presentation of Financial Statements" and IAS 8 "Accounting Policies, Changes in Accounting Estimates and Errors"

Amendments to IAS 1 "Presentation of Financial Statements" and IAS 8 "Accounting Policies, Changes in Accounting Estimates and Errors" were issued in October 2018. The amendments are effective for annual periods beginning on or after January 1, 2020 and are to be applied prospectively. The amendments update the definition of material. Adoption of these amendments is not expected to have a significant impact on the Company's Consolidated Financial Statements.

(V) Interest Rate Benchmark Reform Amendments to IFRS 9, IAS 39 and IFRS 7

Amendments to IFRS 9, IAS 39 and IFRS 7 were issued in September 2019 related to interest rate benchmark reform and are effective retrospectively for annual periods beginning on or after January 1, 2020. The amendments provide temporary relief for hedge accounting to continue during the period of uncertainty before replacement of an existing interest rate benchmark with an alternative risk-free rate. The amendments apply to all hedge accounting relationships that are affected by the interest rate benchmark reform. The IASB is expected to issue further guidance addressing various accounting issues that will arise when the existing interest rate benchmark has been replaced. The Company is assessing the implications of these amendments.

Note 3 Invested Assets and Investment Income

(a) Carrying values and fair values of invested assets

As at December 31, 2019	FVTPL[1]	AFS[2]	Other[3]	Total carrying value[4]	Total fair value[5]
Cash and short-term securities[6]	**$ 1,859**	**$ 12,854**	**$ 5,557**	**$ 20,270**	**$ 20,270**
Debt securities[7]					
Canadian government and agency	**18,582**	**4,779**	**–**	**23,361**	**23,361**
U.S. government and agency	**11,031**	**17,221**	**–**	**28,252**	**28,252**
Other government and agency	**17,383**	**4,360**	**–**	**21,743**	**21,743**
Corporate	**116,044**	**5,285**	**–**	**121,329**	**121,329**
Mortgage/asset-backed securities	**3,267**	**170**	**–**	**3,437**	**3,437**
Public equities	**20,060**	**2,791**	**–**	**22,851**	**22,851**
Mortgages	**–**	**–**	**49,376**	**49,376**	**51,450**
Private placements	**–**	**–**	**37,979**	**37,979**	**41,743**
Policy loans	**–**	**–**	**6,471**	**6,471**	**6,471**
Loans to Bank clients	**–**	**–**	**1,740**	**1,740**	**1,742**
Real estate					
Own use property[8]	**–**	**–**	**1,926**	**1,926**	**3,275**
Investment property	**–**	**–**	**11,002**	**11,002**	**11,002**
Other invested assets					
Alternative long-duration assets[9],[10]	**15,252**	**99**	**9,492**	**24,843**	**25,622**
Various other[11]	**149**	**–**	**3,767**	**3,916**	**3,915**
Total invested assets	**$ 203,627**	**$ 47,559**	**$ 127,310**	**$ 378,496**	**$ 386,463**

As at December 31, 2018	FVTPL[(1)]	AFS[(2)]	Other[(3)]	Total carrying value[(4)]	Total fair value[(5)]
Cash and short-term securities[(6)]	$ 1,080	$ 10,013	$ 5,093	$ 16,186	$ 16,186
Debt securities[(7)]					
Canadian government and agency	16,445	7,342	–	23,787	23,787
U.S. government and agency	11,934	13,990	–	25,924	25,924
Other government and agency	16,159	4,101	–	20,260	20,260
Corporate	107,425	5,245	–	112,670	112,670
Mortgage/asset-backed securities	2,774	179	–	2,953	2,953
Public equities	16,721	2,458	–	19,179	19,179
Mortgages	–	–	48,363	48,363	48,628
Private placements	–	–	35,754	35,754	36,103
Policy loans	–	–	6,446	6,446	6,446
Loans to Bank clients	–	–	1,793	1,793	1,797
Real estate					
Own use property[(8)]	–	–	2,016	2,016	3,179
Investment property	–	–	10,761	10,761	10,761
Other invested assets					
Alternative long-duration assets[(9),(10)]	14,720	101	8,617	23,438	24,211
Various other[(11)]	151	–	3,951	4,102	4,102
Total invested assets	$ 187,409	$ 43,429	$ 122,794	$ 353,632	$ 356,186

(1) FVTPL classification was elected for securities backing insurance contract liabilities to substantially reduce any accounting mismatch arising from changes in the fair value of these assets and changes in the value of the related insurance contract liabilities. If this election had not been made and instead the AFS classification was selected, there would be an accounting mismatch because changes in insurance contract liabilities are recognized in net income rather than in OCI.

(2) Securities that are designated as AFS are not actively traded by the Company but sales do occur as circumstances warrant. Such sales result in a reclassification of any accumulated unrealized gain (loss) in AOCI to net income as a realized gain (loss).

(3) Primarily includes assets classified as loans and carried at amortized cost, own use properties, investment properties, equity method accounted investments, oil and gas investments, and leveraged leases. Refer to note 1(e) for further details regarding accounting policy.

(4) Fixed income invested assets above include debt securities, mortgages, private placements and approximately $179 (2018 – $116) other invested assets, which primarily have contractual cash flows that qualify as SPPI. Fixed income invested assets which do not have SPPI qualifying cash flows as at December 31, 2019 include debt securities, private placements and other invested assets with fair values of $98, $257 and $373, respectively (2018 – $105, $230 and $465). The change in the fair value of these invested assets during the year was $71 (2018 – $21).

(5) The methodologies used in determining fair values of invested assets are described in note 1(c) and note 3(g).

(6) Includes short-term securities with maturities of less than one year at acquisition amounting to $3,806 (2018 – $2,530), cash equivalents with maturities of less than 90 days at acquisition amounting to $10,907 (2018 – $8,563) and cash of $5,557 (2018 – $5,093).

(7) Debt securities include securities which were acquired with maturities of less than one year and less than 90 days of $537 and $69, respectively (2018 – $870 and $40, respectively).

(8) Includes accumulated depreciation of $414 (2018 – $391).

(9) Alternative long-duration assets ("ALDA") include investments in private equity of $6,396, infrastructure of $8,854, oil and gas of $3,245, timber and agriculture of $4,669 and various other invested assets of $1,679 (2018 – $6,769, $7,970, $3,416, $4,493 and $790, respectively). During the year, a group of investments in hydro-electric power of $418 was sold. This group of investments was previously classified as held for sale.

(10) In 2019, the Company sold $1,112 of North American Private Equity investments to Manulife Private Equity Partners, L.P, a closed-end pooled fund of funds. The Company provides management services to the fund. In 2018, the Company sold the following invested assets to related parties: $1,422 of infrastructure ALDA was sold to the John Hancock Infrastructure Master Fund L.P. in the USA, an associate of the Company which is a structured entity based on partnership voting rights, the Company provides management services to the fund and owns less than 1% of the ownership interest; $510 of U.S. commercial real estate was sold to the Manulife US Real Estate Investment Trust in Singapore, an associate of the Company which is a structured entity based on unitholder voting rights, the Company provides management services to the trust and owns approximately 8.5% of its units; and $1,314 of U.S. commercial real estate was sold to three joint ventures which are structured entities based on voting rights.

(11) Includes $3,371 (2018 – $3,575) of leveraged leases. Refer to note 1(e) regarding accounting policy.

(b) Equity method accounted invested assets

Other invested assets include investments in associates and joint ventures which are accounted for using the equity method of accounting as presented in the following table.

	2019		2018	
As at December 31,	Carrying value	% of total	Carrying value	% of total
Leveraged leases	**$ 3,371**	**43**	$ 3,575	51
Timber and agriculture	**668**	**9**	599	9
Real estate	**1,031**	**13**	725	11
Other	**2,714**	**35**	1,956	29
Total	**$ 7,784**	**100**	$ 6,855	100

The Company's share of profit and dividends from these investments for the year ended December 31, 2019 were $369 and $5, respectively (2018 – $369 and $13).

(c) Investment income

For the year ended December 31, 2019	FVTPL	AFS	Other[1]	Total
Cash and short-term securities				
Interest income	$ 32	$ 361	$ –	$ 393
Gains (losses)[2]	5	(22)	–	(17)
Debt securities				
Interest income	5,551	783	–	6,334
Gains (losses)[2]	11,595	472	–	12,067
Recovery (impairment loss), net	(9)	1	–	(8)
Public equities				
Dividend income	552	69	–	621
Gains (losses)[2]	3,079	109	–	3,188
Impairment loss, net	–	(24)	–	(24)
Mortgages				
Interest income	–	–	1,951	1,951
Gains (losses)[2]	–	–	26	26
Recovery (provision), net	–	–	31	31
Private placements				
Interest income	–	–	1,782	1,782
Gains (losses)[2]	–	–	(62)	(62)
Impairment loss, net	–	–	(35)	(35)
Policy loans	–	–	391	391
Loans to Bank clients				
Interest income	–	–	87	87
Provision, net	–	–	(1)	(1)
Real estate				
Rental income, net of depreciation[3]	–	–	505	505
Gains (losses)[2]	–	–	508	508
Derivatives				
Interest income, net	579	–	(25)	554
Gains (losses)[2]	2,617	–	29	2,646
Other invested assets				
Interest income	–	–	69	69
Oil and gas, timber, agriculture and other income	–	–	1,866	1,866
Gains (losses)[2]	745	(1)	35	779
Recovery (impairment loss), net	–	–	93	93
Total investment income	$ 24,746	$ 1,748	$ 7,250	$ 33,744
Investment income				
Interest income	$ 6,162	$ 1,144	$ 4,255	$ 11,561
Dividend, rental and other income	552	69	2,371	2,992
Impairments, provisions and recoveries, net	(9)	(23)	88	56
Other	333	546	56	935
	7,038	1,736	6,770	15,544
Realized and unrealized gains (losses) on assets supporting insurance and investment contract liabilities and on macro equity hedges				
Debt securities	11,520	6	–	11,526
Public equities	2,865	6	–	2,871
Mortgages	–	–	26	26
Private placements	–	–	(62)	(62)
Real estate	–	–	514	514
Other invested assets	777	–	(27)	750
Derivatives, including macro equity hedging program	2,546	–	29	2,575
	17,708	12	480	18,200
Total investment income	$ 24,746	$ 1,748	$ 7,250	$ 33,744

For the year ended December 31, 2018	FVTPL	AFS	Other[1]	Total
Cash and short-term securities				
Interest income	$ 18	$ 293	$ –	$ 311
Gains (losses)[2]	(72)	58	–	(14)
Debt securities				
Interest income	5,429	646	–	6,075
Gains (losses)[2]	(6,015)	(312)	–	(6,327)
Recovery (impairment loss), net	18	–	–	18
Public equities				
Dividend income	484	72	–	556
Gains (losses)[2]	(1,596)	330	–	(1,266)
Impairment loss	–	(43)	–	(43)
Mortgages				
Interest income	–	–	1,824	1,824
Gains (losses)[2]	–	–	56	56
Provision, net	–	–	(8)	(8)
Private placements				
Interest income	–	–	1,729	1,729
Gains (losses)[2]	–	–	(83)	(83)
Impairment loss, net	–	–	(10)	(10)
Policy loans	–	–	371	371
Loans to Bank clients				
Interest income	–	–	81	81
Provision, net	–	–	(1)	(1)
Real estate				
Rental income, net of depreciation[3]	–	–	515	515
Gains (losses)[2]	–	–	445	445
Derivatives				
Interest income, net	689	–	(41)	648
Gains (losses)[2]	(2,192)	–	(35)	(2,227)
Other invested assets				
Interest income	–	–	74	74
Oil and gas, timber, agriculture and other income	–	–	1,778	1,778
Gains (losses)[2]	282	–	(110)	172
Impairment loss, net	(2)	(4)	(115)	(121)
Total investment income	$ (2,957)	$ 1,040	$ 6,470	$ 4,553
Investment income				
Interest income	$ 6,136	$ 939	$ 4,039	$ 11,114
Dividend, rental and other income	484	72	2,292	2,848
Impairments, provisions and recoveries, net	16	(47)	(134)	(165)
Other	(295)	52	27	(216)
	6,341	1,016	6,224	13,581
Realized and unrealized gains (losses) on assets supporting insurance and investment contract liabilities and on macro equity hedges				
Debt securities	(6,012)	18	–	(5,994)
Public equities	(1,454)	10	–	(1,444)
Mortgages	–	–	55	55
Private placements	–	–	(83)	(83)
Real estate	–	–	449	449
Other invested assets	357	(4)	(140)	213
Derivatives, including macro equity hedging program	(2,189)	–	(35)	(2,224)
	(9,298)	24	246	(9,028)
Total investment income	$ (2,957)	$ 1,040	$ 6,470	$ 4,553

(1) Primarily includes investment income on loans carried at amortized cost, own use properties, investment properties, derivative and hedging instruments in cash flow hedging relationships, equity method accounted investments, oil and gas investments, and leveraged leases.

(2) Includes net realized and unrealized gains (losses) for financial instruments at FVTPL, real estate investment properties, and other invested assets measured at fair value. Also includes net realized gains (losses) for financial instruments at AFS and other invested assets carried at amortized cost.

(3) Rental income from investment properties is net of direct operating expenses.

(d) Investment expenses

The following table presents total investment expenses.

For the years ended December 31,	**2019**	2018
Related to invested assets	**$ 642**	$ 643
Related to segregated, mutual and other funds	**1,121**	1,070
Total investment expenses	**$ 1,763**	$ 1,713

(e) Investment properties

The following table presents the rental income and direct operating expenses of investment properties.

For the years ended December 31,	2019	2018
Rental income from investment properties	**$ 864**	$ 1,013
Direct operating expenses of rental investment properties	**(464)**	(582)
Total	**$ 400**	$ 431

(f) Mortgage securitization

The Company securitizes certain insured and uninsured fixed and variable rate residential mortgages and Home Equity Lines of Credit ("HELOC") through creation of mortgage-backed securities under the Canadian Mortgage Bond Program ("CMB"), and the HELOC securitization program.

Benefits received from the securitization include interest spread between the asset and associated liability. There are no expected credit losses on securitized mortgages under the Canada Mortgage and Housing Corporation ("CMHC") sponsored CMB and the Platinum Canadian Mortgage Trust ("PCMT") HELOC securitization programs as they are insured by CMHC and other third-party insurance programs against borrowers' default. Mortgages securitized in the Platinum Canadian Mortgage Trust II ("PCMT II") program are uninsured.

Cash flows received from the underlying securitized assets/mortgages are used to settle the related secured borrowing liability. For CMB transactions receipts of principal are deposited into a trust account for settlement of the liability at time of maturity. These transferred assets and related cash flows cannot be transferred or used for other purposes. For the HELOC transactions, investors are entitled to periodic interest payments and the remaining cash receipts of principal are allocated to the Company (the "Seller") during the revolving period of the deal and are accumulated for settlement during an accumulation period or repaid to the investor monthly during a reduction period, based on the terms of the note.

Securitized assets and secured borrowing liabilities

	Securitized assets			
As at December 31, 2019 Securitization program	Securitized mortgages	Restricted cash and short-term securities	Total	Secured borrowing liabilities[2]
HELOC securitization[1]	**$ 2,285**	**$ 8**	**$ 2,293**	**$ 2,250**
CMB securitization	**1,620**	**–**	**1,620**	**1,632**
Total	**$ 3,905**	**$ 8**	**$ 3,913**	**$ 3,882**

	Securitized assets			
As at December 31, 2018 Securitization program	Securitized mortgages	Restricted cash and short-term securities	Total	Secured borrowing liabilities[2]
HELOC securitization[1]	$ 2,285	$ 8	$ 2,293	$ 2,250
CMB securitization	1,525	–	1,525	1,524
Total	$ 3,810	$ 8	$ 3,818	$ 3,774

(1) Manulife Bank, a subsidiary, securitizes a portion of its HELOC receivables through Platinum Canadian Mortgage Trust ("PCMT"), and Platinum Canadian Mortgage Trust II ("PCMT II"). PCMT funds the purchase of the co-ownership interests from Manulife Bank by issuing term notes collateralized by an underlying pool of CMHC insured HELOCs to institutional investors. PCMT II funds the purchase of the co-ownership interests from Manulife Bank by issuing term notes collateralized by an underlying pool of uninsured HELOCs to institutional investors. The restricted cash balance for the HELOC securitization reflects a cash reserve fund established in relation to the transactions. The reserve will be drawn upon only in the event of insufficient cash flows from the underlying HELOCs to satisfy the secured borrowing liability.

(2) Secured borrowing liabilities primarily comprise of Series 2011-1 notes with a floating rate which are expected to mature on December 15, 2021, and the Series 2016-1 notes with a floating rate which are expected to mature on May 15, 2022. Manulife Bank also securitizes insured amortizing mortgages under the National Housing Act Mortgage-Backed Securities ("NHA MBS") program sponsored by CMHC. Manulife Bank participates in CMB programs by selling NHA MBS securities to Canada Housing Trust ("CHT"), as a source of fixed rate funding.

As at December 31, 2019, the fair value of securitized assets and associated liabilities were $3,950 and $3,879 respectively (2018 – $3,843 and $3,756).

(g) Fair value measurement

The following table presents the fair values of invested assets and segregated funds net assets measured at fair value categorized by the fair value hierarchy.

As at December 31, 2019	Total fair value	Level 1	Level 2	Level 3
Cash and short-term securities				
FVTPL	**$ 1,859**	**$ –**	**$ 1,859**	**$ –**
AFS	**12,854**	**–**	**12,854**	**–**
Other	**5,557**	**5,557**	**–**	**–**
Debt securities				
FVTPL				
Canadian government and agency	**18,582**	**–**	**18,582**	**–**
U.S. government and agency	**11,031**	**–**	**11,031**	**–**
Other government and agency	**17,383**	**–**	**17,383**	**–**
Corporate	**116,044**	**–**	**115,411**	**633**
Residential mortgage-backed securities	**13**	**–**	**13**	**–**
Commercial mortgage-backed securities	**1,271**	**–**	**1,271**	**–**
Other asset-backed securities	**1,983**	**–**	**1,983**	**–**
AFS				
Canadian government and agency	**4,779**	**–**	**4,779**	**–**
U.S. government and agency	**17,221**	**–**	**17,221**	**–**
Other government and agency	**4,360**	**–**	**4,360**	**–**
Corporate	**5,285**	**–**	**5,270**	**15**
Residential mortgage-backed securities	**1**	**–**	**1**	**–**
Commercial mortgage-backed securities	**102**	**–**	**102**	**–**
Other asset-backed securities	**67**	**–**	**67**	**–**
Public equities				
FVTPL	**20,060**	**20,060**	**–**	**–**
AFS	**2,791**	**2,788**	**3**	**–**
Real estate – investment property[1]	**11,002**	**–**	**–**	**11,002**
Other invested assets[2]	**18,194**	**91**	**–**	**18,103**
Segregated funds net assets[3]	**343,108**	**293,903**	**44,693**	**4,512**
Total	**$ 613,547**	**$ 322,399**	**$ 256,883**	**$ 34,265**

As at December 31, 2018	Total fair value	Level 1	Level 2	Level 3
Cash and short-term securities				
FVTPL	$ 1,080	$ –	$ 1,080	$ –
AFS	10,013	–	10,013	–
Other	5,093	5,093	–	–
Debt securities				
FVTPL				
Canadian government and agency	16,445	–	16,445	–
U.S. government and agency	11,934	–	11,934	–
Other government and agency	16,159	–	15,979	180
Corporate	107,425	–	106,641	784
Residential mortgage-backed securities	13	–	6	7
Commercial mortgage-backed securities	1,344	–	1,344	–
Other asset-backed securities	1,417	–	1,417	–
AFS				
Canadian government and agency	7,342	–	7,342	–
U.S. government and agency	13,990	–	13,990	–
Other government and agency	4,101	–	4,064	37
Corporate	5,245	–	5,125	120
Residential mortgage-backed securities	2	–	–	2
Commercial mortgage-backed securities	128	–	128	–
Other asset-backed securities	49	–	49	–
Public equities				
FVTPL	16,721	16,718	–	3
AFS	2,458	2,456	2	–
Real estate – investment property[1]	10,761	–	–	10,761
Other invested assets[2]	17,562	–	–	17,562
Segregated funds net assets[3]	313,209	273,840	34,922	4,447
Total	$ 562,491	$ 298,107	$ 230,481	$ 33,903

[1] For investment properties, the significant unobservable inputs are capitalization rates (ranging from 2.75% to 8.75% during the year and ranging from 2.75% to 8.75% during 2018) and terminal capitalization rates (ranging from 3.80% to 9.25% during the year and ranging from 3.80% to 9.25% during 2018). Holding other factors constant, a lower capitalization or terminal capitalization rate will tend to increase the fair value of an investment property. Changes in fair value based on variations in unobservable inputs generally cannot be extrapolated because the relationship between the directional changes of each input is not usually linear.

[(2)] Other invested assets measured at fair value are held primarily in infrastructure and timber sectors. The significant inputs used in the valuation of the Company's infrastructure investments are primarily future distributable cash flows, terminal values and discount rates. Holding other factors constant, an increase to future distributable cash flows or terminal values would tend to increase the fair value of an infrastructure investment, while an increase in the discount rate would have the opposite effect. Discount rates during the year ranged from 7.00% to 16.5% (2018 – ranged from 8.95% to 16.5%). Disclosure of distributable cash flow and terminal value ranges are not meaningful given the disparity in estimates by project. The significant inputs used in the valuation of the Company's investments in timberland are timber prices and discount rates. Holding other factors constant, an increase to timber prices would tend to increase the fair value of a timberland investment, while an increase in the discount rates would have the opposite effect. Discount rates during the year ranged from 5.0% to 7.0% (2018 – ranged from 5.0% to 7.0%). A range of prices for timber is not meaningful as the market price depends on factors such as property location and proximity to markets and export yards.

[(3)] Segregated funds net assets are measured at fair value. The Company's Level 3 segregated funds assets are predominantly in investment properties and timberland properties valued as described above.

The following table presents fair value of invested assets not measured at fair value by the fair value hierarchy.

As at December 31, 2019	Carrying value	Fair value	Level 1	Level 2	Level 3
Mortgages[(1)]	**$ 49,376**	**$ 51,450**	**$ –**	**$ –**	**$ 51,450**
Private placements[(2)]	**37,979**	**41,743**	**–**	**36,234**	**5,509**
Policy loans[(3)]	**6,471**	**6,471**	**–**	**6,471**	**–**
Loans to Bank clients[(4)]	**1,740**	**1,742**	**–**	**1,742**	**–**
Real estate – own use property[(5)]	**1,926**	**3,275**	**–**	**–**	**3,275**
Other invested assets[(6)]	**10,565**	**11,343**	**165**	**–**	**11,178**
Total invested assets disclosed at fair value	**$ 108,057**	**$ 116,024**	**$ 165**	**$ 44,447**	**$ 71,412**

As at December 31, 2018	Carrying value	Fair value	Level 1	Level 2	Level 3
Mortgages[(1)]	$ 48,363	$ 48,628	$ –	$ –	$ 48,628
Private placements[(2)]	35,754	36,103	–	30,325	5,778
Policy loans[(3)]	6,446	6,446	–	6,446	–
Loans to Bank clients[(4)]	1,793	1,797	–	1,797	–
Real estate – own use property[(5)]	2,016	3,179	–	–	3,179
Other invested assets[(6)]	9,978	10,751	121	–	10,630
Total invested assets disclosed at fair value	$ 104,350	$ 106,904	$ 121	$ 38,568	$ 68,215

[(1)] Fair value of commercial mortgages is determined through an internal valuation methodology using both observable and unobservable inputs. Unobservable inputs include credit assumptions and liquidity spread adjustments. Fair value of fixed-rate residential mortgages is determined using the discounted cash flow method. Inputs used for valuation are primarily comprised of prevailing interest rates and prepayment rates, if applicable. Fair value of variable-rate residential mortgages is assumed to be their carrying value.

[(2)] Fair value of private placements is determined through an internal valuation methodology using both observable and unobservable inputs. Unobservable inputs include credit assumptions and liquidity spread adjustments. Private placements are classified within Level 2 unless the liquidity adjustment constitutes a significant price impact, in which case the securities are classified as Level 3.

[(3)] Fair value of policy loans is equal to their unpaid principal balances.

[(4)] Fair value of fixed-rate loans to Bank clients is determined using the discounted cash flow method. Inputs used for valuation are primarily comprised of current interest rates. Fair value of variable-rate loans is assumed to be their carrying value.

[(5)] Fair value of own use real estate and the fair value hierarchy are determined in accordance with the methodologies described for real estate – investment property in note 1.

[(6)] Primarily include leveraged leases, oil and gas properties and equity method accounted other invested assets. Fair value of leveraged leases is disclosed at their carrying values as fair value is not routinely calculated on these investments. Fair value for oil and gas properties is determined using external appraisals based on discounted cash flow methodology. Inputs used in valuation are primarily comprised of forecasted price curves, planned production, as well as capital expenditures, and operating costs. Fair value of equity method accounted other invested assets is determined using a variety of valuation techniques including discounted cash flows and market comparable approaches. Inputs vary based on the specific investment.

Transfers between Level 1 and Level 2

The Company records transfers of assets and liabilities between Level 1 and Level 2 at their fair values as at the end of each reporting period. Assets are transferred out of Level 1 when they are no longer transacted with sufficient frequency and volume in an active market. Conversely, assets are transferred from Level 2 to Level 1 when transaction volume and frequency are indicative of an active market. The Company had $nil of assets transferred between Level 1 and Level 2 during the years ended December 31, 2019 and 2018.

For segregated funds net assets, the Company had $nil transfers from Level 1 to Level 2 for the year ended December 31, 2019 (2018 – $nil). The Company had $nil transfers from Level 2 to Level 1 for the year ended December 31, 2019 (2018 – $2).

Invested assets and segregated funds net assets measured at fair value using significant unobservable inputs (Level 3)

The Company classifies fair values of invested assets and segregated funds net assets as Level 3 if there are no observable markets for these assets or, in the absence of active markets, most of the inputs used to determine fair value are based on the Company's own assumptions about market participant assumptions. The Company prioritizes the use of market-based inputs over entity-based assumptions in determining Level 3 fair values. The gains and losses in the tables below include the changes in fair value due to both observable and unobservable factors.

The following table presents a roll forward for invested assets, derivatives and segregated funds net assets measured at fair value using significant unobservable inputs (Level 3) for the years ended December 31, 2019 and 2018.

For the year ended December 31, 2019	Balance, January 1, 2019	Net realized/ unrealized gains (losses) included in net income[(1)]	Net realized/ unrealized gains (losses) included in AOCI[(2)]	Purchases	Sales	Settlements	Transfer into Level 3[(3),(4)]	Transfer out of Level 3[(3,(4)]	Currency movement	**Balance, December 31, 2019**	Change in unrealized gains (losses) on assets still held
Debt securities											
FVTPL											
Other government & agency	**$ 180**	**$ 1**	**$ –**	**$ 16**	**$ (18)**	**$ –**	**$ –**	**$ (178)**	**$ (1)**	**$ –**	**$ –**
Corporate	**784**	**35**	**–**	**43**	**(88)**	**(18)**	**514**	**(604)**	**(33)**	**633**	**47**
Residential mortgage-backed securities	**7**	**–**	**–**	**–**	**(1)**	**–**	**–**	**(6)**	**–**	**–**	**–**
	971	**36**	**–**	**59**	**(107)**	**(18)**	**514**	**(788)**	**(34)**	**633**	**47**
AFS											
Other government & agency	**37**	**1**	**–**	**5**	**(12)**	**–**	**–**	**(31)**	**–**	**–**	**–**
Corporate	**120**	**1**	**–**	**13**	**(21)**	**(4)**	**–**	**(93)**	**(2)**	**14**	**–**
Residential mortgage-backed securities	**2**	**–**	**–**	**–**	**–**	**–**	**–**	**(1)**	**–**	**1**	**–**
Commercial mortgage-backed securities	**–**	**–**	**–**	**37**	**–**	**–**	**–**	**(37)**	**–**	**–**	**–**
	159	**2**	**–**	**55**	**(33)**	**(4)**	**–**	**(162)**	**(2)**	**15**	**–**
Public equities											
FVTPL	**3**	**1,739**	**–**	**–**	**(1,679)**	**–**	**–**	**–**	**(63)**	**–**	**1,510**
	3	**1,739**	**–**	**–**	**(1,679)**	**–**	**–**	**–**	**(63)**	**–**	**1,510**
Real estate – investment property	**10,761**	**506**	**–**	**440**	**(457)**	**–**	**15**	**–**	**(263)**	**11,002**	**468**
Other invested assets	**17,562**	**(1,028)**	**2**	**3,401**	**(144)**	**(1,031)**	**2**	**–**	**(661)**	**18,103**	**(923)**
	28,323	**(522)**	**2**	**3,841**	**(601)**	**(1,031)**	**17**	**–**	**(924)**	**29,105**	**(455)**
Derivatives	**106**	**1,884**	**44**	**42**	**–**	**(685)**	**135**	**(34)**	**(36)**	**1,456**	**1,423**
Segregated funds net assets	**4,447**	**148**	**–**	**193**	**(140)**	**(30)**	**–**	**–**	**(106)**	**4,512**	**111**
Total	**$ 34,009**	**$ 3,287**	**$ 46**	**$ 4,190**	**$ (2,560)**	**$ (1,768)**	**$ 666**	**$ (984)**	**$ (1,165)**	**$ 35,721**	**$ 2,636**

For the year ended December 31, 2018	Balance, January 1, 2018	Net realized/ unrealized gains (losses) included in net income[(1)]	Net realized/ unrealized gains (losses) included in AOCI[(2)]	Purchases	Sales	Settlements	Transfer into Level 3[(3),(4)]	Transfer out of Level 3[(3,(4)]	Currency movement	Balance, December 31, 2018	Change in unrealized gains (losses) on assets still held
Debt securities											
FVTPL											
Other government & agency	$ 239	$ (2)	$ –	$ 27	$ (85)	$ (14)	$ –	$ –	$ 15	$ 180	$ (3)
Corporate	710	3	–	190	(61)	(18)	–	(93)	53	784	(10)
Residential mortgage-backed securities	1	6	–	–	–	–	–	–	–	7	6
Other asset-backed securities	25	–	–	31	–	–	–	(56)	–	–	–
	975	7	–	248	(146)	(32)	–	(149)	68	971	(7)
AFS											
Other government & agency	47	–	–	6	(15)	(4)	–	–	3	37	–
Corporate	88	–	–	49	(12)	(4)	–	(7)	6	120	–
Residential mortgage-backed securities	–	–	1	–	–	–	–	–	1	2	–
Other asset-backed securities	1	–	–	–	–	–	–	(1)	–	–	–
	136	–	1	55	(27)	(8)	–	(8)	10	159	–
Public equities											
FVTPL	3	–	–	–	–	–	–	–	–	3	–
	3	–	–	–	–	–	–	–	–	3	–
Real estate – investment property	12,529	291	–	615	(2,578)	–	–	(706)	610	10,761	244
Other invested assets	16,203	(1,168)	1	3,926	(1,636)	(841)	–	(35)	1,112	17,562	(434)
	28,732	(877)	1	4,541	(4,214)	(841)	–	(741)	1,722	28,323	(190)
Derivatives	769	(666)	(48)	12	–	18	9	(13)	25	106	(460)
Segregated funds net assets	4,255	226	–	155	(367)	1	3	(17)	191	4,447	161
Total	$ 34,870	$ (1,310)	$ (46)	$ 5,011	$ (4,754)	$ (862)	$ 12	$ (928)	$ 2,016	$ 34,009	$ (496)

(1) These amounts are included in net investment income on the Consolidated Statements of Income except for the amount related to segregated funds net assets, where the amount is recorded in changes in segregated funds net assets, refer to note 21.

(2) These amounts are included in AOCI on the Consolidated Statements of Financial Position.

(3) The Company uses fair values of the assets at the beginning of the year for assets transferred into and out of Level 3 except for derivatives, refer to footnote 4 below.

(4) For derivatives transfer into or out of Level 3, the Company uses fair value at the end of the year and at the beginning of the year, respectively.

Transfers into Level 3 primarily result from securities that were impaired during the year or securities where a lack of observable market data (versus the previous period) resulted in reclassifying assets into Level 3. Transfers from Level 3 primarily result from observable market data now being available for the entire term structure of the debt security.

Note 4 Derivative and Hedging Instruments

Derivatives are financial contracts, the value of which is derived from underlying interest rates, foreign exchange rates, other financial instruments, commodity prices or indices. The Company uses derivatives including swaps, forward and futures agreements, and options to manage current and anticipated exposures to changes in interest rates, foreign exchange rates, commodity prices and equity market prices, and to replicate permissible investments.

Swaps are over-the-counter ("OTC") contractual agreements between the Company and a third party to exchange a series of cash flows based upon rates applied to a notional amount. For interest rate swaps, counterparties generally exchange fixed or floating interest rate payments based on a notional value in a single currency. Cross currency swaps involve the exchange of principal amounts between parties as well as the exchange of interest payments in one currency for the receipt of interest payments in another currency. Total return swaps are contracts that involve the exchange of payments based on changes in the values of a reference asset, including any returns such as interest earned on these assets, in return for amounts based on reference rates specified in the contract.

Forward and futures agreements are contractual obligations to buy or sell a financial instrument, foreign currency or other underlying commodity on a predetermined future date at a specified price. Forward contracts are OTC contracts negotiated between counterparties, whereas futures agreements are contracts with standard amounts and settlement dates that are traded on regulated exchanges.

Options are contractual agreements whereby the holder has the right, but not the obligation, to buy (call option) or sell (put option) a security, exchange rate, interest rate, or other financial instrument at a predetermined price/rate within a specified time.

See variable annuity dynamic hedging strategy in note 8(a) for an explanation of the Company's dynamic hedging strategy for its variable annuity product guarantees.

(a) Fair value of derivatives

The pricing models used to value OTC derivatives are based on market standard valuation methodologies and the inputs to these models are consistent with what a market participant would use when pricing the instruments. Derivative valuations can be affected by changes in interest rates, currency exchange rates, financial indices, credit spreads, default risk (including the counterparties to the contract), and market volatility. The significant inputs to the pricing models for most OTC derivatives are inputs that are observable or can be corroborated by observable market data and are classified as Level 2. Inputs that are observable generally include interest rates, foreign currency exchange rates and interest rate curves. However, certain OTC derivatives may rely on inputs that are significant to the fair value that are not observable in the market or cannot be derived principally from, or corroborated by, observable market data and these derivatives are classified as Level 3. Inputs that are unobservable generally include broker quoted prices, volatilities and inputs that are outside of the observable portion of the interest rate curve or other relevant market measures. These unobservable inputs may involve significant management judgment or estimation. Even though unobservable, these inputs are based on assumptions deemed appropriate given the circumstances and consistent with what market participants would use when pricing such instruments. The Company's use of unobservable inputs is limited and the impact on derivative fair values does not represent a material amount as evidenced by the limited amount of Level 3 derivatives. The credit risk of both the counterparty and the Company are considered in determining the fair value for all OTC derivatives after considering the effects of netting agreements and collateral arrangements.

The following table presents gross notional amount and fair value of derivative instruments by the underlying risk exposure.

As at December 31,		2019			2018		
		Notional	Fair value		Notional	Fair value	
Type of hedge	Instrument type	amount	Assets	Liabilities	amount	Assets	Liabilities
Qualifying hedge accounting relationships							
Fair value hedges	Interest rate swaps	**$ 350**	**$ –**	**$ 5**	$ 519	$ –	$ 13
	Foreign currency swaps	**86**	**3**	**1**	91	5	–
Cash flow hedges	Foreign currency swaps	**825**	**–**	**407**	894	–	367
	Forward contracts	**–**	**–**	**–**	80	–	9
	Equity contracts	**132**	**16**	**–**	101	–	12
Net investment hedges	Foreign currency swaps	**3,220**	**4**	**178**	3,220	–	209
	Forward contracts	**2,822**	**7**	**22**	1,864	21	65
Total derivatives in qualifying hedge accounting relationships		**7,435**	**30**	**613**	6,769	26	675
Derivatives not designated in qualifying hedge accounting relationships							
	Interest rate swaps	**283,172**	**15,159**	**8,140**	300,704	11,204	5,675
	Interest rate futures	**13,069**	**–**	**–**	14,297	–	–
	Interest rate options	**12,248**	**423**	**–**	11,736	314	–
	Foreign currency swaps	**28,234**	**645**	**1,437**	25,036	827	1,421
	Currency rate futures	**3,387**	**–**	**–**	4,052	–	–
	Forward contracts	**33,432**	**2,337**	**273**	29,248	670	158
	Equity contracts	**14,582**	**853**	**37**	15,492	653	163
	Credit default swaps	**502**	**6**	**–**	652	9	–
	Equity futures	**10,576**	**–**	**–**	10,908	–	–
Total derivatives not designated in qualifying hedge accounting relationships		**399,202**	**19,423**	**9,887**	412,125	13,677	7,417
Total derivatives		**$ 406,637**	**$ 19,453**	**$ 10,500**	$ 418,894	$ 13,703	$ 8,092

The following table presents fair values of derivative instruments by the remaining term to maturity. The fair values disclosed below do not incorporate the impact of master netting agreements. Refer to note 8.

	Remaining term to maturity				
As at December 31, 2019	Less than 1 year	1 to 3 years	3 to 5 years	Over 5 years	Total
Derivative assets	**$ 1,248**	**$ 1,659**	**$ 1,309**	**$ 15,237**	**$ 19,453**
Derivative liabilities	**468**	**162**	**240**	**9,630**	**10,500**

	Remaining term to maturity				
As at December 31, 2018	Less than 1 year	1 to 3 years	3 to 5 years	Over 5 years	Total
Derivative assets	$ 649	$ 671	$ 795	$ 11,588	$ 13,703
Derivative liabilities	359	430	227	7,076	8,092

The following table presents gross notional amount by the remaining term to maturity, total fair value (including accrued interest), credit risk equivalent and risk-weighted amount by contract type.

	Remaining term to maturity (notional amounts)				Fair value				
As at December 31, 2019	Under 1 year	1 to 5 years	Over 5 years	Total	Positive	Negative	Net	Credit risk equivalent(1)	Risk-weighted amount(2)
Interest rate contracts									
OTC swap contracts	**$ 5,105**	**$ 22,288**	**$ 112,863**	**$ 140,256**	**$ 15,627**	**$ (8,910)**	**$ 6,717**	**$ 6,727**	**$ 940**
Cleared swap contracts	**3,932**	**11,499**	**127,835**	**143,266**	**238**	**(240)**	**(2)**	**–**	**–**
Forward contracts	**11,709**	**15,089**	**1,283**	**28,081**	**2,312**	**(253)**	**2,059**	**398**	**53**
Futures	**13,069**	**–**	**–**	**13,069**	**–**	**–**	**–**	**–**	**–**
Options purchased	**1,266**	**4,454**	**6,528**	**12,248**	**423**	**–**	**423**	**560**	**77**
Subtotal	**35,081**	**53,330**	**248,509**	**336,920**	**18,600**	**(9,403)**	**9,197**	**7,685**	**1,070**
Foreign exchange									
Swap contracts	**1,512**	**8,459**	**22,394**	**32,365**	**646**	**(2,082)**	**(1,436)**	**2,895**	**320**
Forward contracts	**8,173**	**–**	**–**	**8,173**	**32**	**(42)**	**(10)**	**130**	**15**
Futures	**3,387**	**–**	**–**	**3,387**	**–**	**–**	**–**	**–**	**–**
Credit derivatives	**275**	**227**	**–**	**502**	**6**	**–**	**6**	**–**	**–**
Equity contracts									
Swap contracts	**1,233**	**164**	**–**	**1,397**	**43**	**(16)**	**27**	**220**	**27**
Futures	**10,576**	**–**	**–**	**10,576**	**–**	**–**	**–**	**–**	**–**
Options purchased	**6,604**	**6,633**	**80**	**13,317**	**821**	**(20)**	**801**	**3,328**	**439**
Subtotal including accrued interest	**66,841**	**68,813**	**270,983**	**406,637**	**20,148**	**(11,563)**	**8,585**	**14,258**	**1,871**
Less accrued interest	**–**	**–**	**–**	**–**	**695**	**(1,063)**	**(368)**	**–**	**–**
Total	**$ 66,841**	**$ 68,813**	**$ 270,983**	**$ 406,637**	**$ 19,453**	**$ (10,500)**	**$ 8,953**	**$ 14,258**	**$ 1,871**

	Remaining term to maturity (notional amounts)				Fair value				
As at December 31, 2018	Under 1 year	1 to 5 years	Over 5 years	Total	Positive	Negative	Net	Credit risk equivalent(1)	Risk-weighted amount(2)
Interest rate contracts									
OTC swap contracts	$ 3,495	$ 22,568	$ 121,817	$ 147,880	$ 11,750	$ (6,477)	$ 5,273	$ 5,190	$ 776
Cleared swap contracts	5,723	16,140	131,480	153,343	95	(96)	(1)	–	–
Forward contracts	10,258	14,300	648	25,206	637	(126)	511	259	37
Futures	14,297	–	–	14,297	–	–	–	–	–
Options purchased	1,166	4,981	5,589	11,736	317	–	317	376	58
Subtotal	34,939	57,989	259,534	352,462	12,799	(6,699)	6,100	5,825	871
Foreign exchange									
Swap contracts	1,024	7,267	20,950	29,241	807	(2,030)	(1,223)	2,622	291
Forward contracts	5,926	60	–	5,986	54	(106)	(52)	105	13
Futures	4,052	–	–	4,052	–	–	–	–	–
Credit derivatives	143	509	–	652	10	–	10	–	–
Equity contracts									
Swap contracts	2,728	142	–	2,870	29	(57)	(28)	278	35
Futures	10,908	–	–	10,908	–	–	–	–	–
Options purchased	6,142	6,581	–	12,723	621	(118)	503	2,217	310
Subtotal including accrued interest	65,862	72,548	280,484	418,894	14,320	(9,010)	5,310	11,047	1,520
Less accrued interest	–	–	–	–	617	(918)	(301)	–	–
Total	$ 65,862	$ 72,548	$ 280,484	$ 418,894	$ 13,703	$ (8,092)	$ 5,611	$ 11,047	$ 1,520

(1) Credit risk equivalent is the sum of replacement cost and the potential future credit exposure. Replacement cost represents the current cost of replacing all contracts with a positive fair value. The amounts take into consideration legal contracts that permit offsetting of positions. The potential future credit exposure is calculated based on a formula prescribed by OSFI.

(2) Risk-weighted amount represents the credit risk equivalent, weighted according to the creditworthiness of the counterparty, as prescribed by OSFI.

The total notional amount of $407 billion (2018 – $419 billion) includes $128 billion (2018 – $136 billion) related to derivatives utilized in the Company's variable annuity guarantee dynamic hedging and macro equity risk hedging programs. Due to the Company's variable annuity hedging practices, a large number of trades are in offsetting positions, resulting in materially lower net fair value exposure to the Company than what the gross notional amount would suggest.

Fair value and the fair value hierarchy of derivative instruments

As at December 31, 2019	Fair value	Level 1	Level 2	Level 3
Derivative assets				
Interest rate contracts	**$ 17,894**	**$ –**	**$ 15,801**	**$ 2,093**
Foreign exchange contracts	**684**	**–**	**684**	**–**
Equity contracts	**869**	**–**	**821**	**48**
Credit default swaps	**6**	**–**	**6**	**–**
Total derivative assets	**$ 19,453**	**$ –**	**$ 17,312**	**$ 2,141**
Derivative liabilities				
Interest rate contracts	**$ 8,397**	**$ –**	**$ 7,730**	**$ 667**
Foreign exchange contracts	**2,066**	**–**	**2,065**	**1**
Equity contracts	**37**	**–**	**20**	**17**
Total derivative liabilities	**$ 10,500**	**$ –**	**$ 9,815**	**$ 685**

As at December 31, 2018	Fair value	Level 1	Level 2	Level 3
Derivative assets				
Interest rate contracts	$ 12,155	$ –	$ 11,537	$ 618
Foreign exchange contracts	886	–	876	10
Equity contracts	653	–	621	32
Credit default swaps	9	–	9	–
Total derivative assets	$ 13,703	$ –	$ 13,043	$ 660
Derivative liabilities				
Interest rate contracts	$ 5,815	$ –	$ 5,318	$ 497
Foreign exchange contracts	2,103	–	2,102	1
Equity contracts	174	–	118	56
Total derivative liabilities	$ 8,092	$ –	$ 7,538	$ 554

Level 3 roll forward information for net derivative contracts measured using significant unobservable inputs is disclosed in note 3(g).

(b) Hedging relationships

The Company uses derivatives for economic hedging purposes. In certain circumstances, these hedges also meet the requirements of hedge accounting. Risk management strategies eligible for hedge accounting are designated as fair value hedges, cash flow hedges or net investment hedges, as described below.

Fair value hedges

The Company uses interest rate swaps to manage its exposure to changes in the fair value of fixed rate financial instruments due to changes in interest rates. The Company also uses cross currency swaps to manage its exposure to foreign exchange rate fluctuations, interest rate fluctuations, or both.

The Company recognizes gains and losses on derivatives and the related hedged items in fair value hedges in investment income. These investment gains (losses) are shown in the following table.

For the year ended December 31, 2019	Hedged items in qualifying fair value hedging relationships	Gains (losses) recognized on derivatives	Gains (losses) recognized for hedged items	Ineffectiveness recognized in investment income
Interest rate swaps	Fixed rate liabilities	**$ 8**	**$ (6)**	**$ 2**
Foreign currency swaps	Fixed rate assets	**(1)**	**2**	**1**
Total		**$ 7**	**$ (4)**	**$ 3**

For the year ended December 31, 2018	Hedged items in qualifying fair value hedging relationships	Gains (losses) recognized on derivatives	Gains (losses) recognized for hedged items	Ineffectiveness recognized in investment income
Interest rate swaps	Fixed rate assets	$ 1	$ (1)	$ –
	Fixed rate liabilities	3	(3)	–
Foreign currency swaps	Fixed rate assets	7	(5)	2
Total		$ 11	$ (9)	$ 2

Cash flow hedges

The Company uses interest rate swaps to hedge the variability in cash flows from variable rate financial instruments and forecasted transactions. The Company also uses cross currency swaps and foreign currency forward contracts to hedge the variability from foreign currency financial instruments and foreign currency expenses. Total return swaps are used to hedge the variability in cash flows associated with certain stock-based compensation awards. Inflation swaps are used to reduce inflation risk generated from inflation-indexed liabilities.

The effects of derivatives in cash flow hedging relationships on the Consolidated Statements of Income and the Consolidated Statements of Comprehensive Income are shown in the following table.

For the year ended December 31, 2019	Hedged items in qualifying cash flow hedging relationships	Gains (losses) deferred in AOCI on derivatives	Gains (losses) reclassified from AOCI into investment income	Ineffectiveness recognized in investment income
Foreign currency swaps	Fixed rate assets	**$ (2)**	**$ 1**	**$ –**
	Floating rate liabilities	**(40)**	**37**	**–**
Forward contracts	Forecasted expenses	**–**	**(9)**	**–**
Equity contracts	Stock-based compensation	**35**	**(9)**	**–**
Total		**$ (7)**	**$ 20**	**$ –**

For the year ended December 31, 2018	Hedged items in qualifying cash flow hedging relationships	Gains (losses) deferred in AOCI on derivatives	Gains (losses) reclassified from AOCI into investment income	Ineffectiveness recognized in investment income
Interest rate swaps	Forecasted liabilities	$ –	$ (20)	$ –
Foreign currency swaps	Fixed rate assets	–	(1)	–
	Floating rate liabilities	(36)	(62)	–
Forward contracts	Forecasted expenses	(8)	(2)	–
Equity contracts	Stock-based compensation	(21)	27	–
Total		$ (65)	$ (58)	$ –

The Company anticipates that net losses of approximately $9 will be reclassified from AOCI to net income within the next 12 months. The maximum time frame for which variable cash flows are hedged is 17 years.

Hedges of net investments in foreign operations

The Company primarily uses forward currency contracts, cross currency swaps and non-functional currency denominated debt to manage its foreign currency exposures to net investments in foreign operations.

The effects of net investment hedging relationships on the Consolidated Statements of Income and the Consolidated Statements of Other Comprehensive Income are shown in the following table.

For the year ended December 31, 2019	Gains (losses) deferred in AOCI	Gains (losses) reclassified from AOCI into investment income	Ineffectiveness recognized in investment income
Foreign currency swaps	**$ 26**	**$ –**	**$ –**
Forward contracts	**80**	**–**	**–**
Total	**$ 106**	**$ –**	**$ –**

For the year ended December 31, 2018	Gains (losses) deferred in AOCI	Gains (losses) reclassified from AOCI into investment income	Ineffectiveness recognized in investment income
Foreign currency swaps	$ (262)	$ –	$ –
Forward contracts	9	–	–
Total	$ (253)	$ –	$ –

(c) Derivatives not designated in qualifying hedge accounting relationships

Derivatives used in portfolios supporting insurance contract liabilities are generally not designated in qualifying hedge accounting relationships because the change in the value of the insurance contract liabilities economically hedged by these derivatives is also recorded through net income. Since changes in fair value of these derivatives and related hedged risks are recognized in investment income as they occur, they generally offset the change in hedged risk to the extent the hedges are economically effective. Interest rate and cross currency swaps are used in the portfolios supporting insurance contract liabilities to manage duration and currency risks.

Investment income on derivatives not designated in qualifying hedge accounting relationships

For the years ended December 31,	2019	2018
Interest rate swaps	**$ 1,483**	$ (1,894)
Interest rate futures	**571**	(298)
Interest rate options	**96**	(52)
Foreign currency swaps	**(276)**	(63)
Currency rate futures	**88**	3
Forward contracts	**2,815**	(354)
Equity futures	**(2,436)**	742
Equity contracts	**277**	(276)
Credit default swaps	**(3)**	(6)
Total	**$ 2,615**	$ (2,198)

(d) Embedded derivatives

Certain insurance contracts contain features that are classified as embedded derivatives and are measured separately at FVTPL including reinsurance contracts related to guaranteed minimum income benefits and contracts containing certain credit and interest rate features.

Certain reinsurance contracts related to guaranteed minimum income benefits contain embedded derivatives requiring separate measurement at FVTPL as the financial component contained in the reinsurance contracts does not contain significant insurance risk. As at December 31, 2019, reinsurance ceded guaranteed minimum income benefits had a fair value of $981 (2018 – $1,148) and reinsurance assumed guaranteed minimum income benefits had a fair value of $109 (2018 – $114). Claims recovered under reinsurance ceded contracts offset claims expenses and claims paid on the reinsurance assumed are reported as contract benefits.

The Company's credit and interest rate embedded derivatives promise to pay the returns on a portfolio of assets to the contract holder. These embedded derivatives contain a credit and interest rate risk that is a financial risk embedded in the underlying insurance contract. As at December 31, 2019, these embedded derivatives had a fair value of $(137) (2018 – $53).

Other financial instruments classified as embedded derivatives but exempt from separate measurement at fair value include variable universal life and variable life products, minimum guaranteed credited rates, no lapse guarantees, guaranteed annuitization options, CPI indexing of benefits, and segregated fund minimum guarantees other than reinsurance ceded/assumed guaranteed minimum income benefits. These embedded derivatives are measured and reported within insurance contract liabilities and are exempt from separate fair value measurement as they contain insurance risk and/or are closely related to the insurance host contract.

Note 5 Goodwill and Intangible Assets

(a) Change in the carrying value of goodwill and intangible assets

The following table presents the change in the carrying value of goodwill and intangible assets.

As at December 31, 2019	Balance, January 1	Additions/ disposals	Amortization expense	Effect of changes in foreign exchange rates	Balance, December 31
Goodwill	**$ 5,864**	**$ (6)**	**$ n/a**	**$ (115)**	**$ 5,743**
Indefinite life intangible assets					
Brand	**819**	**–**	**n/a**	**(40)**	**779**
Fund management contracts and other[1]	**798**	**32**	**n/a**	**(25)**	**805**
	1,617	**32**	**n/a**	**(65)**	**1,584**
Finite life intangible assets[2]					
Distribution networks	**868**	**6**	**44**	**(29)**	**801**
Customer relationships	**860**	**(2)**	**54**	**(9)**	**795**
Software	**821**	**357**	**168**	**(19)**	**991**
Other	**67**	**–**	**5**	**(1)**	**61**
	2,616	**361**	**271**	**(58)**	**2,648**
Total intangible assets	**4,233**	**393**	**271**	**(123)**	**4,232**
Total goodwill and intangible assets	**$ 10,097**	**$ 387**	**$ 271**	**$ (238)**	**$ 9,975**

As at December 31, 2018	Balance, January 1	Additions/ disposals[3]	Amortization expense	Effect of changes in foreign exchange rates	Balance, December 31
Goodwill	$ 5,713	$ (65)	$ n/a	$ 216	$ 5,864
Indefinite life intangible assets					
Brand	753	–	n/a	66	819
Fund management contracts and other[1]	755	3	n/a	40	798
	1,508	3	n/a	106	1,617
Finite life intangible assets[2]					
Distribution networks	989	(133)	48	60	868
Customer relationships	899	–	55	16	860
Software	661	275	147	32	821
Other	70	–	5	2	67
	2,619	142	255	110	2,616
Total intangible assets	4,127	145	255	216	4,233
Total goodwill and intangible assets	$ 9,840	$ 80	$ 255	$ 432	$ 10,097

[1] Fund management contracts were mostly allocated to Canada WAM and U.S. WAM CGUs with the carrying values of $273 (2018 – $273) and $380 (2018 – $400), respectively.

[2] Gross carrying amount of finite life intangible assets was $1,292 for distribution networks, $1,133 for customer relationships, $2,239 for software and $130 for other (2018 – $1,331, $1,145, $2,110 and $133), respectively.

[3] In 2018, disposals include $65 of goodwill and $96 of distribution networks from the sale of the U.S. broker-dealer business, and impairments of distribution networks for discontinued products of $27 in the U.S. segment and $13 in Asia segment.

(b) Goodwill impairment testing

The Company completed its annual goodwill impairment testing in the fourth quarter of 2019 by determining the recoverable amounts of its businesses using valuation techniques discussed below (refer to notes 1(f) and 5(c)). The review indicated that there was no impairment of goodwill in 2019 and 2018.

Effective January 1, 2018, the Company made organizational changes to drive better alignment with strategic priorities and increase focus and leverage scale in its wealth management business. As a result of this reorganization, which included recognition of the Company's wealth and asset management businesses (Global WAM) as a primary reporting segment (note 18), the Company has modified the level at which goodwill is tested for impairment purposes. The modification includes (a) the allocation of existing goodwill to the relevant CGUs or group of CGUs within the Global WAM segment that had previously been combined within respective regional insurance businesses and (b) the amalgamation of the remaining Canadian-based goodwill (including Individual Life, Affinity Markets, Individual Annuities, Group Benefits and International Group Program) under the Canadian Insurance reporting segment. These reorganization-based changes have resulted in goodwill being allocated to CGUs or groups of CGUs based on the lowest level within the Company in which goodwill is monitored for internal management purposes.

The following tables present the carrying value of goodwill by CGU or group of CGUs.

As at December 31, 2019 CGU or group of CGUs	Balance, January 1	Additions/ disposals	Effect of changes in foreign exchange rates	Balance, December 31
Asia				
Asia Insurance (excluding Japan)	**$ 165**	**$ –**	**$ (6)**	**$ 159**
Japan Insurance	**435**	**–**	**(15)**	**420**
Canada Insurance	**1,962**	**–**	**(5)**	**1,957**
U.S. Insurance	**367**	**–**	**(18)**	**349**
Global Wealth and Asset Management				
Asia WAM	**196**	**–**	**(9)**	**187**
Canada WAM	**1,436**	**–**	**–**	**1,436**
U.S. WAM	**1,303**	**(6)**	**(62)**	**1,235**
Total	**$ 5,864**	**$ (6)**	**$ (115)**	**$ 5,743**

As at December 31, 2018 CGU or group of CGUs	Balance, January 1	Additions/ disposals	Effect of changes in foreign exchange rates	Balance, December 31
Asia				
Asia Insurance (excluding Japan)	$ 154	$ –	$ 11	$ 165
Japan Insurance	391	–	44	435
Canada Insurance	1,954	–	8	1,962
U.S. Insurance	400	(65)	32	367
Global Wealth and Asset Management				
Asia WAM	180	–	16	196
Canada WAM	1,436	–	–	1,436
U.S. WAM	1,198	–	105	1,303
Total	$ 5,713	$ (65)	$ 216	$ 5,864

The valuation techniques, significant assumptions and sensitivities, where applicable, applied in the goodwill impairment testing are described below.

(c) Valuation techniques

The recoverable amounts were based on fair value less costs to sell ("FVLCS") for Asia Insurance (excluding Japan) and Asia WAM. For other CGUs, value-in-use ("VIU") was used. When determining if a CGU is impaired, the Company compares its recoverable amount to the allocated capital for that unit, which is aligned with the Company's internal reporting practices.

Under the FVLCS approach, the Company determines the fair value of the CGU or group of CGUs using an earnings-based approach which incorporates forecasted earnings, excluding interest and equity market impacts and normalized new business expenses multiplied by an earnings-multiple derived from the observable price-to-earnings multiples of comparable financial institutions. The price-to-earnings multiple used by the Company for testing was 10.3 (2018 – 9.0 to 11.7). These FVLCS valuations are categorized as Level 3 of the fair value hierarchy (2018 – Level 3).

Under the VIU approach, used for CGUs with insurance business, an embedded appraisal value is determined from a projection of future distributable earnings derived from both the in-force business and new business expected to be sold in the future, and therefore, reflects the economic value for each CGU's or group of CGUs' profit potential under a set of assumptions. This approach requires assumptions including sales and revenue growth rates, capital requirements, interest rates, equity returns, mortality, morbidity, policyholder behaviour, tax rates and discount rates. For non-insurance CGUs, the VIU is based on discounted cash flow analysis which incorporates relevant aspects of the embedded appraisal value approach.

(d) Significant assumptions

To calculate embedded value, the Company discounted projected earnings from in-force contracts and valued 10 years of new business growing at expected plan levels, consistent with the periods used for forecasting long-term businesses such as insurance. In arriving at its projections, the Company considered past-experience, economic trends such as interest rates, equity returns and product mix as well as industry and market trends. Where growth rate assumptions for new business cash flows were used in the embedded value calculations, they ranged from zero per cent to 20 per cent (2018 – negative five per cent to 17 per cent).

Interest rate assumptions are based on prevailing market rates at the valuation date.

Tax rates applied to the projections include the impact of internal reinsurance treaties and amounted to 28.0 per cent, 26.5 per cent and 21 per cent (2018 – 30.8 per cent, 26.8 per cent and 21 per cent) for the Japan, Canadian and U.S. jurisdictions, respectively. Tax assumptions are sensitive to changes in tax laws as well as assumptions about the jurisdictions in which profits are earned. It is possible that actual tax rates could differ from those assumed.

Discount rates assumed in determining the value-in-use for applicable CGUs or groups of CGUs ranged from 7.5 per cent to 10.0 per cent on an after-tax basis or 9.4 per cent to 12.5 per cent on a pre-tax basis (2018 – 7.5 per cent to 14.2 per cent on an after-tax basis or 10.2 per cent to 20.4 per cent on a pre-tax basis).

The key assumptions described above may change as economic and market conditions change, which may lead to impairment charges in the future. 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.

Note 6 Insurance Contract Liabilities and Reinsurance Assets

(a) Insurance contract liabilities and reinsurance assets

Insurance contract liabilities are reported gross of reinsurance ceded and the ceded liabilities are reported separately as a reinsurance asset. Insurance contract liabilities include actuarial liabilities, benefits payable, provision for unreported claims and policyholder amounts on deposit. The components of gross and net insurance contract liabilities are shown below.

As at December 31,	**2019**	2018
Insurance contract liabilities	**$ 336,156**	$ 313,737
Benefits payable and provision for unreported claims	**4,229**	4,398
Policyholder amounts on deposit	**10,776**	10,519
Gross insurance contract liabilities	**351,161**	328,654
Reinsurance assets[1]	**(41,353)**	(42,925)
Net insurance contract liabilities	**$ 309,808**	$ 285,729

[1] The Company also holds reinsurance assets of $93 (2018 – $128) for investment contract liabilities, refer to note 7(b).

Net insurance contract liabilities represent the amount which, together with estimated future premiums and net investment income, will be sufficient to pay estimated future benefits, policyholder dividends and refunds, taxes (other than income taxes) and expenses on policies in-force net of reinsurance premiums and recoveries.

Net insurance contract liabilities are determined using CALM, as required by the Canadian Institute of Actuaries.

The determination of net insurance contract liabilities is based on an explicit projection of cash flows using current assumptions for each material cash flow item. Investment returns are projected using the current asset portfolios and projected reinvestment strategies.

Each assumption is based on the best estimate adjusted by a margin for adverse deviation. For fixed income returns, this margin is established by scenario testing a range of prescribed and company-developed scenarios consistent with Canadian Actuarial Standards of Practice. For all other assumptions, this margin is established by directly adjusting the best estimate assumption.

Cash flows used in the net insurance contract liabilities valuation adjust the gross policy cash flows to reflect projected cash flows from ceded reinsurance. The cash flow impact of ceded reinsurance varies depending upon the amount of reinsurance, the structure of reinsurance treaties, the expected economic benefit from treaty cash flows and the impact of margins for adverse deviation. Gross insurance contract liabilities are determined by discounting gross policy cash flows using the same discount rate as the net CALM model discount rate.

The reinsurance asset is determined by taking the difference between the gross insurance contract liabilities and the net insurance contract liabilities. The reinsurance asset represents the benefit derived from reinsurance arrangements in-force at the date of the Consolidated Statements of Financial Position.

The period used for the projection of cash flows is the policy lifetime for most individual insurance contracts. For other types of contracts, a shorter projection period may be used, with the contract generally ending at the earlier of the first renewal date on or after the Consolidated Statements of Financial Position date where the Company can exercise discretion in renewing its contractual obligations or terms of those obligations and the renewal or adjustment date that maximizes the insurance contract liabilities. For segregated fund products with guarantees, the projection period is generally set as the period that leads to the largest insurance contract liability. Where the projection period is less than the policy lifetime, insurance contract liabilities may be reduced by an allowance for acquisition expenses expected to be recovered from policy cash flows beyond the projection period used for the liabilities. Such allowances are tested for recoverability using assumptions that are consistent with other components of the actuarial valuation.

(b) Composition

The composition of insurance contract liabilities and reinsurance assets by the line of business and reporting segment is as follows.

Gross insurance contract liabilities

	Individual insurance						
As at December 31, 2019	Participating	Non-participating	Annuities and pensions	Other insurance contract liabilities[1]	Total, net of reinsurance ceded	Total reinsurance ceded	Total, gross of reinsurance ceded
Asia	**$ 46,071**	**$ 32,887**	**$ 5,915**	**$ 3,064**	**$ 87,937**	**$ 1,432**	**$ 89,369**
Canada	**12,012**	**39,655**	**17,871**	**13,759**	**83,297**	**286**	**83,583**
U.S.	**8,734**	**66,163**	**14,763**	**49,199**	**138,859**	**39,411**	**178,270**
Corporate and Other	**–**	**(609)**	**36**	**288**	**(285)**	**224**	**(61)**
Total, net of reinsurance ceded	**66,817**	**138,096**	**38,585**	**66,310**	**309,808**	**$ 41,353**	**$ 351,161**
Total reinsurance ceded	**9,869**	**13,588**	**16,850**	**1,046**	**41,353**		
Total, gross of reinsurance ceded	**$ 76,686**	**$ 151,684**	**$ 55,435**	**$ 67,356**	**$ 351,161**		

	Individual insurance						
As at December 31, 2018	Participating	Non-participating	Annuities and pensions	Other insurance contract liabilities[1]	Total, net of reinsurance ceded	Total reinsurance ceded	Total, gross of reinsurance ceded
Asia	$ 38,470	$ 29,547	$ 5,062	$ 3,048	$ 76,127	$ 1,332	$ 77,459
Canada	10,743	34,677	18,339	12,869	76,628	(202)	76,426
U.S.	8,673	63,412	16,125	44,932	133,142	41,695	174,837
Corporate and Other	–	(601)	46	387	(168)	100	(68)
Total, net of reinsurance ceded	57,886	127,035	39,572	61,236	285,729	$ 42,925	$ 328,654
Total reinsurance ceded	11,596	12,303	17,927	1,099	42,925		
Total, gross of reinsurance ceded	$ 69,482	$ 139,338	$ 57,499	$ 62,335	$ 328,654		

[1] Other insurance contract liabilities include group insurance and individual and group health including long-term care insurance.

Separate sub-accounts were established for participating policies in-force at the demutualization of MLI and John Hancock Mutual Life Insurance Company. These sub-accounts permit this participating business to be operated as separate "closed blocks" of participating policies. As at December 31, 2019, $29,402 (2018 – $28,790) of both assets and insurance contract liabilities were related to these closed blocks of participating policies.

(c) Assets backing insurance contract liabilities, other liabilities and capital

Assets are segmented and matched to liabilities with similar underlying characteristics by product line and major currency. The Company has established target investment strategies and asset mixes for each asset segment supporting insurance contract liabilities which consider the risk attributes of the liabilities supported by the assets and expectations of market performance. Liabilities with rate and term guarantees are predominantly backed by fixed-rate instruments on a cash flow matching basis for a targeted duration horizon. Longer duration cash flows on these liabilities as well as on adjustable products such as participating life insurance are backed by a broader range of asset classes, including equity and alternative long-duration investments. The Company's capital is invested in a range of debt and equity investments, both public and private.

Changes in the fair value of assets backing net insurance contract liabilities, that the Company considers to be other than temporary, would have a limited impact on the Company's net income wherever there is an effective matching of assets and liabilities, as these changes would be substantially offset by corresponding changes in the value of net insurance contract liabilities. The fair value of assets backing net insurance contract liabilities as at December 31, 2019, excluding reinsurance assets, was estimated at $315,952 (2018 – $287,326).

As at December 31, 2019, the fair value of assets backing capital and other liabilities was estimated at $501,395 (2018 – $465,590).

The following table presents the carrying value of assets backing net insurance contract liabilities, other liabilities and capital.

As at December 31, 2019	Individual insurance Participating	Non-participating	Annuities and pensions	Other insurance contract liabilities(1)	Other liabilities(2)	Capital(3)	Total
Assets							
Debt securities	**$ 34,169**	**$ 74,113**	**$ 19,865**	**$ 31,620**	**$ 8,828**	**$ 29,527**	**$ 198,122**
Public equities	**10,907**	**6,453**	**204**	**253**	**381**	**4,653**	**22,851**
Mortgages	**2,921**	**12,140**	**5,203**	**7,916**	**21,165**	**31**	**49,376**
Private placements	**4,658**	**16,020**	**6,957**	**9,122**	**1,090**	**132**	**37,979**
Real estate	**3,336**	**6,446**	**1,082**	**1,731**	**113**	**220**	**12,928**
Other	**10,826**	**22,924**	**5,274**	**15,668**	**405,905**	**27,525**	**488,122**
Total	**$ 66,817**	**$ 138,096**	**$ 38,585**	**$ 66,310**	**$ 437,482**	**$ 62,088**	**$ 809,378**

As at December 31, 2018	Individual insurance Participating	Non-participating	Annuities and pensions	Other insurance contract liabilities(1)	Other liabilities(2)	Capital(3)	Total
Assets							
Debt securities	$ 30,934	$ 67,387	$ 20,469	$ 28,435	$ 10,061	$ 28,308	$ 185,594
Public equities	8,416	5,562	172	262	589	4,178	19,179
Mortgages	2,218	11,111	4,972	8,732	21,295	35	48,363
Private placements	4,151	14,131	6,960	8,581	1,772	159	35,754
Real estate	3,106	6,028	1,214	1,799	397	233	12,777
Other	9,061	22,816	5,785	13,427	369,736	27,872	448,697
Total	$ 57,886	$ 127,035	$ 39,572	$ 61,236	$ 403,850	$ 60,785	$ 750,364

(1) Other insurance contract liabilities include group insurance and individual and group health including long-term care insurance.

(2) Other liabilities are non-insurance contract liabilities which include segregated funds, bank deposits, long-term debt, deferred tax liabilities, derivatives, investment contracts, embedded derivatives and other miscellaneous liabilities.

(3) Capital is defined in note 11.

(d) Significant insurance contract liability valuation assumptions

The determination of insurance contract liabilities involves the use of estimates and assumptions. Insurance contract liabilities have two major components: a best estimate amount and a provision for adverse deviation.

Best estimate assumptions

Best estimate assumptions are made with respect to mortality and morbidity, investment returns, rates of policy termination, operating expenses and certain taxes. Actual experience is monitored to ensure that assumptions remain appropriate and assumptions are changed as warranted. Assumptions are discussed in more detail in the following table.

Nature of factor and assumption methodology		Risk management
Mortality and morbidity	Mortality relates to the occurrence of death. Mortality is a key assumption for life insurance and certain forms of annuities. Mortality assumptions are based on the Company's internal experience as well as past and emerging industry experience. Assumptions are differentiated by sex, underwriting class, policy type and geographic market. Assumptions are made for future mortality improvements. Morbidity relates to the occurrence of accidents and sickness for insured risks. Morbidity is a key assumption for long-term care insurance, disability insurance, critical illness and other forms of individual and group health benefits. Morbidity assumptions are based on the Company's internal experience as well as past and emerging industry experience and are established for each type of morbidity risk and geographic market. Assumptions are made for future morbidity improvements.	The Company maintains underwriting standards to determine the insurability of applicants. Claim trends are monitored on an ongoing basis. Exposure to large claims is managed by establishing policy retention limits, which vary by market and geographic location. Policies in excess of the limits are reinsured with other companies. Mortality is monitored monthly and the overall 2019 experience was unfavourable (2018 – favourable) when compared to the Company's assumptions. Morbidity is also monitored monthly and the overall 2019 experience was unfavourable (2018 – unfavourable) when compared to the Company's assumptions.
Investment returns	The Company segments assets to support liabilities by business segment and geographic market and establishes investment strategies for each liability segment. Projected cash flows from these assets are combined with projected cash flows from future asset purchases/sales to determine expected rates of return on these assets for future years. Investment strategies are based on the target investment policies for each segment and the reinvestment returns are derived from current and projected market rates for fixed income investments and a projected outlook for other alternative long-duration assets. Investment return assumptions include expected future asset credit losses on fixed income investments. Credit losses are projected based on past experience of the Company and industry as well as specific reviews of the current investment portfolio. Investment return assumptions for each asset class and geographic market also incorporate expected investment management expenses that are derived from internal cost studies. The costs are attributed to each asset class to develop unitized assumptions per dollar of asset for each asset class and geographic market.	The Company's policy of closely matching asset cash flows with those of the corresponding liabilities is designed to mitigate the Company's exposure to future changes in interest rates. The interest rate risk positions in business segments are monitored on an ongoing basis. Under CALM, the reinvestment rate is developed using interest rate scenario testing and reflects the interest rate risk positions. In 2019, the movement in interest rates negatively (2018 – positively) impacted the Company's net income. This negative impact was driven by decreases in risk free interest rates and corporate spreads, as well the impact of swap spreads on policy liabilities. The exposure to credit losses is managed against policies that limit concentrations by issuer, corporate connections, ratings, sectors and geographic regions. On participating policies and some non-participating policies, credit loss experience is passed back to policyholders through the investment return crediting formula. For other policies, premiums and benefits reflect the Company's assumed level of future credit losses at contract inception or most recent contract adjustment date. The Company holds explicit provisions in actuarial liabilities for credit risk including provisions for adverse deviation. In 2019, credit loss experience on debt securities and mortgages was favourable (2018 – favourable) when compared to the Company's assumptions. Equities, real estate and other alternative long-duration assets are used to support liabilities where investment return experience is passed back to policyholders through dividends or credited investment return adjustments. Equities, real estate, oil and gas and other alternative long-duration assets are also used to support long-dated obligations in the Company's annuity and pension businesses and for long-dated insurance obligations on contracts where the investment return risk is borne by the Company. In 2019, investment experience on alternative long-duration assets backing policyholder liabilities was favourable (2018 – unfavourable) primarily due to gains in real estate properties and private equities, partially offset by losses in timber and agriculture properties as well as in oil and gas properties. In 2019, alternative long-duration asset origination exceeded (2018 – exceeded) valuation requirements. In 2019, for the business that is dynamically hedged, segregated fund guarantee experience on residual, non-dynamically hedged market risks were favourable (2018 – unfavourable). For the business that is not dynamically hedged, experience on segregated fund guarantees due to changes in the market value of assets under management was also favourable (2018 – unfavourable). This excludes the experience on the macro equity hedges. In 2019, investment expense experience was unfavourable (2018 – unfavourable) when compared to the Company's assumptions.

Nature of factor and assumption methodology		Risk management
Policy termination and premium persistency	Policies are terminated through 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 the Company's recent experience adjusted for expected future conditions. Assumptions reflect differences by type of contract within each geographic market.	The Company seeks to design products that minimize financial exposure to lapse, surrender and premium persistency risk. The Company monitors lapse, surrender and persistency experience. In aggregate, 2019 policyholder termination and premium persistency experience was unfavourable (2018 – unfavourable) when compared to the Company's assumptions used in the computation of actuarial liabilities.
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 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 grow. 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.	The Company prices its products to cover the expected costs of servicing and maintaining them. In addition, the Company monitors expenses monthly, including comparisons of actual expenses to expense levels allowed for in pricing and valuation. Maintenance expenses for 2019 were unfavourable (2018 – unfavourable) when compared to the Company's assumptions used in the computation of actuarial liabilities. The Company prices its products to cover the expected cost of taxes.
Policyholder dividends, experience rating refunds, and other adjustable policy elements	The best estimate projections for policyholder dividends and experience rating refunds, and other adjustable elements of policy benefits are determined to be consistent with management's expectation of how these elements will be managed should experience emerge consistently with the best estimate assumptions used for mortality and morbidity, investment returns, rates of policy termination, operating expenses and taxes.	The Company monitors policy experience and adjusts policy benefits and other adjustable elements to reflect this experience. Policyholder dividends are reviewed annually for all businesses under a framework of Board-approved policyholder dividend policies.
Foreign currency	Foreign currency risk results from a mismatch of the currency of liabilities and the currency of the assets designated to support these obligations. 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 foreign exchange rates.	The Company generally matches the currency of its 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.

The Company reviews actuarial methods and assumptions on an annual basis. If changes are made to assumptions (refer to note 6(h)), the full impact is recognized in income immediately.

(e) Sensitivity of insurance contract liabilities to changes in non-economic assumptions

The sensitivity of net income attributed to shareholder to changes in non-economic assumptions underlying insurance contract liabilities is shown below, assuming a simultaneous change in the assumption across all business units. The sensitivity of net income attributed to shareholder to a deterioration or improvement in non-economic assumptions for Long-Term Care ("LTC") as at December 31, 2019 is also shown below.

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; changes in business mix, effective tax rates and other market factors; and the general limitations of internal models.

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

	Decrease in net income attributed to shareholder	
As at December 31,	**2019**	2018
Policy related assumptions		
2% adverse change in future mortality rates(2),(4)		
Products where an increase in rates increases insurance contract liabilities	**$ (500)**	$ (500)
Products where a decrease in rates increases insurance contract liabilities	**(500)**	(500)
5% adverse change in future morbidity rates (incidence and termination)(3),(4),(5)	**(5,100)**	(4,800)
10% adverse change in future policy termination rates(4)	**(2,400)**	(2,200)
5% increase in future expense levels	**(600)**	(600)

(1) The participating policy funds are largely self-supporting and generate no material impact on net income attributed to shareholder 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 shareholder.

(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 adverse sensitivities on LTC for morbidity, mortality and lapse do not assume any partial offsets from the Company's ability to contractually raise premium rates in such events, subject to state regulatory approval. In practice, the Company would plan to file for rate increases equal to the amount of deterioration resulting from the sensitivity.

(5) This includes a 5% deterioration in incidence rates and 5% deterioration in claim termination rates.

Potential impact on net income attributed to shareholder arising from changes to non-economic assumptions for Long-Term Care included in the above table [(1),(2)]

As at December 31,	Decrease in net income attributed to shareholder 2019	2018
Policy related assumptions		
2% adverse change in future mortality rates	**$ (300)**	$ (200)
5% adverse change in future morbidity incidence rates	**(2,500)**	(1,700)
5% adverse change in future morbidity claims termination rates	**(2,200)**	(2,800)
10% adverse change in future policy termination rates	**(400)**	(400)
5% increase in future expense levels	**(100)**	(100)

(1) The impacts of the adverse sensitivities on LTC for morbidity, mortality and lapse do not assume any partial offsets from the Company's ability to contractually raise premium rates in such events, subject to state regulatory approval. In practice, the Company would plan to file for rate increases equal to the amount of deterioration resulting from the sensitivities.

(2) The impact of favourable changes to all the sensitivities is relatively symmetrical.

(f) Provision for adverse deviation assumptions

The assumptions made in establishing insurance contract liabilities reflect expected best estimates of future experience. To recognize the uncertainty in these best estimate assumptions, to allow for possible misestimation of and deterioration in experience and to provide a greater degree of assurance that the insurance contract liabilities are adequate to pay future benefits, the Appointed Actuary is required to include a margin in each assumption.

Margins are released into future earnings as the policy is released from risk. 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 the 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.

Specific guidance is also provided for other risks such as market, credit, mortality and morbidity risks. For other risks which are not specifically addressed by the Canadian Institute of Actuaries, a range is provided of five per cent to 20 per cent of the expected experience assumption. The Company uses assumptions within the permissible ranges, with the determination of the level set considering the risk profile of the business. On occasion, in specific circumstances for additional prudence, a margin may exceed the high end of the range, which is permissible under the Canadian Actuarial Standards of Practice. This additional margin would be released if the specific circumstances which led to it being established were to change.

Each margin is reviewed annually for continued appropriateness.

(g) Change in insurance contract liabilities

The change in insurance contract liabilities was a result of the following business activities and changes in actuarial estimates.

For the year ended December 31, 2019	Net actuarial liabilities	Other insurance contract liabilities(1)	Net insurance contract liabilities	Reinsurance assets	Gross insurance contract liabilities
Balance, January 1	**$ 272,761**	**$ 12,968**	**$ 285,729**	**$ 42,925**	**$ 328,654**
New policies(2)	**3,251**	**–**	**3,251**	**521**	**3,772**
Normal in-force movement(2)	**30,171**	**750**	**30,921**	**(972)**	**29,949**
Changes in methods and assumptions(2)	**74**	**–**	**74**	**927**	**1,001**
Impact of changes in foreign exchange rates	**(9,668)**	**(499)**	**(10,167)**	**(2,048)**	**(12,215)**
Balance, December 31	**$ 296,589**	**$ 13,219**	**$ 309,808**	**$ 41,353**	**$ 351,161**

For the year ended December 31, 2018	Net actuarial liabilities	Other insurance contract liabilities[1]	Net insurance contract liabilities	Reinsurance assets	Gross insurance contract liabilities
Balance, January 1	$ 263,091	$ 11,155	$ 274,246	$ 30,359	$ 304,605
New policies[3]	3,269	–	3,269	388	3,657
Normal in-force movement[3]	2,044	985	3,029	(1,150)	1,879
Changes in methods and assumptions[3]	(173)	(1)	(174)	(608)	(782)
Impact of annuity coinsurance transactions	(11,156)	–	(11,156)	11,156	–
Impact of changes in foreign exchange rates	15,686	829	16,515	2,780	19,295
Balance, December 31	$ 272,761	$ 12,968	$ 285,729	$ 42,925	$ 328,654

[1] Other insurance contract liabilities are comprised of benefits payable and provision for unreported claims and policyholder amounts on deposit.

[2] In 2019, the $33,727 increase reported as the change in insurance contract liabilities on the 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 in the gross insurance contract liabilities were netted off by an increase of $34,721, of which $34,056 is included in the Consolidated Statements of Income increase in insurance contract liabilities and $665 is included in gross claims and benefits. The Consolidated Statements of Income change in insurance contract liabilities also includes the change in embedded derivatives associated with insurance contracts.

[3] In 2018, the $2,907 increase reported as the change in insurance contract liabilities on the 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 in the gross insurance contract liabilities were netted off by an increase of $4,754, of which $3,632 is included in the Consolidated Statements of Income increase in insurance contract liabilities and $1,122 is included in gross claims and benefits. The Consolidated Statements of Income change in insurance contract liabilities also includes the change in embedded derivatives associated with insurance contracts. The Company finalized its estimate of U.S. Tax reform which resulted in a $196 pre-tax ($154 post-tax) increase in insurance contract liabilities, refer to note 15.

(h) Actuarial methods and assumptions

A comprehensive review of valuation assumptions and methods is performed annually. The review reduces the Company's exposure to uncertainty by ensuring assumptions for both asset and liability risks remain appropriate. This is accomplished by monitoring experience and updating assumptions which represent a best estimate 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 the changes in economic environment are likely to result in future changes to the actuarial assumptions, which could materially impact the insurance contract liabilities.

Annual review 2019

The completion of the 2019 annual review of actuarial methods and assumptions resulted in an increase in insurance contract liabilities of $74, net of reinsurance, and a decrease in net income attributed to shareholder of $21 post-tax.

	Change in insurance contract liabilities, net of reinsurance			
For the year ended December 31, 2019	Total	Attributed to participating policyholders' account	Attributed to shareholder's account	Change in net income attributed to shareholder (post-tax)
Long-term care triennial review	**$ 11**	**$ –**	**$ 11**	**$ (8)**
Mortality and morbidity updates	**25**	**47**	**(22)**	**14**
Lapses and policyholder behaviour	**135**	**17**	**118**	**(75)**
Investment return assumptions	**12**	**81**	**(69)**	**70**
Other updates	**(109)**	**(163)**	**54**	**(22)**
Net impact	**$ 74**	**$ (18)**	**$ 92**	**$ (21)**

Long-term care triennial review

U.S. Insurance completed a comprehensive long-term care ("LTC") experience study. The review included all aspects of claim assumptions, the impact of policyholder benefit reductions as well as the progress on future premium rate increases and a review of margins on the business. The impact of the LTC review was approximately net neutral to net income attributed to shareholder.

The experience study showed lower termination rates than expected during the elimination or "qualifying" period (which is the period between when a claim is filed and when benefit payments begin), and favourable incidence as policyholders are filing claims at a lower rate than expected. In addition, policyholders are electing to reduce their benefits in lieu of paying increased premiums. The overall claims experience review led to a post-tax charge to net income attributed to shareholder of approximately $1.9 billion, which includes a gain of approximately $0.2 billion for the impact of benefit reductions.

The experience study included additional claims data due to the natural aging of the block of business. As a result, the Company reduced certain margins for adverse deviations, which resulted in a post-tax gain to net income attributed to shareholder of approximately $0.7 billion.

While the study continues to support the assumptions of both future morbidity and mortality improvement, the Company reduced its morbidity improvement assumption, which resulted in a post-tax charge to net income attributed to shareholder of approximately $0.7 billion.

The review of premium increases assumed in the policy liabilities resulted in a post-tax gain to net income attributed to shareholder of approximately $2.0 billion related to the expected timing and amount of premium increases that are subject to state approval and reflects a 30% margin. The expected premium increases are informed by past approval rates applied to prior state filings that remain outstanding and estimated new requests based on the Company's 2019 review of morbidity, mortality and lapse assumptions. The Company's actual experience in obtaining premium increases could be materially different than what it has assumed, resulting in further increases or decreases in policy liabilities, which could be material.

Updates to mortality and morbidity

Mortality and morbidity updates resulted in a $14 post-tax gain to net income attributed to shareholder. This included a review of the Company's Canada Individual Insurance mortality and reinsurance arrangements.

Updates to lapses and policyholder behaviour

Updates to lapses and policyholder behaviour assumptions resulted in a $75 post-tax charge to net income attributed to shareholder.

The primary driver of the charge was an update to the Company's lapse assumptions across several term and whole life product lines within the Company's Canada Individual Insurance business, partially offset by several updates to lapse and premium persistency assumptions in other geographies.

Updates to investment return assumptions

Updates to investment return assumptions resulted in a $70 post-tax gain to net income attributed to shareholder.

The primary driver of the gain was an update to the Company's senior secured loan default rates to reflect recent experience, as well as its investment and crediting rate strategy for certain universal life products. This was partially offset by updates to certain private equity investment assumptions in Canada.

Other updates

Other updates resulted in a $22 post-tax charge to net income attributed to shareholder.

Annual review 2018

The 2018 annual review of actuarial methods and assumptions resulted in a decrease in insurance contract liabilities of $174, net of reinsurance, and a decrease in net income attributed to shareholder of $51 post-tax.

	Change in insurance contract liabilities, net of reinsurance			
For the year ended December 31, 2018	Total	Attributed to participating policyholders' account	Attributed to shareholder's account	Change in net income attributed to shareholder (post-tax)
Mortality and morbidity updates	$ 319	$ (192)	$ 511	$ (360)
Lapses and policyholder behaviour	287	–	287	(226)
Investment return assumptions	(96)	50	(146)	143
Other	(684)	(94)	(590)	392
Net impact	$ (174)	$ (236)	$ 62	$ (51)

Updates to mortality and morbidity assumptions

Mortality and morbidity updates resulted in a $360 post-tax charge to net income attributed to shareholder.

The primary driver of the charge is related to updates to mortality and morbidity assumptions for the Company's structured settlement and term renewal business in Canada. A review of mortality assumptions for the Company's U.S. group pension annuity business and certain blocks of life insurance business resulted in a small charge to earnings, and other updates to mortality and morbidity assumptions led to a small net charge.

Updates to lapses and policyholder behaviour

Lapses and policyholder behaviour updates resulted in a $226 post-tax charge to net income attributed to shareholder.

The primary driver of the charge is related to updated lapses and premium persistency rates for certain U.S. insurance product lines ($252 post-tax charge). This included updates to universal life no-lapse guarantee business lapse assumptions to better reflect emerging experience, which showed a variation in lapses based on premium funding levels, partially offset by favourable lapse experience on several of the U.S. life insurance product lines.

Other updates to lapses and policyholder behaviour assumptions were made across several product lines to reflect recent experience.

Updates to investment return assumptions

Investment return assumption updates resulted in a $143 post-tax gain to net income attributed to shareholder.

The Company updated its bond default rates to reflect recent experience, leading to a $401 post-tax gain and updated the investment return assumptions for ALDA and public equities, specifically oil and gas, which led to a $210 post-tax charge. Other refinements to the projections of investment returns resulted in a $48 post-tax charge.

Other updates

Refinements to the projection of the tax and liability cash flows across multiple product lines led to a post-tax gain to net income attributed to shareholder of $392. The refinements were primarily driven by the projection of tax cash flows as the Company reviewed the deductibility of certain reserves. In addition, the Company refined the projection of policyholder crediting rates for certain products.

(i) Insurance contracts contractual obligations

Insurance contracts give rise to obligations fixed by agreement. As at December 31, 2019, the Company's contractual obligations and commitments relating to insurance contracts are as follows.

Payments due by period	Less than 1 year	1 to 3 years	3 to 5 years	Over 5 years	Total
Insurance contract liabilities[1]	**$ 9,682**	**$ 12,084**	**$ 16,587**	**$ 758,687**	**$ 797,040**

[1] Insurance contract liability 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. Cash flows include embedded derivatives measured separately at fair value.

(j) Gross claims and benefits

The following table presents a breakdown of gross claims and benefits.

For the years ended December 31,	2019	2018
Death, disability and other claims	**$ 15,752**	$ 15,174
Maturity and surrender benefits	**8,433**	7,722
Annuity payments	**4,030**	4,262
Policyholder dividends and experience rating refunds	**1,445**	1,809
Net transfers from segregated funds	**(1,000)**	(1,089)
Total	**$ 28,660**	$ 27,878

(k) Annuity coinsurance transactions

On September 26, 2018, the Company entered into coinsurance agreements with Reinsurance Group of America ("RGA") to reinsure a block of legacy U.S. individual pay-out annuities business from John Hancock Life Insurance Company (U.S.A.) ("JHUSA") with a 100% quota share and John Hancock Life Insurance Company of New York ("JHNY") with a 90% quota share. Under the terms of the agreements, the Company will maintain responsibility for servicing the policies. The transaction was structured such that the Company ceded policyholder contract liabilities and transferred invested assets backing these liabilities. The JHUSA transaction closed in 2018.

The JHNY transaction closed with an effective date of January 1, 2019. The Company recorded an after-tax gain of $18, which includes an increase of reinsurance assets of $132 and ceded premiums of $131 on the Consolidated Statements of Income.

On October 31, 2018, the Company entered into coinsurance agreements with Jackson National Life Insurance Company ("Jackson"), a wholly-owned subsidiary of Prudential plc, to reinsure a block of legacy U.S. group pay-out annuities business from JHUSA with a 100% quota share and JHNY with a 90% quota share. Under the terms of the agreements, the Company will maintain responsibility for servicing the policies. The transaction was structured such that the Company ceded policyholder contract liabilities and transferred related invested assets backing these liabilities. The JHUSA transaction closed in 2018.

The JHNY transaction closed with an effective date of January 1, 2019. The Company recorded an after-tax gain of $31, which includes an increase of reinsurance assets of $621, a ceding commission paid of $35 and ceded premiums of $581 on the Consolidated Statements of Income.

Note 7 Investment Contract Liabilities

Investment contract liabilities are contractual obligations that do not contain significant insurance risk. Those contracts are measured either at fair value or at amortized cost.

(a) Investment contract liabilities measured at fair value

Investment contract liabilities measured at fair value include certain investment savings and pension products sold primarily in Hong Kong and mainland China. The following table presents the movement in investment contract liabilities measured at fair value.

For the years ended December 31,	2019	2018
Balance, January 1	**$ 782**	$ 639
New policies	**66**	96
Changes in market conditions	**62**	76
Redemptions, surrenders and maturities	**(86)**	(86)
Impact of changes in foreign exchange rates	**(35)**	57
Balance, December 31	**$ 789**	$ 782

(b) Investment contract liabilities measured at amortized cost

Investment contract liabilities measured at amortized cost include several fixed annuity products sold in Canada and U.S. fixed annuity products that provide guaranteed income payments for a contractually determined period and are not contingent on survivorship.

The following table presents carrying and fair values of investment contract liabilities measured at amortized cost.

	2019		2018	
As at December 31,	Amortized cost, gross of reinsurance ceded[1]	Fair value	Amortized cost, gross of reinsurance ceded[1]	Fair value
U.S. fixed annuity products	**$ 1,248**	**$ 1,482**	$ 1,357	$ 1,449
Canadian fixed annuity products	**1,067**	**1,158**	1,126	1,269
Investment contract liabilities	**$ 2,315**	**$ 2,640**	$ 2,483	$ 2,718

[1] As at December 31, 2019, investment contract liabilities with the carrying value and fair value of $93 and $103, respectively (2018 – $128 and $130, respectively), were reinsured by the Company. The net carrying value and fair value of investment contract liabilities were $2,222 and $2,537 (2018 – $2,355 and $2,588), respectively.

The changes in investment contract liabilities measured at amortized cost was a result of the following business activities.

For the years ended December 31,	2019	2018
Balance, January 1	**$ 2,483**	$ 2,487
Policy deposits	**2**	6
Interest	**62**	82
Withdrawals	**(182)**	(201)
Fees	**(3)**	(1)
Other	**17**	–
Impact of changes in foreign exchange rates	**(64)**	110
Balance, December 31	**$ 2,315**	$ 2,483

Carrying value of fixed annuity products is amortized at a rate that exactly discounts the projected actual cash flows to the net carrying amount of the liability at the date of issue.

Fair value of fixed annuity products is determined by projecting cash flows according to the contract terms and discounting the cash flows at current market rates adjusted for the Company's own credit standing. As at December 31, 2019 and 2018, all investment contracts were categorized in Level 2 of the fair value hierarchy.

(c) Investment contracts contractual obligations

As at December 31, 2019, the Company's contractual obligations and commitments relating to the investment contracts are as follows.

Payments due by period	Less than 1 year	1 to 3 years	3 to 5 years	Over 5 years	Total
Investment contract liabilities[1]	**$ 289**	**$ 484**	**$ 476**	**$ 3,846**	**$ 5,095**

[1] Due to the nature of the products, the timing of net cash flows may be before contract maturity. Cash flows are undiscounted.

Note 8 Risk Management

Manulife offers insurance, wealth and asset management products and other financial services, which subjects the Company to a broad range of risks. Manulife manages these risks within an enterprise-wide risk management framework. Manulife's goal in managing risk is to strategically optimize risk taking and risk management to support long-term revenue, earnings and capital growth. Manulife seeks to achieve this by capitalizing on business opportunities and strategies with appropriate risk/return profiles; ensuring sufficient management expertise is in place to effectively execute strategies, and to identify, understand and manage underlying inherent risks; ensuring strategies and activities align with its corporate and ethical standards and operational capabilities; pursuing opportunities and risks that enhance diversification; and in making all risk taking decisions with analyses of inherent risks, risk controls and mitigations, and risk/return trade-off.

(a) Market risk

Market risk is the risk of loss resulting from market price volatility, interest rate change, credit and swap spread changes, and adverse foreign currency rate movements. Market price volatility primarily relates to changes in prices of publicly traded equities and alternative long-duration assets. Liquidity risk, which the Company manages as a form of market risk, is the risk of not having access to sufficient funds or liquid assets to meet both expected and unexpected cash outflows and collateral demands.

Market risk management strategy

Market risk management strategy is governed by the Global Asset Liability Committee which oversees the overall market and liquidity risk program. The Company's overall strategy to manage its market risks incorporates several component strategies, each targeted to manage one or more of the market risks arising from Manulife's businesses. At an enterprise level, these strategies are designed to manage the Company's aggregate exposures to market risks against limits associated with earnings and capital volatility.

The following table outlines the Company's 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	Liquidity risk
Product design and pricing	✓	✓	✓	✓	✓
Variable annuity guarantee dynamic hedging	✓	✓		✓	✓
Macro equity risk hedging	✓			✓	✓
Asset liability management	✓	✓	✓	✓	✓
Foreign exchange management				✓	✓
Liquidity risk management					✓

Product design and pricing strategy

The Company's policies, standards, and guidelines with respect to product design and pricing are designed with the objective of aligning its product offerings with its risk-taking philosophy and risk appetite, and in particular, that incremental risk generated from new sales aligns with its strategic risk objectives and risk limits. The specific design features of Manulife's product offerings, including level of benefit guarantees, policyholder options, fund offerings and availability restrictions as well as its associated investment strategies, help to mitigate the level of underlying risk. Manulife regularly reviews and modifies key features within its product offerings, including premiums and fee charges with a goal of meeting profit targets and staying within risk limits. Certain of the Company's 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 Chief Risk Officer 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 insurance liabilities related to variable annuity guarantees and general account public equity investments.

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.

Manulife seeks to manage public equity risk arising from unhedged exposures in its insurance liabilities through the macro equity risk hedging strategy. The Company seeks to manage interest rate risk arising from variable annuity business not dynamically hedged within its 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 the hedge asset portfolio. The economic value of guarantees moves in close tandem, but not exactly, with the

Company's variable annuity guarantee policy liabilities, as it reflects best estimate liabilities and does not include any liability provisions for adverse deviations.

The Company's variable annuity hedging program uses a variety of exchange-traded and over-the-counter ("OTC") derivative contracts to offset the change in value of variable annuity guarantees. The main derivative instruments used are equity index futures, government bond futures, currency futures, interest rate swaps, total return swaps, equity options and interest rate swaptions. The hedge instruments' positions against policy liabilities are continuously monitored as market conditions change. As necessary, the hedge asset positions will be dynamically rebalanced in order to stay within established limits. The Company may also utilize other derivatives with the objective to improve hedge effectiveness opportunistically.

The Company's 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 may widen and actions might not be 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 the Company's overall earnings sensitivity to public equity market movements within 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; and
- Unhedged provisions for adverse deviation related to variable annuity guarantees dynamically hedged.

Asset liability management strategy

Manulife's asset liability management strategy is designed to help ensure that the market risks embedded in its 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 within risk limits. The embedded market risks include risks related to the level and movement of interest rates and credit and swap spreads, public equity market performance, ALDA performance and foreign exchange rate movements.

General fund product liabilities are categorized into groups with similar characteristics in order to support them with a specific asset strategy. The Company seeks to align the asset strategy for each group to 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.

Foreign exchange risk management strategy

Manulife's policy is to generally match the currency of its assets with the currency of the liabilities they support. Where assets and liabilities are not currency matched, the Company seeks to hedge this exposure where appropriate to stabilize its capital positions and remain within its enterprise foreign exchange risk limits through the use of financial instruments such as derivatives.

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 the Company's 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 Manulife's liquidity ratios to remain strong. Manulife manages liquidity centrally and closely monitors the liquidity positions of principal subsidiaries.

Manulife seeks to mitigate liquidity risk by diversifying its business across different products, markets, geographical regions and policyholders. The Company designs insurance products to encourage policyholders to maintain their policies in-force, to help generate a diversified and stable flow of recurring premium income. The Company designs the policyholder termination features of wealth management products and related investment strategies with the goal of mitigating the financial exposure and liquidity risk related to unexpected policyholder terminations. The Company establishes and implements 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 total assets. Manulife aims to reduce liquidity risk in deposit funded businesses by diversifying funding sources and appropriately managing the term structure of funding. The Company forecasts and monitors 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.

The Company also maintains centralized cash pools and access to other sources of liquidity and contingent liquidity such as repurchase funding agreements. Manulife's 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.

Manulife has established a variety of contingent liquidity sources. The Company, along with its parent and certain subsidiaries, maintains a US$500 committed unsecured revolving credit facility with certain U.S. banks. There were no outstanding borrowings under this credit facility as of December 31, 2019. In addition, JHUSA is a member of the Federal Home Loan Bank of Indianapolis ("FHLBI"), which enables the Company to obtain loans from FHLBI as an alternative source of liquidity that is collateralizable by qualifying mortgage loans, mortgage-backed securities and U.S. Treasury and Agency securities. Based on regulatory limitations, as of December 31, 2019, JHUSA had an estimated maximum borrowing capacity of US$3.9 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, 2019	Less than 1 year	1 to 3 years	3 to 5 years	Over 5 years	Total
Capital instruments	**–**	**–**	**598**	**3,245**	**3,843**
Derivatives	**468**	**162**	**240**	**9,630**	**10,500**
Deposits from Bank clients[2]	**16,872**	**2,632**	**1,984**	**–**	**21,488**
Lease liabilities	**107**	**142**	**49**	**76**	**374**

[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, 2019 was $21,488 and $21,563, respectively (2018 – $19,684 and $19,731, 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 (2018 – 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 $455.4 billion as at December 31, 2019 (2018 – $428.0 billion).

(b) 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 2020 to 2040.

Manulife seeks to mitigate a portion of the risks embedded in its retained (i.e. net of reinsurance) variable annuity and segregated fund guarantee business through the combination of 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,	2019 Guarantee value	2019 Fund value	2019 Amount at risk[4],[5]	2018 Guarantee value	2018 Fund value	2018 Amount at risk[4],[5]
Guaranteed minimum income benefit	**$ 4,629**	**$ 3,696**	**$ 998**	$ 5,264	$ 3,675	$ 1,593
Guaranteed minimum withdrawal benefit	**53,355**	**48,031**	**6,030**	60,494	49,214	11,388
Guaranteed minimum accumulation benefit	**17,994**	**18,362**	**10**	18,611	18,720	141
Gross living benefits[1],[2]	**75,978**	**70,089**	**7,038**	84,369	71,609	13,122
Gross death benefits[3]	**9,555**	**17,186**	**802**	10,663	14,654	1,567
Total gross of reinsurance	**85,533**	**87,275**	**7,840**	95,032	86,263	14,689
Living benefits reinsured	**3,977**	**3,199**	**832**	4,515	3,173	1,343
Death benefits reinsured	**718**	**500**	**318**	2,353	2,070	493
Total reinsured	**4,695**	**3,699**	**1,150**	6,868	5,243	1,836
Total, net of reinsurance	**$ 80,838**	**$ 83,576**	**$ 6,690**	$ 88,164	$ 81,020	$ 12,853

(1) Where a policy includes both living and death benefits, the guarantee in excess of the living benefit is included in the death benefit category as outlined in footnote 3.
(2) Contracts with guaranteed long-term care benefits are included in this 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, 2019 was $6,690 (2018 – $12,853) of which: US$3,995 (2018 – US$6,899) was on U.S. business, $1,178 (2018 – $2,654) was on Canadian business, US$104 (2018 – US$332) was on Japan business and US$145 (2018 – US$246) was related to Asia (other than Japan) and run-off reinsurance business.

Investment categories for variable contracts with guarantees

Variable contracts with guarantees, including variable annuities and variable life, 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, Investment category	2019	2018
Equity funds	**$ 47,489**	$ 44,333
Balanced funds	**42,448**	41,749
Bond funds	**11,967**	12,279
Money market funds	**1,732**	2,109
Other fixed interest rate investments	**1,975**	2,000
Total	**$ 105,611**	$ 102,470

Caution related to sensitivities

In the sections that follow, the Company provides 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 the Company's 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, the Company cannot provide assurance that the actual impact on net income attributed to shareholder will be as indicated.

Publicly traded equity performance risk sensitivities and exposure measures

The table below shows the potential impact on net income attributed to shareholder 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 shareholder could be considerably more than shown. The potential impact is shown after taking into account the impact of the change in markets on the hedge assets. While the Company 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, the Company makes certain assumptions for the purposes of estimating the impact on net income attributed to shareholder.

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, the Company assumes 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 dynamic and macro hedging programs 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 Canadian Institute of Actuaries ("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 shareholder 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 shareholder arising from changes to public equity returns[1],[2]

As at December 31, 2019	-30%	-20%	-10%	+10%	+20%	+30%
Underlying sensitivity to net income attributed to shareholder[3]						
Variable annuity guarantees	**$ (3,270)**	**$ (1,930)**	**$ (860)**	**$ 620**	**$ 1,060**	**$ 1,360**
General fund equity investments[4]	**(1,140)**	**(720)**	**(330)**	**340**	**680**	**1,020**
Total underlying sensitivity before hedging	**(4,410)**	**(2,650)**	**(1,190)**	**960**	**1,740**	**2,380**
Impact of macro and dynamic hedge assets[5]	**2,690**	**1,580**	**670**	**(580)**	**(1,020)**	**(1,340)**
Net potential impact on net income attributed to shareholder after impact of hedging	**$ (1,720)**	**$ (1,070)**	**$ (520)**	**$ 380**	**$ 720**	**$ 1,040**

As at December 31, 2018	-30%	-20%	-10%	+10%	+20%	+30%
Underlying sensitivity to net income attributed to shareholder[3]						
Variable annuity guarantees	$ (3,650)	$ (2,240)	$ (1,040)	$ 890	$ 1,610	$ 2,170
General fund equity investments[4]	(1,150)	(780)	(390)	290	580	860
Total underlying sensitivity before hedging	(4,800)	(3,020)	(1,430)	1,180	2,190	3,030
Impact of macro and dynamic hedge assets[5]	3,110	1,940	910	(820)	(1,450)	(1,930)
Net potential impact on net income attributed to shareholder after impact of hedging	$ (1,690)	$ (1,080)	$ (520)	$ 360	$ 740	$ 1,100

(1) See "Caution related to sensitivities" above.

(2) The tables show the potential impact on net income attributed to shareholder 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, excluding impacts from asset-based fees earned on assets under management and policyholder account value.

(3) 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.

(4) This impact for general fund equity investments includes general fund investments supporting policy liabilities, investment in seed money investments (in new segregated and mutual funds made by the Corporate and Other segment) and the impact on policy liabilities related to the projected future fee income on variable universal life and other unit linked products. The impact 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 shareholder as a result of changes in equity markets.

(5) 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).

Interest rate and spread risk sensitivities and exposure measures

At December 31, 2019, the Company estimated the sensitivity of net income attributed to shareholder to a 50 basis point parallel decline in interest rates to be a charge of $100, and to a 50 basis point increase in interest rates to be a charge of $100.

The table below shows the potential impact on net income attributed to shareholder 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, sensitivities are not consistent across all regions in which the Company operates, and the impact of yield curve changes will vary depending upon the geography where the change occurs. 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 insurance liabilities are based on interest rate scenarios and calibration criteria set by the

Canadian Actuarial Standards Board, while 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 swaps may be greater than the decrease in the value of insurance liabilities. This could result in a charge to net income attributed to shareholder in the short-term even though the rising and steepening of the yield curve, if sustained, may have a positive long-term economic impact.

The potential impact on net income attributed to shareholder does not take into account any future potential changes to the Company's ultimate reinvestment rate ("URR") assumptions or calibration criteria for stochastic risk-free rates. At December 31, 2019, the Company estimated the sensitivity of net income attributed to shareholder to a 10 basis point reduction in the URR in all geographies, and a corresponding change to stochastic risk-free modeling, to be a charge of $350 million (post-tax); and note that the impact of changes to the URR are not linear. The long-term URR for risk-free rates in Canada is prescribed at 3.05% and the Company uses the same assumption for the U.S. The assumption for Japan is 1.6%. The Canadian Actuarial Standards Board does not anticipate an update to this promulgation prior to the effective date of IFRS 17, expected to be 2022 at the earliest.

The potential impact on net income attributable to shareholder does not take into account other potential impacts of lower interest rate levels, for example, increased strain on the sale of new business or lower interest earned on surplus assets. The impact also does not reflect any unrealized gains or losses on AFS fixed income assets held in the Corporate and Other segment. Changes in the market value of these assets may provide a natural economic offset to the interest rate risk arising from 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 the Company would realize any of the unrealized gains or losses available.

The impact does not reflect any potential effect of changing interest rates to the value of ALDA assets. Rising interest rates could negatively impact the value of ALDA assets. More information on ALDA can be found under the section "Alternative long-duration asset performance risk sensitivities and exposure measures", below.

The following table shows the potential impact on net income attributed to shareholder including the change in the market value of AFS fixed income assets held in the Corporate and Other segment, which could be realized through the sale of these assets.

Potential impact on net income attributed to shareholder of an immediate parallel change in interest rates relative to rates assumed in the valuation of policy liabilities(1),(2),(3),(4)

	2019		2018	
As at December 31,	-50bp	+50bp	-50bp	+50bp
Net income attributed to shareholder				
Excluding change in market value of AFS fixed income assets held in the Corporate and Other segment	**$ (100)**	**$ (100)**	$ (100)	$ 100
From fair value changes in AFS fixed income assets held in the Corporate and Other segment, if realized	**1,700**	**(1,600)**	1,600	(1,500)

(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 Corporate and Other segment will depend on the aggregate amount of unrealized gain or loss.
(4) Sensitivities are based on projected asset and liability cash flows and the impact of realizing fair value changes in AFS fixed income is based on the holdings at the end of the period.

The following tables show the potential impact on net income attributed to shareholder 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 shareholder arising from changes to corporate spreads and swap spreads(1),(2),(3)

Corporate spreads(4),(5)	2019		2018	
As at December 31,	-50bp	+50bp	-50bp	+50bp
Net income attributed to shareholder	**$ (800)**	**$ 800**	$ (600)	$ 600

Swap spreads	2019		2018	
As at December 31,	-20bp	+20bp	-20bp	+20bp
Net income attributed to shareholder	**$ 100**	**$ (100)**	$ 100	$ (100)

(1) See "Caution related to sensitivities" above.

(2) The impact on net income attributed to shareholder assumes no gains or losses are realized on AFS fixed income assets held in the Corporate and Other segment and excludes the impact of changes in segregated fund bond values due to changes in credit spreads. The participating policy funds are largely self-supporting and generate no material impact on net income attributed to shareholder as a result of changes in corporate and swap spreads.
(3) Sensitivities are based on projected asset and liability cash flows.
(4) Corporate spreads are assumed to grade to the long-term average over five years.
(5) 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.

Alternative long-duration asset performance risk sensitivities and exposure measures

The following table shows the potential impact on net income attributed to shareholder 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 shareholder could be considerably more than shown.

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 shareholder arising from changes in ALDA returns[1],[2],[3],[4],[5],[6]

	2019		2018	
As at December 31,	-10%	+10%	-10%	+10%
Real estate, agriculture and timber assets	**$ (1,300)**	**$ 1,200**	$ (1,300)	$ 1,200
Private equities and other ALDA	**(1,800)**	**1,700**	(1,600)	1,600
Alternative long-duration assets	**$ (3,100)**	**$ 2,900**	$ (2,900)	$ 2,800

(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 or (ii) any gains or losses on ALDA held in the Corporate and Other segment.
(3) The participating policy funds are largely self-supporting and generate no material impact on net income attributed to shareholder 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) The impact of changes to the portfolio asset mix supporting the Company's North American legacy businesses are reflected in the sensitivities when the changes take place.
(6) The impact from a 10% change in ALDA returns increased from December 31, 2018 as the changes in actuarial methods and assumptions resulted in a lengthening of the policy liability cash flows, a portion of which is assumed to be supported by ALDA. Refer to note 6(h).

Foreign currency risk for financial instruments

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, 2019, the Company did not have a material unmatched currency exposure.

Liquidity risk exposure measures

Manulife manages liquidity levels of the consolidated group and key subsidiaries against established thresholds. These thresholds are based on liquidity stress scenarios over different time horizons.

Increased use of derivatives for hedging purposes has necessitated greater emphasis on measurement and management of contingent liquidity risk related to these instruments, in particular the movement of "over-the-counter" derivatives to central clearing in the U.S. and Japan places an emphasis on cash as the primary source of liquidity as opposed to security holdings. The market value of the Company's derivative portfolio is therefore regularly stress tested to assess the potential collateral and cash settlement requirements under various market conditions.

(c) Credit risk

Credit risk is the risk of loss due to inability or unwillingness of a borrower, or counterparty, to fulfill its payment obligations. Worsening regional and global economic conditions, segment or industry sector challenges, or company specific factors could result in defaults or downgrades and could lead to increased provisions or impairments related to the Company's general fund invested assets, derivative financial instruments and reinsurance assets and an increase in provisions for future credit impairments that are included in actuarial liabilities.

The Company's exposure to credit risk is managed through risk management policies and procedures which include a defined credit evaluation and adjudication process, delegated credit approval authorities and established exposure limits by borrower, corporate connection, credit rating, industry and geographic region. The Company measures 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 Company also ensures where warranted, that mortgages, private placements and loans to Bank clients are secured by collateral, the nature of which depends on the credit risk of the counterparty.

An allowance for losses on loans is established when a loan becomes impaired. Allowances for loan losses are calculated to reduce the carrying value of the loans to estimated net realizable value. The establishment of such allowances takes into consideration normal historical credit loss levels and future expectations, with an allowance for adverse deviations. In addition, policy liabilities include general provisions for credit losses from future asset impairments. Impairments are identified through regular monitoring of all credit related exposures, considering such information as general market conditions, industry and borrower specific credit events and any other relevant trends or conditions. Allowances for losses on reinsurance contracts are established when a reinsurance counterparty becomes unable or unwilling to fulfill its contractual obligations. The allowance for loss is based on current recoverable amounts and ceded policy liabilities.

Credit risk associated with derivative counterparties is discussed in note 8(f) and credit risk associated with reinsurance counterparties is discussed in note 8(k).

(i) Credit exposure

The following table presents the gross carrying amount of financial instruments subject to credit exposure, without considering any collateral held or other credit enhancements.

As at December 31,	2019	2018
Debt securities		
FVTPL	**$ 166,307**	$ 154,737
AFS	**31,815**	30,857
Mortgages	**49,376**	48,363
Private placements	**37,979**	35,754
Policy loans	**6,471**	6,446
Loans to Bank clients	**1,740**	1,793
Derivative assets	**19,453**	13,703
Accrued investment income	**2,455**	2,466
Reinsurance assets	**41,446**	43,053
Other financial assets	**5,581**	4,798
Total	**$ 362,623**	$ 341,970

As at December 31, 2019, 99% (2018 – 99%) of debt securities were investment grade-rated with ratings ranging between AAA to BBB.

(ii) Credit quality

Credit quality of commercial mortgages and private placements

Credit quality of commercial mortgages and private placements is assessed at least annually by using an internal rating based on regular monitoring of credit-related exposures, considering both qualitative and quantitative factors.

A provision is recorded when the internal risk ratings indicate that a loss represents the most likely outcome. These assets are designated as non-accrual and an allowance is established based on an analysis of the security and repayment sources.

The following table presents credit quality of commercial mortgages and private placements.

As at December 31, 2019	AAA	AA	A	BBB	BB	B and lower	Total
Commercial mortgages							
Retail	**$ 132**	**$ 1,374**	**$ 5,285**	**$ 2,039**	**$ 10**	**$ –**	**$ 8,840**
Office	**77**	**1,540**	**5,808**	**1,402**	**26**	**18**	**8,871**
Multi-family residential	**640**	**1,585**	**2,397**	**714**	**35**	**–**	**5,371**
Industrial	**38**	**364**	**1,820**	**237**	**10**	**–**	**2,469**
Other	**260**	**739**	**976**	**1,290**	**–**	**8**	**3,273**
Total commercial mortgages	**1,147**	**5,602**	**16,286**	**5,682**	**81**	**26**	**28,824**
Agricultural mortgages	**–**	**27**	**137**	**312**	**–**	**–**	**476**
Private placements	**1,098**	**5,513**	**14,311**	**14,139**	**823**	**2,095**	**37,979**
Total	**$ 2,245**	**$ 11,142**	**$ 30,734**	**$ 20,133**	**$ 904**	**$ 2,121**	**$ 67,279**

As at December 31, 2018	AAA	AA	A	BBB	BB	B and lower	Total
Commercial mortgages							
Retail	$ 82	$ 1,524	$ 4,459	$ 2,227	$ 11	$ 74	$ 8,377
Office	56	1,495	5,454	1,650	45	6	8,706
Multi-family residential	613	1,427	2,407	839	37	–	5,323
Industrial	36	366	1,953	339	120	–	2,814
Other	289	334	1,167	1,191	–	14	2,995
Total commercial mortgages	1,076	5,146	15,440	6,246	213	94	28,215
Agricultural mortgages	–	163	–	389	–	–	552
Private placements	1,143	4,968	13,304	14,055	733	1,551	35,754
Total	$ 2,219	$ 10,277	$ 28,744	$ 20,690	$ 946	$ 1,645	$ 64,521

Credit quality of residential mortgages and loans to Bank clients

Credit quality of residential mortgages and loans to Bank clients is assessed at least annually with the loan being performing or non-performing as the key credit quality indicator.

Full or partial write-offs of loans are recorded when management believes that there is no realistic prospect of full recovery. Write-offs, net of recoveries, are deducted from the allowance for credit losses. All impairments are captured in the allowance for credit losses.

The following table presents credit quality of residential mortgages and loans to Bank clients.

	2019[1]			2018		
As at December 31,	Insured	Uninsured	Total	Insured	Uninsured	Total
Residential mortgages						
Performing	**$ 6,613**	**$ 13,411**	**$ 20,024**	$ 6,854	$ 12,696	$ 19,550
Non-performing	**25**	**27**	**52**	19	27	46
Loans to Bank clients						
Performing	**n/a**	**1,740**	**1,740**	n/a	1,787	1,787
Non-performing	**n/a**	**–**	**–**	n/a	6	6
Total	**$ 6,638**	**$ 15,178**	**$ 21,816**	$ 6,873	$ 14,516	$ 21,389

[1] Non-performing refers to assets that are 90 days or more past due.

The carrying value of government-insured mortgages was 14% of the total mortgage portfolio as at December 31, 2019 (2018 – 15%). Most of these insured mortgages are residential loans as classified in the table above.

(iii) Past due or credit impaired financial assets

The Company provides for credit risk by establishing allowances against the carrying value of impaired loans and recognizing impairment losses on AFS debt securities. In addition, the Company reports as impairment certain declines in the fair value of debt securities designated as FVTPL which it deems represent an impairment.

The following table presents past due but not impaired and impaired financial assets.

	Past due but not impaired			
As at December 31, 2019	Less than 90 days	90 days and greater	Total	Total impaired
Debt securities				
FVTPL	**$ 11**	**$ –**	**$ 11**	**$ 167**
AFS	**4**	**1**	**5**	**–**
Private placements	**215**	**–**	**215**	**7**
Mortgages and loans to Bank clients	**61**	**–**	**61**	**59**
Other financial assets	**60**	**42**	**102**	**1**
Total	**$ 351**	**$ 43**	**$ 394**	**$ 234**

	Past due but not impaired			
As at December 31, 2018	Less than 90 days	90 days and greater	Total	Total impaired
Debt securities				
FVTPL	$ 14	$ –	$ 14	$ 39
AFS	–	2	2	1
Private placements	15	–	15	18
Mortgages and loans to Bank clients	70	–	70	120
Other financial assets	77	26	103	1
Total	$ 176	$ 28	$ 204	$ 179

The following table presents gross carrying amount and allowances for loan losses for impaired loans.

As at December 31, 2019	Gross carrying value	Allowances for loan losses	Net carrying value
Private placements	**$ 11**	**$ 4**	**$ 7**
Mortgages and loans to Bank clients	**75**	**16**	**59**
Total	**$ 86**	**$ 20**	**$ 66**

As at December 31, 2018	Gross carrying value	Allowances for loan losses	Net carrying value
Private placements	$ 61	$ 43	$ 18
Mortgages and loans to Bank clients	172	52	120
Total	$ 233	$ 95	$ 138

The following table presents movement of allowance for loan losses during the year.

	2019			2018		
For the years ended December 31,	Private placements	Mortgages and loans to Bank clients	Total	Private placements	Mortgages and loans to Bank clients	Total
Balance, January 1	**$ 43**	**$ 52**	**$ 95**	$ 39	$ 46	$ 85
Provisions	**35**	**15**	**50**	37	18	55
Recoveries	**–**	**(46)**	**(46)**	(27)	(9)	(36)
Write-offs[(1)]	**(74)**	**(5)**	**(79)**	(6)	(3)	(9)
Balance, December 31	**$ 4**	**$ 16**	**$ 20**	$ 43	$ 52	$ 95

(1) Includes disposals and impact of changes in foreign exchange rates.

(d) Securities lending, repurchase and reverse repurchase transactions

The Company engages in securities lending to generate fee income. Collateral exceeding the market value of the loaned securities is retained by the Company until the underlying security has been returned to the Company. The market value of the loaned securities is monitored daily and additional collateral is obtained or refunded as the market value of the underlying loaned securities fluctuates. As at December 31, 2019, the Company had loaned securities (which are included in invested assets) with a market value of $558 (2018 – $1,518). The Company holds collateral with a current market value that exceeds the value of securities lent in all cases.

The Company engages in reverse repurchase transactions to generate fee income to take possession of securities to cover short positions in similar instruments and to meet short-term funding requirements. As at December 31, 2019, the Company had engaged in reverse repurchase transactions of $990 (2018 – $63) which are recorded as short-term receivables. In addition, the Company had engaged in repurchase transactions of $333 as at December 31, 2019 (2018 – $64) which are recorded as payables.

(e) Credit default swaps

The Company replicates exposure to specific issuers by selling credit protection via credit default swaps ("CDS") to complement its cash debt securities investing. The Company does not write CDS protection more than its government bond holdings. A CDS is a derivative instrument representing an agreement between two parties to exchange the credit risk of a single specified entity or an index based on the credit risk of a group of entities (all commonly referred to as the "reference entity" or a portfolio of "reference entities"), in return for a periodic premium. CDS contracts typically have a five-year term.

The following table presents details of the credit default swap protection sold by type of contract and external agency rating for the underlying reference security.

As at December 31, 2019	Notional amount[(1)]	Fair value	Weighted average maturity (in years)[(2)]
Single name CDS[(3)] – Corporate debt			
AA	**$ 24**	**$ –**	**1**
A	**371**	**5**	**1**
BBB	**107**	**1**	**2**
Total single name CDS	**$ 502**	**$ 6**	**1**
Total CDS protection sold	**$ 502**	**$ 6**	**1**

As at December 31, 2018	Notional amount[1]	Fair value	Weighted average maturity (in years)[2]
Single name CDS[3] – Corporate debt			
AA	$ 25	$ –	2
A	447	7	2
BBB	180	2	2
Total single name CDS	$ 652	$ 9	2
Total CDS protection sold	$ 652	$ 9	2

[1] Notional amounts represent the maximum future payments the Company would have to pay its counterparties assuming a default of the underlying credit and zero recovery on the underlying issuer obligation.
[2] The weighted average maturity of the CDS is weighted based on notional amounts.
[3] Rating agency designations are based on S&P where available followed by Moody's, DBRS, and Fitch. If no rating is available from a rating agency, an internally developed rating is used.

The Company held no purchased credit protection as at December 31, 2019 and 2018.

(f) Derivatives

The Company's point-in-time exposure to losses related to credit risk of a derivative counterparty is limited to the amount of any net gains that may have accrued with a counterparty. Gross derivative counterparty exposure is measured as the total fair value (including accrued interest) of all outstanding contracts in a gain position excluding any offsetting contracts in a loss position and the impact of collateral on hand. The Company limits the risk of credit losses from derivative counterparties by: using investment grade counterparties; entering into master netting arrangements which permit the offsetting of contracts in a loss position in the case of a counterparty default; and entering into Credit Support Annex agreements, whereby collateral must be provided when the exposure exceeds a certain threshold. All contracts are held with counterparties rated BBB+ or higher. As at December 31, 2019, the percentage of the Company's derivative exposure with counterparties rated AA- or higher was 23 per cent (2018 – 19 per cent). The Company's exposure to credit risk was mitigated by $12,038 fair value of collateral held as security as at December 31, 2019 (2018 – $7,848).

As at December 31, 2019, the largest single counterparty exposure, without considering the impact of master netting agreements or the benefit of collateral held, was $3,047 (2018 – $2,269). The net exposure to this counterparty, after considering master netting agreements and the fair value of collateral held, was $nil (2018 – $nil). As at December 31, 2019, the total maximum credit exposure related to derivatives across all counterparties, without considering the impact of master netting agreements and the benefit of collateral held, was $20,148 (2018 – $14,320).

(g) Offsetting financial assets and financial liabilities

Certain derivatives, securities lent and repurchase agreements have conditional offset rights. The Company does not offset these financial instruments in the Consolidated Statements of Financial Position, as the rights of offset are conditional.

In the case of derivatives, collateral is collected from and pledged to counterparties and clearing houses to manage credit risk exposure in accordance with Credit Support Annexes to swap agreements and clearing agreements. Under master netting agreements, the Company has a right of offset in the event of default, insolvency, bankruptcy or other early termination.

In the case of reverse repurchase and repurchase transactions, additional collateral may be collected from or pledged to counterparties to manage credit exposure according to bilateral reverse repurchase or repurchase agreements. In the event of default by a counterparty, the Company is entitled to liquidate the collateral held to offset against the same counterparty's obligation.

The following table presents the effect of conditional master netting and similar arrangements. Similar arrangements may include global master repurchase agreements, global master securities lending agreements, and any related rights to financial collateral.

As at December 31, 2019	Gross amounts of financial instruments(1)	Related amounts not set off in the Consolidated Statements of Financial Position: Amounts subject to an enforceable master netting arrangement or similar agreements	Related amounts not set off in the Consolidated Statements of Financial Position: Financial and cash collateral pledged (received)(2)	Net amount including financing trusts(3)	Net amounts excluding financing trusts
Financial assets					
Derivative assets	**$ 20,148**	**$ (9,192)**	**$(10,889)**	**$ 67**	**$ 67**
Securities lending	**558**	**–**	**(558)**	**–**	**–**
Reverse repurchase agreements	**990**	**–**	**(989)**	**1**	**1**
Total financial assets	**$ 21,696**	**$ (9,192)**	**$(12,436)**	**$ 68**	**$ 68**
Financial liabilities					
Derivative liabilities	**$ (11,563)**	**$ 9,192**	**$ 1,903**	**$ (468)**	**$ (53)**
Repurchase agreements	**(333)**	**–**	**330**	**(3)**	**(3)**
Total financial liabilities	**$ (11,896)**	**$ 9,192**	**$ 2,233**	**$ (471)**	**$ (56)**

As at December 31, 2018	Gross amounts of financial instruments(1)	Related amounts not set off in the Consolidated Statements of Financial Position: Amounts subject to an enforceable master netting arrangement or similar agreements	Related amounts not set off in the Consolidated Statements of Financial Position: Financial and cash collateral pledged (received)(2)	Net amount including financing trusts(3)	Net amounts excluding financing trusts
Financial assets					
Derivative assets	$ 14,320	$ (6,644)	$ (7,431)	$ 245	$ 245
Securities lending	1,518	–	(1,518)	–	–
Reverse repurchase agreements	63	(63)	–	–	–
Total financial assets	$ 15,901	$ (6,707)	$ (8,949)	$ 245	$ 245
Financial liabilities					
Derivative liabilities	$ (9,010)	$ 6,644	$ 1,868	$ (498)	$ (33)
Repurchase agreements	(64)	63	1	–	–
Total financial liabilities	$ (9,074)	$ 6,707	$ 1,869	$ (498)	$ (33)

(1) Financial assets and liabilities include accrued interest of $696 and $1,063, respectively (2018 – $621 and $918, respectively).

(2) Financial and cash collateral exclude over-collateralization. As at December 31, 2019, the Company was over-collateralized on OTC derivative assets, OTC derivative liabilities, securities lending and reverse purchase agreements and repurchase agreements in the amounts of $1,149, $526, $44 and $nil (2018 – $417, $405, $80 and $nil). As at December 31, 2019, collateral pledged (received) does not include collateral-in-transit on OTC instruments or initial margin on exchange traded contracts or cleared contracts.

(3) Includes derivative contracts entered between the Company and its financing trusts which it does not consolidate. The Company does not exchange collateral on derivative contracts entered with these trusts. Refer to note 16.

The Company has certain credit linked note assets and variable surplus note liabilities which have unconditional offset rights. Under the netting agreements, the Company has rights of offset including in the event of the Company's default, insolvency, or bankruptcy. These financial instruments are offset in the Consolidated Statements of Financial Position.

A credit linked note is a security that allows the issuer to transfer a specific credit risk to the buyer. A surplus note is a subordinated debt obligation that often qualifies as a surplus (the U.S. statutory equivalent of equity) by some U.S. state insurance regulators. Interest payments on surplus notes are made after all other contractual payments are made. The following table presents the effect of unconditional netting.

As at December 31, 2019	Gross amounts of financial instruments	Amounts subject to an enforceable netting arrangement	Net amounts of financial instruments
Credit linked note(1)	**$ 782**	**$ (782)**	**$ –**
Variable surplus note	**(782)**	**782**	**–**

As at December 31, 2018	Gross amounts of financial instruments	Amounts subject to an enforceable netting arrangement	Net amounts of financial instruments
Credit linked note[1]	$ 679	$ (679)	$ –
Variable surplus note	(679)	679	–

[1] As at December 31, 2019, the Company had no fixed surplus notes outstanding (December 31, 2018 – $nil).

(h) Risk concentrations

The Company defines enterprise-wide investment portfolio level targets and limits to ensure that portfolios are diversified across asset classes and individual investment risks. The Company monitors actual investment positions and risk exposures for concentration risk and reports its findings to the Executive Risk Committee and the Risk Committee of the Board of Directors.

As at December 31,	2019	2018
Debt securities and private placements rated as investment grade BBB or higher[1]	**98%**	98%
Government debt securities as a per cent of total debt securities	**37%**	38%
Government private placements as a per cent of total private placements	**12%**	11%
Highest exposure to a single non-government debt security and private placement issuer	**$ 1,083**	$ 1,013
Largest single issuer as a per cent of the total equity portfolio	**2%**	2%
Income producing commercial office properties (2019 – 56% of real estate, 2018 – 55%)	**$ 7,279**	$ 7,065
Largest concentration of mortgages and real estate[2] – Ontario, Canada (2019 – 27%, 2018 – 26%)	**$ 17,038**	$ 16,092

[1] Investment grade debt securities and private placements include 41% rated A, 17% rated AA and 16% rated AAA (2018 – 41%, 17% and 17%) investments based on external ratings where available.

[2] Mortgages and real estate investments are diversified geographically and by property type.

The following table presents debt securities and private placements portfolio by sector and industry.

	2019		2018	
As at December 31,	Carrying value	% of total	Carrying value	% of total
Government and agency	**$ 77,883**	**33**	$ 73,858	33
Utilities	**44,426**	**19**	41,929	19
Financial	**31,929**	**13**	31,340	14
Consumer	**25,931**	**11**	24,190	11
Energy	**20,196**	**9**	17,685	8
Industrial	**19,024**	**8**	17,508	8
Other	**16,712**	**7**	14,838	7
Total	**$ 236,101**	**100**	$ 221,348	100

(i) Insurance risk

Insurance risk is the risk of loss due to actual experience for mortality and morbidity claims, policyholder behaviour and expenses emerging differently than assumed when a product was designed and priced. A variety of assumptions are made related to these experience factors, for reinsurance costs, and for sales levels when products are designed and priced, as well as in the determination of 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. Such assumptions require significant professional judgment, and actual experience may be materially different than the assumptions made by the Company. Claims may be impacted unexpectedly by changes in the prevalence of diseases or illnesses, medical and technology advances, widespread lifestyle changes, natural disasters, large-scale man-made disasters and acts of terrorism. 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. Some reinsurance rates are not guaranteed and may be changed unexpectedly. Adjustments the Company seeks to make to Non-Guaranteed elements to reflect changing experience factors may be challenged by regulatory or legal action and the Company may be unable to implement them or may face delays in implementation.

The Company manages insurance risk through global policies, standards and best practices with respect to product design, pricing, underwriting and claim adjudication, and a global underwriting manual. Each business unit establishes underwriting policies and procedures, including criteria for approval of risks and claims adjudication policies and procedures. The current global life retention limit is US$30 for individual policies (US$35 for survivorship life policies) and is shared across businesses. Lower limits are applied in some markets and jurisdictions. The Company aims to further reduce exposure to claims concentrations by applying geographical aggregate retention limits for certain covers. Enterprise-wide, the Company aims to reduce the likelihood of high aggregate claims by operating globally, insuring a wide range of unrelated risk events, and reinsuring some risk.

(j) Concentration risk

The geographic concentration of the Company's insurance and investment contract liabilities, including embedded derivatives, is shown below. The disclosure is based on the countries in which the business is written.

As at December 31, 2019	Gross liabilities	Reinsurance assets	Net liabilities
U.S. and Canada	**$ 255,999**	**$ (40,944)**	**$ 215,055**
Asia and Other	**98,237**	**(502)**	**97,735**
Total	**$ 354,236**	**$ (41,446)**	**$ 312,790**

As at December 31, 2018	Gross liabilities	Reinsurance assets	Net liabilities
U.S. and Canada	$ 246,255	$ (42,634)	$ 203,621
Asia and Other	85,830	(419)	85,411
Total	$ 332,085	$ (43,053)	$ 289,032

(k) Reinsurance risk

In the normal course of business, the Company limits the amount of loss on any one policy by reinsuring certain levels of risk with other insurers. In addition, the Company accepts reinsurance from other reinsurers. Reinsurance ceded does not discharge the Company's liability as the primary insurer. Failure of reinsurers to honour their obligations could result in losses to the Company; consequently, allowances are established for amounts deemed uncollectible. To minimize losses from reinsurer insolvency, the Company monitors the concentration of credit risk both geographically and with any one reinsurer. In addition, the Company selects reinsurers with high credit ratings.

As at December 31, 2019, the Company had $41,446 (2018 – $43,053) of reinsurance assets. Of this, 94 per cent (2018 – 94 per cent) were ceded to reinsurers with Standard and Poor's ratings of A- or above. The Company's exposure to credit risk was mitigated by $26,638 fair value of collateral held as security as at December 31, 2019 (2018 – $24,435). Net exposure after considering offsetting agreements and the benefit of the fair value of collateral held was $14,808 as at December 31, 2019 (2018 – $18,618).

Note 9 Capital Instruments

(a) Carrying value of capital instruments

As at December 31,	Issuance date	Earliest par redemption date	Maturity date	Par value	2019	2018
7.535% MFCT II Senior debenture notes(1)	July 10, 2009	December 31, 2019	December 31, 2108	$1,000	**$ –**	$ 1,000
JHFC Subordinated notes(2)	December 14, 2006	n/a	December 15, 2036	$ 650	**647**	647
3.181% MLI Subordinated debentures(3)	November 20, 2015	November 22, 2022	November 22, 2027	$1,000	**998**	997
2.389% MLI Subordinated debentures(3)	June 1, 2015	January 5, 2021	January 5, 2026	$ 350	**350**	349
2.10% MLI Subordinated debentures(3)	March 10, 2015	June 1, 2020	June 1, 2025	$ 750	**750**	749
2.64% MLI Subordinated debentures(3),(4)	December 1, 2014	January 15, 2020	January 15, 2025	$ 500	**500**	500
2.811% MLI Subordinated debentures(5)	February 21, 2014	February 21, 2019	February 21, 2024	$ 500	**–**	500
7.375% JHUSA Surplus notes(6)	February 25, 1994	n/a	February 15, 2024	US$ 450	**598**	632
Total					**$ 3,843**	$ 5,374

(1) MLI redeemed in full the 7.535% Manulife Financial Capital Trust II ("MFCT II") Senior debenture notes at par, on December 30, 2019, together with accrued interest. Refer to note 16.

(2) Issued by Manulife Holdings (Delaware) LLC ("MHDLL"), now John Hancock Financial Corporation ("JHFC"), a wholly owned subsidiary of MFC, to Manulife Finance (Delaware) LLC ("MFLLC"), a subsidiary of Manulife Finance (Delaware) L.P. ("MFLP"). MFLP and its subsidiaries are wholly owned unconsolidated related parties of MFC and are related parties to the Company. The note bears interest at a floating rate equal to the 90-day Bankers' Acceptance rate plus 0.72%. With regulatory approval, JHFC may redeem the note, in whole or in part, at any time, at par, together with accrued and unpaid interest. Refer to note 16. This subordinated debenture is included in related party capital instruments (refer to note 19(b)).

(3) Interest is fixed for the period up to the earliest par redemption date, thereafter the interest rate will reset to a floating rate equal to the 90-day Bankers' Acceptance rate plus a specified number of basis points. The specified number of basis points is as follows: 3.181% – 157 bps, 2.389% – 83 bps, 2.10% – 72 bps, 2.64% – 73 bps. With regulatory approval, MLI may redeem the debentures, in whole or in part, on or after the earliest par redemption date, at a redemption price equal to par, together with accrued and unpaid interest.

(4) MLI redeemed in full the 2.64% subordinated debentures at par, on January 15, 2020, the earliest par redemption date.

(5) MLI redeemed in full the 2.811% subordinated debentures at par, on February 21, 2019, the earliest par redemption date.

(6) Issued by John Hancock Mutual Life Insurance Company, now John Hancock Life Insurance Company (U.S.A.). Any payment of interest or principal on the surplus notes requires prior approval from the Department of Insurance and Financial Services of the State of Michigan. The carrying value of the surplus notes reflects an unamortized fair value increment of US$17 (2018 – US$20), which arose as a result of the acquisition of John Hancock Financial Services, Inc. The amortization of the fair value adjustment is recorded in interest expense.

(b) Fair value measurement

Fair value of capital instruments is determined using the following hierarchy:

Level 1 – Fair value is determined using quoted market prices where available.

Level 2 – When quoted market prices are not available, fair value is determined with reference to quoted prices of similar debt instruments or estimated using discounted cash flows based on observable market rates.

The Company measures capital instruments at amortized cost in the Consolidated Statements of Financial Position. As at December 31, 2019, the fair value of capital instruments was $3,959 (2018 – $5,457). Fair value of capital instruments was determined using Level 2 valuation techniques (2018 – Level 2).

Note 10 Share Capital

The authorized capital of MLI consists of:

- an unlimited number of common shares without nominal or par value; and
- an unlimited number of Class A, Class B and Class 1 preferred shares without nominal or par value, issuable in series.

	2019		2018	
As at December 31,	Number of shares	Amount	Number of shares	Amount
Preferred shares – Class A, Series 1	**40,000**	**$ 1**	40,000	$ 1
Common shares	**5,638,986,460**	**$ 34,446**	5,638,986,459	$ 34,446

The Class A Preferred Shares Series 1 are non-voting and entitle their holder to non-cumulative preferential cash dividends payable quarterly equal to $0.344 per share. With regulatory approval, the Class A Preferred Shares Series 1 may be redeemed by MLI by the payment in cash of $25.00 per share, together with any declared and unpaid dividends to the date of redemption.

During 2019, MLI issued 1 common share to MFC in connection with the acquisition of the shares of certain MFC subsidiaries.

During 2018, MLI issued 75,869,360 common shares to MFC in exchange for $850 and 485 common shares in connection with the acquisition of the shares of certain MFC subsidiaries.

Note 11 Capital Management

(a) Capital management

The Company monitors and manages its consolidated capital in compliance with the Life Insurance Capital Adequacy Test (“LICAT”) guideline, the capital framework issued by the Office of the Superintendent of Financial Institutions (“OSFI”) that became effective on January 1, 2018. Under this capital framework, the Company’s consolidated capital resources, including available capital, surplus allowance, and eligible deposits, are measured against the base solvency buffer, which is the risk-based capital requirement determined in accordance with the guideline.

The Company 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 shareholder 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.

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

Consolidated capital, based on accounting standards, is presented in the table below for MLI. For regulatory reporting purposes, LICAT available capital is based on consolidated capital with adjustments for certain deductions, limits and restrictions, as mandated by the LICAT guideline.

Consolidated capital

As at December 31,	2019	2018
Total equity	$ 58,007	$ 55,193
Adjusted for AOCI loss on cash flow hedges	(238)	(218)
Total equity excluding AOCI on cash flow hedges	58,245	55,411
Qualifying capital instruments	3,843	5,374
Consolidated capital	$ 62,088	$ 60,785

(b) Restrictions on dividends and capital distributions

Dividends and capital distributions are restricted under the Insurance Companies Act ("ICA"). The ICA prohibits the declaration or payment of any dividend on shares of an insurance company if there are reasonable grounds for believing a company does not have adequate capital and adequate and appropriate forms of liquidity or 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 OSFI. The ICA also requires an insurance company to notify OSFI of the declaration of a dividend at least 15 days prior to the date fixed for its payment. Similarly, the ICA prohibits the purchase for cancellation of any shares issued by an insurance company or the redemption of any redeemable shares or other similar capital transactions, if there are reasonable grounds for believing that the company does not have adequate capital and adequate and appropriate forms of liquidity or the payment 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 any direction made to the company by OSFI. These latter transactions would require the prior approval of OSFI.

The ICA requires Canadian insurance companies to maintain adequate levels of capital at all times.

MLI's ability to pay future dividends will depend in part on the receipt of sufficient funds from its regulated insurance subsidiaries. These subsidiaries are also subject to certain regulatory restrictions under laws in Canada, the United States and certain other countries that may limit their ability to pay dividends or make other upstream distributions.

Note 12 Revenue from Service Contracts

The Company provides investment management services, administrative services, distribution and related services to proprietary and third-party investment funds, retirement plans, group benefit plans and other arrangements. The Company also provides real estate management services to tenants of the Company's investment properties.

The Company's service contracts generally impose single performance obligations, each consisting of a series of similar related services for each customer.

The Company's performance obligations within service arrangements are generally satisfied over time as the customer simultaneously receives and consumes the benefits of the services rendered, measured using an output method. Fees typically include variable consideration and the related revenue is recognized to the extent that it is highly probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the uncertainty is subsequently resolved.

Asset based fees vary with asset values of accounts under management, subject to market conditions and investor behaviors beyond the Company's control. Transaction processing and administrative fees vary with activity volume, also beyond the Company's control. Some fees, including distribution fees, are based on account balances and transaction volumes. Fees related to account balances and transaction volumes are measured daily. Real estate management service fees include fixed portions plus recovery of variable costs of services rendered to tenants. Fees related to services provided are generally recognized as services are rendered, which is when it becomes highly probable that no significant reversal of cumulative revenue recognized will occur. The Company has determined that its service contracts have no significant financing components as fees are collected monthly. The Company has no significant contract assets or contract liabilities.

The following tables present revenue from service contracts by service lines and reporting segments as disclosed in note 18.

For the year ended December 31, 2019	Asia	Canada	U.S.	Global WAM	Corporate and Other	Total
Investment management and other related fees	$ 177	$ 161	$ 542	$ 2,773	$ (198)	$ 3,455
Transaction processing, administration, and service fees	268	827	17	2,048	–	3,160
Distribution fees and other	184	52	72	741	(44)	1,005
Total included in other revenue	629	1,040	631	5,562	(242)	7,620
Real estate management services included in net investment income	36	160	137	–	9	342
Total	$ 665	$ 1,200	$ 768	$ 5,562	$ (233)	$ 7,962

For the year ended December 31, 2018	Asia	Canada	U.S.	Global WAM	Corporate and Other	Total
Investment management and other related fees	$ 148	$ 149	$ 521	$ 2,809	$ (236)	$ 3,391
Transaction processing, administration, and service fees	242	854	17	1,939	–	3,052
Distribution fees and other	246	49	617	724	(30)	1,606
Total included in other revenue	636	1,052	1,155	5,472	(266)	8,049
Real estate management services included in net investment income	31	160	147	–	10	348
Total	$ 667	$ 1,212	$ 1,302	$ 5,472	$ (256)	$ 8,397

Note 13 Stock-Based Compensation

Employees of the Company participate in MFC's Executive Stock Option Plan ("ESOP"). Under this plan, stock options are granted to selected individuals. The options provide the holder the right to purchase MFC common shares at an exercise price equal to the higher of the prior day, prior five-day or prior ten-day average closing market price of MFC common shares on the Toronto Stock Exchange on the date the options are granted. The options vest over a period not exceeding four years and expire not more than 10 years from the grant date. Effective with the 2015 grant, options may only be exercised after the fifth-year anniversary.

For the year ended December 31, 2019, 6.5 million Restricted Share Units ("RSUs") (2018 – 5.5 million) and 1.1 million Performance Share Units ("PSUs") (2018 – 0.8 million) were granted to certain eligible employees under MFC's Restricted Share Unit Plan. The fair value of the RSUs and PSUs granted during the year was $26.36 per unit, as at December 31, 2019 (2018 – $19.37 per unit). Each RSU and PSU entitles the holder to receive payment equal to the market value of one common share of MFC, plus credited dividends, at the time of vesting, subject to any performance conditions.

RSUs granted in February 2019 will vest after 36 months and PSUs granted in February 2019 will vest after 36 months from their grant date and the related compensation expense is recognized over these periods, except where the employee is eligible to retire prior to a vesting date, in which case the cost is recognized over the period between the grant date and the date on which the employee is eligible to retire. Compensation expense related to RSUs and PSUs was $128 and $17, respectively, for the year ended December 31, 2019 (2018 – $111 and $14, respectively).

In aggregate, the Company recorded stock-based compensation expense of $160 for the year ended December 31, 2019 (2018 – $136).

The Company's Global Share Ownership Plan allows qualifying employees to apply up to five per cent of their annual base earnings toward the purchase of common shares. The Company matches a percentage of the employee's eligible contributions up to a maximum amount. The Company's contributions vest immediately. All contributions are used to purchase common shares in the open market.

Note 14 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.

(a) Plan characteristics

The Company's final average pay defined benefit pension plans and retiree welfare plans are closed to new members. All employees may participate in capital accumulation plans including defined benefit cash balance plans, 401(k) plans and/or defined contribution plans, depending on the country of employment.

During 2018, the Company implemented a voluntary exit program, as part of its Canadian operations transformation, and a North American voluntary early retirement program. Combined, these two programs resulted in the voluntary separation of 1,225 employees in Canada and 204 employees in the U.S. by the end of 2019. A curtailment loss of $22 resulting from these programs was recorded in earnings during 2018. This loss represents the increase in net defined benefit liability due to the affected employees separating sooner than had previously been assumed.

All pension arrangements are governed by local pension committees or management, but significant plan changes require approval from the Company's Board of Directors.

The Company's funding policy for defined benefit pension plans is to make the minimum annual contributions required by regulations in the countries in which the plans are offered. Assumptions and methods prescribed for regulatory funding purposes typically differ from those used for accounting purposes.

The Company's remaining defined benefit pension and/or retiree welfare plans are in the U.S., Canada, Japan, and Taiwan (China). There are also disability welfare plans in the U.S. and Canada.

The largest defined benefit pension and retiree welfare plans are the primary plans for employees in the U.S. and Canada. These are the material plans that are discussed in the balance of this note. The Company measures its defined benefit obligations and fair value of plan assets for accounting purposes as at December 31 each year.

U.S. defined benefit pension and retiree welfare plans

The Company operates a qualified cash balance plan that is open to new members, a closed non-qualified cash balance plan, and a closed retiree welfare plan.

Actuarial valuations to determine the Company's minimum funding contributions for the qualified cash balance plan are required annually. Deficits revealed in the funding valuations must generally be funded over a period of up to seven years. It is expected that there will be no required funding for this plan in 2020. There are no plan assets set aside for the non-qualified cash balance plan.

The retiree welfare plan subsidizes the cost of life insurance and medical benefits. The majority of those who retired after 1991 receive a fixed-dollar subsidy from the Company based on service. The plan was closed to all employees hired after 2004. While assets have been set aside in a qualified trust to pay future retiree welfare benefits, this funding is optional. Retiree welfare benefits offered under the plan coordinate with the U.S. Medicare program to make optimal use of available federal financial support.

The qualified pension and retiree welfare plans are governed by the U.S. Benefits Committee, while the non-qualified pension plan is governed by the U.S. Non-Qualified Plans Subcommittee.

Canadian defined benefit pension and retiree welfare plans

The Company's defined benefit plans in Canada include two registered final average pay pension plans, a non-registered supplemental final average pay pension plan and a retiree welfare plan, all of which have been closed to new members.

Actuarial valuations to determine the Company's minimum funding contributions for the registered pension plans are required at least once every three years. Deficits revealed in the funding valuation must generally be funded over a period of ten years. For 2020, the required funding for these plans is expected to be $11. The supplemental non-registered pension plan is not funded.

The retiree welfare plan subsidizes the cost of life insurance, medical and dental benefits. These subsidies are a fixed dollar amount for those who retired after April 30, 2013 and will be eliminated for those who retire after 2019. There are no assets set aside for this plan.

The registered pension plans are governed by Pension Committees, while the supplemental non-registered plan is governed by the Board of Directors. The retiree welfare plan is governed by management.

(b) Risks

In final average pay pension plans and retiree welfare plans, the Company generally bears the material risks which include interest rate, investment, longevity and health care cost inflation risks. In defined contribution plans, these risks are typically borne by the employee. In cash balance plans, the interest rate, investment and longevity risks are partially transferred to the employee.

Material sources of risk to the Company for all plans include:

- A decline in discount rates that increases the defined benefit obligations by more than the change in value of plan assets;
- Lower than expected rates of mortality; and
- For retiree welfare plans, higher than expected health care costs.

The Company has managed these risks through plan design and eligibility changes that have limited the size and growth of the defined benefit obligations. Investment risks for funded plans are managed by investing significantly in asset classes which are highly correlated with the plans' liabilities.

In the U.S., delegated committee representatives and management review the financial status of the qualified defined benefit pension plan at least monthly, and steps are taken in accordance with an established dynamic investment policy to increase the plan's allocation to asset classes which are highly correlated with the plan's liabilities and reduce investment risk as the funded status improves. As at December 31, 2019, the target asset allocation for the plan was 27% return-seeking assets and 73% liability-hedging assets.

In Canada, internal committees and management review the financial status of the registered defined benefit pension plans on at least a quarterly basis. As at December 31, 2019, the target asset allocation for the plans was 20% return-seeking assets and 80% liability-hedging assets.

(c) Pension and retiree welfare plans

For the years ended December 31,	Pension plans 2019	Pension plans 2018	Retiree welfare plans 2019	Retiree welfare plans 2018
Changes in defined benefit obligation:				
Opening balance	**$ 4,675**	$ 4,706	**$ 640**	$ 665
Current service cost	**40**	42	**–**	–
Past service cost – amendments and curtailments	**–**	18	**–**	12
Interest cost	**182**	165	**25**	24
Plan participants' contributions	**1**	1	**3**	4
Actuarial losses (gains) due to:				
Experience	**8**	–	**(10)**	(7)
Demographic assumption changes	**–**	35	**–**	(1)
Economic assumption changes	**413**	(250)	**56**	(56)
Benefits paid	**(358)**	(304)	**(46)**	(45)
Impact of changes in foreign exchange rates	**(144)**	262	**(23)**	44
Defined benefit obligation, December 31	**$ 4,817**	$ 4,675	**$ 645**	$ 640

For the years ended December 31,	Pension plans 2019	Pension plans 2018	Retiree welfare plans 2019	Retiree welfare plans 2018
Change in plan assets:				
Fair value of plan assets, opening balance	**$ 4,190**	$ 4,328	**$ 610**	$ 587
Interest income	**164**	153	**25**	21
Return on plan assets (excluding interest income)	**529**	(315)	**25**	(16)
Employer contributions	**75**	79	**12**	10
Plan participants' contributions	**1**	1	**3**	4
Benefits paid	**(358)**	(304)	**(46)**	(45)
Administration costs	**(9)**	(9)	**(2)**	(2)
Impact of changes in foreign exchange rates	**(136)**	254	**(29)**	51
Fair value of plan assets, December 31	**$ 4,456**	$ 4,187	**$ 598**	$ 610

(d) Amounts recognized in the Consolidated Statements of Financial Position

As at December 31,	Pension plans 2019	Pension plans 2018	Retiree welfare plans 2019	Retiree welfare plans 2018
Development of net defined benefit liability				
Defined benefit obligation	**$ 4,817**	$ 4,675	**$ 645**	$ 640
Fair value of plan assets	**4,453**	4,190	**598**	610
Deficit (surplus)	**364**	485	**47**	30
Effect of asset limit[1]	**4**	9	**–**	–
Deficit (surplus) and net defined benefit liability (asset)	**368**	494	**47**	30
Deficit is comprised of:				
Funded or partially funded plans	**(391)**	(248)	**(120)**	(121)
Unfunded plans	**759**	742	**167**	151
Deficit (surplus) and net defined benefit liability (asset)	**$ 368**	$ 494	**$ 47**	$ 30

[1] In 2018, the Company recognized an impairment of $9 on the net defined benefit asset for one of its registered pension plans in Canada. This was due to benefit changes for future service which reduced the economic benefit that can be derived by the Company from the plan's surplus.

(e) Disaggregation of defined benefit obligation

	U.S. plans				Canadian plans			
	Pension plans		Retiree welfare plans		Pension plans		Retiree welfare plans	
As at December 31,	**2019**	2018	**2019**	2018	**2019**	2018	**2019**	2018
Active members	**$ 550**	$ 621	**$ 31**	$ 32	**$ 301**	$ 332	**$ 25**	$ 22
Inactive and retired members	**2,529**	2,431	**447**	457	**1,437**	1,291	**142**	129
Total	**$ 3,079**	$ 3,052	**$ 478**	$ 489	**$ 1,738**	$ 1,623	**$ 167**	$ 151

(f) Fair value measurements

The major categories of plan assets and the allocation to each category are as follows.

	U.S. plans[1]				Canadian plans[2]			
	Pension plans		Retiree welfare plans		Pension plans		Retiree welfare plans	
As at December 31, 2019	Fair value	% of total	Fair value	% of total	Fair value	% of total	Fair value	% of total
Cash and cash equivalents	**$ 32**	**1%**	**$ 35**	**6%**	**$ 12**	**1%**	**$ –**	**–**
Equity securities[3]	**563**	**19%**	**45**	**8%**	**311**	**21%**	**–**	**–**
Debt securities	**2,155**	**72%**	**511**	**85%**	**1,123**	**78%**	**–**	**–**
Other investments[4]	**255**	**8%**	**7**	**1%**	**2**	**0%**	**–**	**–**
Total	**$ 3,005**	**100%**	**$ 598**	**100%**	**$ 1,448**	**100%**	**$ –**	**–**

	U.S. plans[1]				Canadian plans[2]			
	Pension plans		Retiree welfare plans		Pension plans		Retiree welfare plans	
As at December 31, 2018	Fair value	% of total	Fair value	% of total	Fair value	% of total	Fair value	% of total
Cash and cash equivalents	$ 26	1%	$ 51	8%	$ 19	1%	$ –	–
Equity securities[3]	500	17%	38	6%	269	20%	–	–
Debt securities	2,088	73%	514	85%	1,033	79%	–	–
Other investments[4]	252	9%	7	1%	3	0%	–	–
Total	$ 2,866	100%	$ 610	100%	$ 1,324	100%	$ –	–

(1) All the U.S. pension and retiree welfare plan assets have daily quoted prices in active markets, except for the private equity, timber and agriculture assets. In the aggregate, the latter assets represent approximately 7% of all U.S. pension and retiree welfare plan assets as at December 31, 2019 (2018 – 7%).

(2) All the Canadian pension plan assets have daily quoted prices in active markets, except for the group annuity contract assets that represent approximately 0.1% of all Canadian pension plan assets as at December 31, 2019 (2018 – 0.2%).

(3) Equity securities include direct investments in MFC common shares of $1.3 (2018 – $0.9) in the U.S. retiree welfare plan and $nil (2018 – $nil) in Canada.

(4) Other U.S. plan assets include investment in private equity, timberland and agriculture, and managed futures. Other Canadian pension plan assets include investment in the group annuity contract.

(g) Net benefit cost recognized in the Consolidated Statements of Income

Components of the net benefit cost for the pension plans and retiree welfare plans were as follows.

	Pension plans		Retiree welfare plans	
For the years ended December 31,	**2019**	2018	**2019**	2018
Defined benefit current service cost	**$ 40**	$ 42	**$ –**	$ –
Defined benefit administrative expenses	**9**	9	**2**	2
Past service cost – plan amendments and curtailments[1],[2]	**–**	18	**–**	12
Service cost	**49**	69	**2**	14
Interest on net defined benefit (asset) liability	**18**	12	**–**	3
Defined benefit cost	**67**	81	**2**	17
Defined contribution cost	**80**	78	**–**	–
Net benefit cost	**$ 147**	$ 159	**$ 2**	$ 17

(1) Past service cost – plan amendments includes $8 for 2018 for a Canadian pension plan, reflecting a surplus sharing agreement between the Company and certain legacy employees in Canada, which received regulatory approval in 2018.

(2) Past service cost – curtailments includes $22 for 2018 for the pension plans and retiree welfare plans in total, reflecting the cost of the voluntary exit and voluntary retirement programs described in section (a) of this note.

(h) Re-measurement effects recognized in Other Comprehensive Income

	Pension plans		Retiree welfare plans	
For the years ended December 31,	**2019**	2018	**2019**	2018
Actuarial gains (losses) on defined benefit obligations due to:				
Experience	**$ (8)**	$ –	**$ 10**	$ 7
Demographic assumption changes	**–**	(35)	**–**	1
Economic assumption changes	**(413)**	250	**(56)**	56
Return on plan assets (excluding interest income)	**529**	(315)	**25**	(16)
Change in effect of asset limit	**5**	(9)	**–**	–
Total re-measurement effects	**$ 113**	$ (109)	**$ (21)**	$ 48

(i) Assumptions

The key assumptions used by the Company to determine the defined benefit obligation and net benefit cost for the defined benefit pension plans and retiree welfare plans were as follows.

	U.S. Plans				Canadian Plans			
	Pension plans		Retiree welfare plans		Pension plans		Retiree welfare plans	
For the years ended December 31,	**2019**	2018	**2019**	2018	**2019**	2018	**2019**	2018
To determine the defined benefit obligation at end of year[(1)]:								
Discount rate	**3.2%**	4.3%	**3.2%**	4.3%	**3.1%**	3.8%	**3.1%**	3.8%
Initial health care cost trend rate[(2)]	**n/a**	n/a	**7.5%**	7.8%	**n/a**	n/a	**5.6%**	5.7%
To determine the defined benefit cost for the year[(1)]:								
Discount rate	**4.3%**	3.6%	**4.3%**	3.6%	**3.8%**	3.5%	**3.8%**	3.6%
Initial health care cost trend rate[(2)]	**n/a**	n/a	**7.8%**	8.5%	**n/a**	n/a	**5.7%**	5.9%

(1) Inflation and salary increase assumptions are not shown as they do not materially affect obligations and cost.

(2) The health care cost trend rate used to measure the U.S. based retiree welfare obligation was 7.5% grading to 4.5% for 2032 and years thereafter (2018 – 7.8% grading to 5.0% for 2030) and to measure the net benefit cost was 7.8% grading to 5.0% for 2030 and years thereafter (2018 – 8.5% grading to 5.0% for 2032). In Canada, the rate used to measure the retiree welfare obligation was 5.6% grading to 4.8% for 2026 and years thereafter (2018 – 5.7% grading to 4.8% for 2026) and to measure the net benefit cost was 5.7% grading to 4.8% for 2026 and years thereafter (2018 – 5.9% grading to 4.8% for 2026).

Assumptions regarding future mortality are based on published statistics and mortality tables. The current life expectancies underlying the values of the obligations in the defined benefit pension and retiree welfare plans are as follows.

As at December 31, 2019	U.S.	Canada
Life expectancy (in years) for those currently age 65		
Males	**22.6**	**23.7**
Females	**24.1**	**25.6**
Life expectancy (in years) at age 65 for those currently age 45		
Males	**24.2**	**24.7**
Females	**25.7**	**26.5**

(j) Sensitivity of assumptions on obligations

Assumptions used can have a significant effect on the obligations reported for defined benefit pension and retiree welfare plans. The potential impact on the obligations arising from changes in the key assumptions is set out in the following table. The sensitivities assume all other assumptions are held constant. In actuality, inter-relationships with other assumptions may exist.

As at December 31, 2019	Pension plans	Retiree welfare plans
Discount rate:		
Impact of a 1% increase	**$ (443)**	**$ (66)**
Impact of a 1% decrease	**525**	**80**
Health care cost trend rate:		
Impact of a 1% increase	**n/a**	**20**
Impact of a 1% decrease	**n/a**	**(17)**
Mortality rates[(1)]		
Impact of a 10% decrease	**136**	**14**

(1) If the actuarial estimates of mortality are adjusted in the future to reflect unexpected decreases in mortality, the effect of a 10% decrease in mortality rates at each future age would be an increase in life expectancy at age 65 of 0.9 years for U.S. males and females and 0.8 years for Canadian males and females.

(k) Maturity profile

The weighted average duration (in years) of the defined benefit obligations is as follows.

	Pension plans		Retiree welfare plans	
As at December 31,	**2019**	2018	**2019**	2018
U.S. plans	**9.3**	8.8	**9.7**	9.0
Canadian plans	**12.3**	12.4	**14.3**	14.3

(l) Cash flows – contributions

Total cash payments for all employee future benefits, comprised of cash contributed by the Company to funded defined benefit pension and retiree welfare plans, cash payments directly to beneficiaries in respect of unfunded pension and retiree welfare plans, and cash contributed to defined contribution pension plans, are as follows.

	Pension plans		Retiree welfare plans	
For the years ended December 31,	**2019**	2018	**2019**	2018
Defined benefit plans	**$ 75**	$ 79	**$ 12**	$ 10
Defined contribution plans	**80**	78	**–**	–
Total	**$ 155**	$ 157	**$ 12**	$ 10

The Company's best estimate of expected cash payments for employee future benefits for the year ending December 31, 2020 is $77 for defined benefit pension plans, $80 for defined contribution pension plans and $12 for retiree welfare plans.

Note 15 Income Taxes

(a) Income tax expense

The following table presents income tax expense (recovery) recognized in the Consolidated Statements of Income.

For the years ended December 31,	**2019**	2018
Current tax		
Current year	**$ 1,246**	$ (327)
Adjustments related to prior year	**(74)**	29
Total current tax	**1,172**	(298)
Deferred tax		
Change related to temporary differences	**(332)**	1,344
Impact of U.S. Tax Reform	**–**	(320)
Total deferred tax	**(332)**	1,024
Income tax expense	**$ 840**	$ 726

The following table discloses income tax expense (recovery) recognized directly in equity.

For the years ended December 31,	**2019**	2018
Recognized in other comprehensive income		
Current income tax expense (recovery)	**$ 90**	$ 3
Deferred income tax expense (recovery)	**367**	(149)
Total recognized in other comprehensive income	**$ 457**	$ (146)
Recognized in equity, other than other comprehensive income		
Current income tax expense (recovery)	**$ 5**	$ 6
Deferred income tax expense (recovery)	**(105)**	(112)
Total income tax recognized directly in equity	**$ (100)**	$ (106)

(b) Current tax receivable and payable

As at December 31, 2019, the Company had approximately $597 and $121 of current tax receivable and current tax payable, respectively (2018 – $1,709 and $118).

(c) Tax reconciliation

The effective income tax rate reflected in the Consolidated Statements of Income varies from the Canadian tax rate of 26.75 per cent for the year ended December 31, 2019 (2018 – 26.75 per cent) due to the following reasons.

For the years ended December 31,	**2019**	2018
Income before income taxes	**$ 6,703**	$ 5,889
Income tax expense at Canadian statutory tax rate	**$ 1,793**	$ 1,575
Increase (decrease) in income taxes due to:		
Tax-exempt investment income	**(260)**	(200)
Differences in tax rate on income not subject to tax in Canada	**(756)**	(392)
Adjustments to taxes related to prior years	**(106)**	(71)
Impact of U.S. Tax Reform	**–**	(320)
Other differences	**169**	134
Income tax expense	**$ 840**	$ 726

Impact of U.S. Tax Reform

On December 22, 2017, the U.S. government enacted new tax legislation with broad and complex changes to the U.S. tax code, effective January 1, 2018. In 2018, the Company finalized its estimate of the impact of these changes and reported a gain of $124 including a $196 increase in insurance contract liabilities. Refer to note 6(g) for the impact of U.S. Tax Reform on the Company's insurance contract liabilities.

(d) Deferred tax assets and liabilities

The following table presents the Company's deferred tax assets and liabilities reflected on the Consolidated Statement of Financial Position.

As at December 31,	**2019**	2018
Deferred tax assets	**$ 4,509**	$ 4,273
Deferred tax liabilities	**(1,972)**	(1,814)
Net deferred tax assets (liabilities)	**$ 2,537**	$ 2,459

The following table presents movement of deferred tax assets and liabilities.

As at December 31, 2019	Balance, January 1	Disposals	Recognized in Income Statement	Recognized in Other Comprehensive Income	Recognized in Equity	Translation and Other	Balance, December 31
Loss carry forwards	**$ 967**	**$ (18)**	**$ (406)**	**$ –**	**$ 106**	**$ (18)**	**$ 631**
Actuarial liabilities	**5,463**	**–**	**3,093**	**–**	**(1)**	**(115)**	**8,440**
Pensions and post-employment benefits	**242**	**–**	**4**	**(20)**	**–**	**–**	**226**
Tax credits	**261**	**–**	**(253)**	**–**	**–**	**(8)**	**–**
Accrued interest	**1**	**–**	**–**	**–**	**–**	**–**	**1**
Real estate	**(959)**	**–**	**(110)**	**–**	**–**	**23**	**(1,046)**
Securities and other investments	**(2,592)**	**–**	**(1,864)**	**(348)**	**–**	**156**	**(4,648)**
Sale of investments	**(88)**	**–**	**17**	**–**	**–**	**2**	**(69)**
Goodwill and intangible assets	**(846)**	**–**	**(49)**	**–**	**–**	**20**	**(875)**
Other	**10**	**(37)**	**(100)**	**1**	**–**	**3**	**(123)**
Total	**$ 2,459**	**$ (55)**	**$ 332**	**$ (367)**	**$ 105**	**$ 63**	**$ 2,537**

As at December 31, 2018	Balance, January 1	Disposals	Recognized in Income Statement	Recognized in Other Comprehensive Income	Recognized in Equity	Translation and Other	Balance, December 31
Loss carry forwards	$ 548	$ –	$ 277	$ –	$ 118	$ 24	$ 967
Actuarial liabilities	7,875	–	(2,697)	–	3	282	5,463
Pensions and post-employment benefits	208	–	27	7	–	–	242
Tax credits	453	–	(224)	–	–	32	261
Accrued interest	1	–	–	–	–	–	1
Real estate	(1,062)	–	150	(1)	–	(46)	(959)
Securities and other investments	(3,712)	–	1,236	137	–	(253)	(2,592)
Sale of investments	(106)	–	18	–	–	–	(88)
Goodwill and intangible assets	(825)	–	18	–	–	(39)	(846)
Other	(153)	–	171	6	(9)	(5)	10
Total	$ 3,227	$ –	$ (1,024)	$ 149	$ 112	$ (5)	$ 2,459

The total deferred tax assets as at December 31, 2019 of $4,509 (2018 – $4,273) include $36 (2018 – $3,467) where the Company has suffered losses in either the current or preceding year and where the recognition is dependent on future taxable profits in the relevant jurisdictions and feasible management actions.

As at December 31, 2019, tax loss carryforwards available were approximately $3,162 (2018 – $4,641) of which $3,017 expire between the years 2022 and 2039 while $145 have no expiry date, and capital loss carryforwards available were approximately $29 (2018 – $18) and have no expiry date. A $631 (2018 – $967) tax benefit related to these tax loss carryforwards has been recognized as a deferred tax asset as at December 31, 2019, and a benefit of $92 (2018 – $121) has not been recognized. In addition, the Company has approximately $157 (2018 – $426) of tax credit carryforwards which will expire between the years 2027 and 2029 of which a benefit of $157 (2018 – $165) has not been recognized.

The total deferred tax liability as at December 31, 2019 was $1,972 (2018 – $1,814). This amount includes the deferred tax liability of consolidated entities. The aggregate amount of taxable temporary differences associated with the Company's own investments in subsidiaries is not included in the Consolidated Financial Statements and was $29,986 (2018 – $26,175).

Note 16 Interests in Structured Entities

The Company is involved with both consolidated and unconsolidated structured entities ("SEs") which are established to generate investment and fee income. The Company is also involved with SEs that are used to facilitate financing for the Company. These entities may have some or all the following features: control is not readily identified based on voting rights; restricted activities designed to achieve a narrow objective; high amount of leverage; and/or highly structured capital.

The Company only discloses its involvement in significant consolidated and unconsolidated SEs. In assessing the significance, the Company considers the nature of its involvement with the SE, including whether it is sponsored by the Company (i.e. initially organized and managed by the Company). Other factors considered include the Company's investment in the SE as compared to total investments, its returns from the SE as compared to total net investment income, the SE's size as compared to total funds under management, and its exposure to any other risks from its involvement with the SE.

The Company does not provide financial or other support to its SEs, when it does not have a contractual obligation to do so.

(a) Consolidated SEs

Investment SEs

The Company acts as an investment manager of timberlands and timber companies. The Company's general fund and segregated funds invest in many of these companies. The Company has control over one timberland company which it manages, Hancock Victoria Plantations Holdings PTY Limited ("HVPH"). HVPH is a SE primarily because the Company's employees exercise voting rights over it on behalf of other investors. As at December 31, 2019, the Company's consolidated timber assets relating to HVPH were $936 (2018 – $920). The Company does not provide guarantees to other parties against the risk of loss from HVPH.

Financing SEs

The Company securitizes certain insured and variable rate commercial and residential mortgages and HELOC. This activity is facilitated by consolidated entities that are SEs because their operations are limited to issuing and servicing the Company's funding. Further information regarding the Company's mortgage securitization program is included in note 3.

(b) Unconsolidated SEs

Investment SEs

The following table presents the Company's investments and maximum exposure to loss from significant unconsolidated investment SEs, some of which are sponsored by the Company. The Company does not provide guarantees to other parties against the risk of loss from these SEs.

	Company's investment[1]		Company's maximum exposure to loss[2]	
As at December 31,	**2019**	2018	**2019**	2018
Leveraged leases[3]	**$ 3,371**	$ 3,575	**$ 3,371**	$ 3,575
Timberland companies[4]	**752**	788	**765**	821
Real estate companies[5]	**541**	413	**541**	413
Total	**$ 4,664**	$ 4,776	**$ 4,677**	$ 4,809

(1) The Company's investments in these unconsolidated SEs are included in invested assets and the Company's returns from them are included in net investment income and AOCI.

(2) The Company's maximum exposure to loss from each SE is limited to amounts invested in each, plus unfunded capital commitments, if any. The Company's investment commitments are disclosed in note 17. The maximum loss is expected to occur only upon the entity's bankruptcy/liquidation, or in case a natural disaster in the case of the timber companies.

(3) These entities are statutory business trusts which use capital provided by the Company and senior debt provided by other parties to finance the acquisition of assets. These assets are leased to third-party lessees under long-term leases. The Company owns equity capital in these business trusts. The Company does not consolidate any of the trusts that are party to the lease arrangements because the Company does not have decision-making power over them.

(4) These entities own and operate timberlands. The Company invests in their equity and debt. The Company's returns include investment income, investment advisory fees, forestry management fees and performance advisory fees. The Company does not control these entities because it either does not have the power to govern their financial and operating policies or does not have significant variable returns from them, or both.

(5) These entities, which include the Manulife U.S. REIT, own and manage commercial real estate. The Company invests in their equity. The Company's returns include investment income, investment management fees, property management fees, acquisition/disposition fees, and leasing fees. The Company does not control these entities because it either does not have the power to govern their financial and operating policies or does not have significant variable returns from them, or both.

Financing SEs

The Company's interests and maximum exposure to loss from significant unconsolidated financing SEs are as follows.

	Company's interests[1]	
As at December 31,	**2019**	2018
Manulife Finance (Delaware), L.P.[2]	**$ 854**	$ 824
Manulife Financial Capital Trust II[3]	**1**	999
Total	**$ 855**	$ 1,823

[1] The Company's interests include amounts borrowed from the SEs and the Company's investment in their subordinated capital, and foreign currency and interest swaps with them, if any.

[2] This entity is a wholly-owned related party of MFC and is used to facilitate the Company's financing. Refer to note 9.

[3] This entity is an open-ended trust that was used to facilitate the Company's financing. The Company redeemed all of its outstanding $1B principal amount of MFCT II Senior debenture notes, at par, on December 30, 2019. Using these proceeds, the trust redeemed MFCT II Series 1 held by 3rd parties, at par on December 31, 2019. Refer to note 9.

(i) Other invested assets

The Company has investment relationships with a variety of other entities, which result from its direct investment in their debt and/or equity and which have been assessed for control. These other entities' investments include but are not limited to investments in power and infrastructure, oil and gas, private equity, real estate and agriculture, organized as limited partnerships and limited liability companies. Most of these other entities are not sponsored by the Company. The Company's involvement with these other entities is not individually significant. As such, the Company neither provides summary financial data for these entities nor individually assesses whether they are SEs. The Company's maximum exposure to losses because of its involvement with these other entities is limited to its investment in them and amounts committed to be invested but not yet funded. The Company records its income from these entities in net investment income and AOCI. The Company does not provide guarantees to other parties against the risk of loss from these other entities.

(ii) Interest in securitized assets

The Company invests in mortgage/asset-backed securities issued by securitization vehicles sponsored by other parties, including private issuers and government sponsored issuers, to generate investment income. The Company does not own a controlling financial interest in any of the issuers. These securitization vehicles are SEs based on their narrow scope of activities and highly leveraged capital structures. Investments in mortgage/asset-backed securities are reported on the Consolidated Statements of Financial Position as debt securities and private placements, and their fair value and carrying value are disclosed in note 3. The Company's maximum loss from these investments is limited to amounts invested.

Commercial mortgage backed securities ("CMBS") are secured by commercial mortgages and residential mortgage backed securities ("RMBS") are secured by residential mortgages. Asset-backed securities ("ABS") may be secured by various underlying assets including credit card receivables, automobile loans and aviation leases. The mortgage/asset-backed securities that the Company invests in primarily originate in North America.

The following table presents investments in securitized holdings by the type and asset quality.

		2019			2018
As at December 31,	CMBS	RMBS	ABS	Total	Total
AAA	**$ 1,580**	**$ 7**	**$ 1,218**	**$ 2,805**	$ 2,471
AA	**–**	**–**	**648**	**648**	306
A	**69**	**7**	**296**	**372**	453
BBB	**–**	**–**	**63**	**63**	70
Total company exposure	**$ 1,649**	**$ 14**	**$ 2,225**	**$ 3,888**	$ 3,300

(iii) Mutual funds

The Company sponsors and may invest in a range of public mutual funds with a broad range of investment styles. As sponsor, the Company organizes mutual funds that implement investment strategies on behalf of current and future investors. The Company earns fees which are at market rates for providing advisory and administrative services to these mutual funds. Generally, the Company does not control its sponsored mutual funds because either the Company does not have power to govern their financial and operating policies, or its returns in the form of fees and ownership interests are not significant, or both. Certain mutual funds are SEs because their decision-making rights are not vested in voting equity interests and their investors are provided with redemption rights.

The Company's relationships with these mutual funds are not individually significant. As such, the Company neither provides summary financial data for these mutual funds nor individually assesses whether they are SEs. The Company's interest in mutual funds is limited to its investment and fees earned, if any. The Company's investments in mutual funds are recorded as part of its investment in public equities within the Consolidated Statements of Financial Position. For information regarding the Company's invested assets, refer to note 3. The Company does not provide guarantees to other parties against the risk of loss from these mutual funds.

As sponsor, the Company's investment in startup capital of mutual funds as at December 31, 2019 was $1,576 (2018 – $1,711). The Company's retail mutual fund assets under management as at December 31, 2019 were $217,015 (2018 – $188,729).

Note 17 Commitments and Contingencies

(a) Legal 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 relate to its activities as a provider of insurance protection or wealth management products, reinsurance, or in its capacity as an investment adviser, employer, or 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.

In June 2018, a class action was initiated against John Hancock Life Insurance Company (U.S.A.) ("JHUSA") and John Hancock Life Insurance Company of New York ("JHNY") in the U.S. District Court for the Southern District of New York on behalf of owners of approximately 1,500 Performance Universal Life policies issued between 2003 and 2009 whose policies were subject to a Cost of Insurance ("COI") increase announced in 2018. In October 2018, a second and almost identical class action was initiated against JHUSA and JHNY in the U.S. District Court for the Southern District of NY. The two cases were determined to be related, and they were assigned to the same judge. Discovery has commenced in these cases. No hearings on substantive matters have been scheduled. It is too early to assess the range of potential outcomes for these two related lawsuits. In addition to the consolidated class action, there are six non-class lawsuits opposing the Performance UL COI increases that also have been filed. Each of the lawsuits, except one, is brought by plaintiffs owning multiple policies and by entities managing them for investment purposes. Two of the non-class lawsuits are pending in New York state court; two of the lawsuits are pending in the U.S. District Court for the Southern District of New York; and the last two lawsuits are pending in the U.S. District Court for the Central District of California. Whether individually or on a combined basis, it remains premature, given the procedural status of these cases, as well as the relatively early development of parties' respective legal theories, to provide a reliable estimate of potential outcomes.

(b) Investment commitments

In the normal course of business, various investment commitments are outstanding which are not reflected in the Consolidated Financial Statements. There were $8,682 (2018 – $10,372) of outstanding investment commitments as at December 31, 2019, of which $411 (2018 – $888) mature in 30 days, $2,507 (2018 – $3,546) mature in 31 to 365 days and $5,764 (2018 – $5,938) mature after one year.

(c) Letters of credit

In the normal course of business, third-party relationship banks issue letters of credit on the Company's behalf. The Company's businesses utilize letters of credit for which third parties are the beneficiaries, as well as for affiliate reinsurance transactions between its subsidiaries. As at December 31, 2019, letters of credit for which third parties are beneficiary, in the amount of $57 (2018 – $74), were outstanding.

(d) Guarantees

On January 29, 2007, MFC provided a subordinated guarantee, as amended and restated on January 13, 2017, of Class A Shares and Class B Shares of MLI and any other class of preferred shares that rank in parity with Class A Shares or Class B Shares of MLI. For the following subordinated debentures issued by MLI, MFC has provided a subordinated guarantee on the day of issuance: $500 issued on December 1, 2014; $750 issued on March 10, 2015; $350 issued on June 1, 2015; and $1,000 issued on November 20, 2015. As a result of these guarantees, MLI has received an exemption from the requirements to file certain continuous disclosure requirements with the Canadian securities regulatory authorities. Certain comparative financial information of MLI is provided by MFC on a quarterly basis.

JHUSA maintains a book of deferred annuity contracts that feature a market value adjustment. The deferred annuity contracts may contain variable investment options along with fixed investment period options or may offer only fixed investment period options. The fixed investment period options enable the participant to invest fixed amounts of money for fixed terms at fixed interest rates, subject to a market value adjustment if the participant desires to terminate a fixed investment period before its maturity date. These fixed investment period options that contain a market value adjustment feature are referred to as "MVAs". MFC fully and unconditionally guaranteed JHUSA's MVAs, both those outstanding and those to be issued subsequently.

JHUSA may also sell medium-term notes to retail investors under its SignatureNotes program. MFC fully and unconditionally guaranteed JHUSA's outstanding SignatureNotes. MFC's guarantees of the MVAs and the SignatureNotes are unsecured obligations of MFC and are subordinated in right of payment to the prior payment in full of all other obligations of MFC, except for other guarantees or obligations of MFC which by their terms are designated as ranking equally in right of payment with or subordinate to MFC's guarantees of the MVAs and SignatureNotes.

(e) Pledged assets

In the normal course of business, the Company pledges its assets in respect of liabilities incurred, strictly for providing collateral to the counterparty. In the event of the Company's default, the counterparty is entitled to apply the collateral to settle the liability. The pledged assets are returned to the Company if the underlying transaction is terminated or, in the case of derivatives, if there is a decrease in the net exposure due to market value changes.

The amounts pledged are as follows.

	2019		2018	
As at December 31,	Debt securities	Other	Debt securities	Other
In respect of:				
Derivatives	**$ 4,257**	**$ 17**	$ 3,655	$ 102
Regulatory requirements	**433**	**67**	412	84
Repurchase agreements	**330**	**–**	64	–
Non-registered retirement plans in trust	**–**	**407**	–	420
Other	**3**	**331**	3	301
Total	**$ 5,023**	**$ 822**	$ 4,134	$ 907

(f) Lease obligations

The Company has a number of lease obligations, primarily for the use of office space. The aggregate future minimum lease payments under non-cancelable leases are $374 (2018 – $575). Payments by year are included in note 8 under Liquidity Risk.

(g) Participating business

In some territories where the Company maintains participating accounts, there are regulatory restrictions on the amounts of profit that can be transferred to the shareholder. Where applicable, these restrictions generally take the form of a fixed percentage of policyholder dividends. For participating businesses operating as separate "closed blocks", transfers are governed by the terms of MLI's and John Hancock Mutual Life Insurance Company's plans of demutualization.

(h) Fixed surplus notes

A third party contractually provides standby financing arrangements for the Company's U.S. operations under which, in certain circumstances, funds may be provided in exchange for the issuance of fixed surplus notes. As at December 31, 2019, the Company had no fixed surplus notes outstanding.

Note 18 Segmented Information

The Company's reporting segments are Asia, Canada, U.S., Global WAM and Corporate and Other. Each reporting segment is responsible for managing its operating results, developing products, defining strategies for services and distribution based on the profile and needs of its business and market. The Company's significant product and service offerings by the reporting segments are mentioned below.

Wealth and asset management businesses (Global WAM) – include mutual funds and exchange-traded funds, group retirement and savings products, and institutional asset management services across all major asset classes. These products and services are distributed through multiple distribution channels, including agents and brokers affiliated with the Company, independent securities brokerage firms and financial advisors pension plan consultants and banks.

Insurance and annuity products (Asia, Canada and U.S.) – includes a variety of individual life insurance, individual and group long-term care insurance and guaranteed and partially guaranteed annuity products. Products are distributed through multiple distribution channels, including insurance agents, brokers, banks, financial planners and direct marketing. Manulife Bank of Canada offers a variety of deposit and credit products to Canadian customers.

Corporate and Other segment – comprised of investment performance on assets backing capital, net of amounts allocated to operating segments; costs incurred by the corporate office related to shareholder activities (not allocated to operating segments); financing costs; Property and Casualty ("P&C") Reinsurance Business; and run-off reinsurance operations including variable annuities and accident and health.

Reporting segments

Effective January 1, 2019, the Company updated its methodology for allocating capital and the related earnings to each reporting segment from the Corporate and Other segment.

The following table presents results by reporting segments.

As at and for the year ended December 31, 2019	Asia	Canada	U.S.	Global WAM	Corporate and Other	Total
Revenue						
Life and health insurance	**$ 17,107**	**$ 8,714**	**$ 6,522**	**$ –**	**$ 112**	**$ 32,455**
Annuities and pensions	**2,900**	**361**	**(138)**	**–**	**–**	**3,123**
Net premium income	**20,007**	**9,075**	**6,384**	**–**	**112**	**35,578**
Net investment income (loss)	**7,451**	**9,446**	**15,556**	**33**	**1,258**	**33,744**
Other revenue	**1,215**	**1,088**	**2,654**	**5,562**	**(130)**	**10,389**
Total revenue	**28,673**	**19,609**	**24,594**	**5,595**	**1,240**	**79,711**
Contract benefits and expenses						
Life and health insurance	**17,975**	**10,572**	**19,320**	**–**	**(36)**	**47,831**
Annuities and pensions	**3,090**	**4,312**	**599**	**83**	**–**	**8,084**
Net benefits and claims	**21,065**	**14,884**	**19,919**	**83**	**(36)**	**55,915**
Interest expense	**236**	**508**	**43**	**6**	**190**	**983**
Other expenses	**5,148**	**3,237**	**2,944**	**4,362**	**419**	**16,110**
Total contract benefits and expenses	**26,449**	**18,629**	**22,906**	**4,451**	**573**	**73,008**
Income (loss) before income taxes	**2,224**	**980**	**1,688**	**1,144**	**667**	**6,703**
Income tax recovery (expense)	**(277)**	**25**	**(260)**	**(122)**	**(206)**	**(840)**
Net income (loss)	**1,947**	**1,005**	**1,428**	**1,022**	**461**	**5,863**
Less net income (loss) attributed to:						
Non-controlling interests	**228**	**–**	**–**	**–**	**5**	**233**
Participating policyholders	**(216)**	**(117)**	**–**	**–**	**–**	**(333)**
Net income (loss) attributed to shareholder	**$ 1,935**	**$ 1,122**	**$ 1,428**	**$ 1,022**	**$ 456**	**$ 5,963**
Total assets	**$ 127,367**	**$ 159,042**	**$ 274,993**	**$ 216,348**	**$ 31,628**	**$ 809,378**

As at and for the year ended December 31, 2018	Asia	Canada	U.S.	Global WAM	Corporate and Other	Total
Revenue						
Life and health insurance	$ 14,938	$ 8,975	$ 6,341	$ –	$ 98	$ 30,352
Annuities and pensions[1]	3,175	452	(9,967)	–	–	(6,340)
Net premium income	18,113	9,427	(3,626)	–	98	24,012
Net investment income (loss)	301	2,725	1,670	(9)	(134)	4,553
Other revenue	1,296	1,446	2,542	5,472	(327)	10,429
Total revenue	19,710	13,598	586	5,463	(363)	38,994
Contract benefits and expenses						
Life and health insurance	10,875	8,044	4,255	–	(37)	23,137
Annuities and pensions	1,986	518	(9,784)	77	–	(7,203)
Net benefits and claims	12,861	8,562	(5,529)	77	(37)	15,934
Interest expense	187	447	56	2	248	940
Other expenses	4,749	3,063	3,428	4,322	669	16,231
Total contract benefits and expenses	17,797	12,072	(2,045)	4,401	880	33,105
Income (loss) before income taxes	1,913	1,526	2,631	1,062	(1,243)	5,889
Income tax recovery (expense)	(361)	(311)	(340)	(108)	394	(726)
Net income (loss)	1,552	1,215	2,291	954	(849)	5,163
Less net income (loss) attributed to:						
Non-controlling interests	208	–	–	–	6	214
Participating policyholders	(360)	233	–	–	–	(127)
Net income (loss) attributed to shareholder	$ 1,704	$ 982	$ 2,291	$ 954	$ (855)	$ 5,076
Total assets	$ 113,781	$ 149,219	$ 270,601	$ 194,214	$ 22,549	$ 750,364

[1] In 2018, the Company ceded premiums to RGA and Jackson for the JHNY transactions, refer to note 6(k) for details.

Geographical location

The results of the Company's reporting segments differ from its geographical location primarily due to the allocation of Global WAM and Corporate and Other segments into the geographical location to which its businesses relate.

The following table presents results by geographical location.

For the year ended December 31, 2019	Asia	Canada	U.S.	Other	Total
Revenue					
Life and health insurance	**$ 17,178**	**$ 8,388**	**$ 6,523**	**$ 366**	**$ 32,455**
Annuities and pensions	**2,900**	**361**	**(138)**	**–**	**3,123**
Net premium income	**20,078**	**8,749**	**6,385**	**366**	**35,578**
Net investment income (loss)	**7,750**	**9,952**	**15,816**	**226**	**33,744**
Other revenue	**2,100**	**2,641**	**5,641**	**7**	**10,389**
Total revenue	**$ 29,928**	**$ 21,342**	**$ 27,842**	**$ 599**	**$ 79,711**

For the year ended December 31, 2018	Asia	Canada	U.S.	Other	Total
Revenue					
Life and health insurance	$ 15,010	$ 8,561	$ 6,342	$ 439	$ 30,352
Annuities and pensions	3,175	452	(9,967)	–	(6,340)
Net premium income	18,185	9,013	(3,625)	439	24,012
Net investment income (loss)	371	2,954	1,032	196	4,553
Other revenue	2,115	2,905	5,395	14	10,429
Total revenue	$ 20,671	$ 14,872	$ 2,802	$ 649	$ 38,994

Note 19 Related Party Transactions

The Company enters into transactions with related parties in the normal course of business and at the terms that would exist in arm's-length transactions. Refer to note 3(a) for additional transactions with related parties.

(a) Related party notes

The following table presents related party note receivable and payable.

			2019		2018	
As at December 31,	Interest terms	Maturity date	Carrying value	Fair value[1]	Carrying value	Fair value[1]
Note receivable from MFC	Interest free	Demand	**$ 306**	**$ 306**	$ 156	$ 156
Note payable to MFC	Interest free	Demand	**89**	**89**	92	92

[1] Fair value has been determined using Level 2 measurements as defined in note 1.

(b) Capital instruments

As at December 31, Interest terms	Maturity date	**2019**	2018
Payable to Manulife Finance (Delaware) LLC ("MFLLC")			
90-day Bankers' Acceptance rate plus 0.72%, payable semi-annually	December 15, 2036	**$ 647**	$ 647
Payable to Manulife Financial Capital Trust II ("MFCT II")			
7.535%, payable semi-annually	December 31, 2108	**–**	1,000
Total		**$ 647**	$ 1,647
Fair value[2]		**$ 652**	$ 1,656

[1] MLI redeemed in full the 7.535% Manulife Financial Capital Trust II (MFCT II) Senior debenture notes at par, on December 30, 2019, together with accrued interest. Refer to note 16.

[2] Fair value has been determined through the use of Level 2 measurements as defined in note 1.

The cash amount of interest paid during the year ended December 31, 2019 related to capital instruments was $94 (2018 – $129).

(c) Other related party transactions

On December 27, 2019, MLI transferred to MFC $16,758 in debt securities and short-term investments as settlement of liabilities, dividend on common shares, and as a loan. On December 31, 2019, MFC transferred to MLI $16,693 in debt securities and short-term investments as settlement of liabilities and liquidity pool contributions.

On December 28, 2018, MLI transferred to MFC $15,368 in equities, debt securities and short-term investments as settlement of liabilities, dividend on common shares, and as a loan. On December 31, 2018, MFC transferred to MLI $15,395 in equities, debt securities and short-term investments as settlement of liabilities and liquidity pool contributions. All transactions were accounted for at carrying value.

The Company manages a liquidity pool in which various entities have invested excess cash. The liquidity pool structure allows the Company to pool the excess cash of various contributing legal entities in a centralized location until such funds are needed by the entities. The resulting economies of scale allow the Company and participating legal entities to earn improved returns on excess cash and reduce the need for any external short-term operational borrowing. The participation in the liquidity pool is evidenced by demand promissory notes issued by the Company, bearing interest at rates based on the one-month Canadian Bankers' Acceptance rate, the one-month U.S. London Interbank Bid rate ("LIBOR"), and at the one month U.S. Treasury Bill rate. These rates are reset daily. As at December 31, 2019, the balance contributed to the Company from entities outside the consolidated group was $2 (2018 – $5) and the balance contributed by the Company to a pool outside the consolidated group was $226 (2018 – $172). These balances are netted against cash and short-term securities, in an aggregate amount totaling $(224) (2018 – $(167)).

In 2010, the Company entered into a foreign exchange swap contract with MFC, maturing in 2020. In 2016, the Company entered into four foreign exchange swap contracts with MFC, maturing in 2021, 2026 and 2046. In 2017, the Company entered into a foreign exchange swap contract with MFC, maturing in 2024. As at December 31, 2019, the swap contracts required the Company to pay US $2,520 (2018 – US $2,520) and to pay S$1,000 (2018 – S$1,000) and entitled it to receive $4,160 (2018 – $4,160). The US Dollar contracts were designated as net investment hedges. The Singapore Dollar contracts were designated as non-hedge contracts. The fair value of these contracts as at December 31, 2019 was $(212) (2018 – $(290)).

MLI received all of the issued and outstanding shares of certain MFC subsidiaries on a tax deferred basis from MFC on December 30, 2019. These subsidiaries were then wound up into MLI on December 31, 2019. Contributed surplus of $107 (2018 – $111) was recorded in MLI and/or its subsidiaries on the recognition of deferred income tax assets in respect of income tax losses.

As at December 31, 2019, the Company had receivables from MFC of $4 (2018 – $14).

The Company has service agreements with MFC to receive and provide administrative services. In 2019, the Company paid $18 (2018 – received $2) for net services received.

Compensation is provided to certain employees and directors of the Company in the form of MFC stock options, deferred share units and restricted share units. For the year ended December 31, 2019, the amounts charged to the Company by MFC representing the fair value under these plans totaled $160 (2018 – $136). Refer to note 13.

(d) Compensation of key management personnel

The Company's key management personnel are those personnel who have the authority and responsibility for planning, directing and controlling the activities of the Company. Directors (both executive and non-executive) and senior management are considered key personnel. A summary of compensation of key management personnel is as follows.

For the years ended December 31,	2019	2018
Short-term employee benefits	**$ 67**	$ 65
Post-employment benefits	**5**	5
Share-based payments	**55**	50
Termination benefits	**8**	5
Other long-term benefits	**2**	2
Total	**$ 137**	$ 127

Note 20 Subsidiaries

The following is a list of Manulife's directly and indirectly held major operating subsidiaries.

As at December 31, 2019 (100% owned unless otherwise noted in brackets beside company name)	Equity interest	Address	Description
Manulife Holdings (Alberta) Limited	$21,673	Calgary, Canada	Holding company
John Hancock Financial Corporation		Boston, Massachusetts, U.S.A.	Holding company
The Manufacturers Investment Corporation		Boston, Massachusetts, U.S.A.	Holding company
John Hancock Reassurance Company Ltd.		Boston, Massachusetts, U.S.A.	Captive insurance subsidiary that provides life, annuity and long-term care reinsurance to affiliates
John Hancock Life Insurance Company (U.S.A.)		Boston, Massachusetts, U.S.A.	U.S. life insurance company licensed in all states, except New York
John Hancock Subsidiaries LLC		Boston, Massachusetts, U.S.A.	Holding company
John Hancock Financial Network, Inc.		Boston, Massachusetts, U.S.A.	Financial services distribution organization
John Hancock Investment Management LLC		Boston, Massachusetts, U.S.A.	Investment advisor
John Hancock Investment Management Distributors LLC		Boston, Massachusetts, U.S.A.	Broker-dealer
Manulife Investment Management (US) LLC		Boston, Massachusetts, U.S.A.	Investment advisor
Hancock Natural Resource Group, Inc.		Boston, Massachusetts, U.S.A.	Manager of globally diversified timberland and agricultural portfolios

As at December 31, 2019 (100% owned unless otherwise noted in brackets beside company name)	**Equity interest**	**Address**	**Description**
John Hancock Life Insurance Company of New York		New York, U.S.A.	U.S. life insurance company licensed in New York
John Hancock Variable Trust Advisers LLC		Boston, Massachusetts, U.S.A.	Investment advisor for open-end mutual funds
John Hancock Life & Health Insurance Company		Boston, Massachusetts, U.S.A.	U.S. life insurance company licensed in all states
John Hancock Distributors LLC		Boston, Massachusetts, U.S.A.	Broker-dealer
John Hancock Insurance Agency, Inc.		Boston, Massachusetts, U.S.A.	Insurance agency
Manulife Reinsurance Limited		Hamilton, Bermuda	Provides life and financial reinsurance to affiliates
Manulife Reinsurance (Bermuda) Limited		Hamilton, Bermuda	Provides life and annuity reinsurance to affiliates
Manulife Bank of Canada	$ 1,570	Waterloo, Canada	Provides integrated banking products and service options not available from an insurance company
Manulife Investment Management Holdings (Canada) Limited	935	Toronto, Canada	Holding company
Manulife Investment Management Limited		Toronto, Canada	Provides investment counseling, portfolio and mutual fund management in Canada
First North American Insurance Company	7	Toronto, Canada	Property and casualty insurance company
NAL Resources Management Limited	8	Calgary, Canada	Management company for oil and gas properties
Manulife Resources Limited	19	Calgary, Canada	Holds oil and gas properties
Manulife Property Limited Partnership	4	Toronto, Canada	Holds oil and gas royalties
Manulife Property Limited Partnership II	835	Toronto, Canada	Holds oil and gas royalties and foreign bonds and equities
Manulife Western Holdings Limited Partnership		Calgary, Canada	Holds oil and gas properties
Manulife Securities Investment Services Inc.	72	Oakville, Canada	Mutual fund dealer for Canadian operations
Manulife Holdings (Bermuda) Limited	17,597	Hamilton, Bermuda	Holding company
Manufacturers P&C Limited		St. Michael, Barbados	Provides property and casualty reinsurance
Manulife Financial Asia Limited		Hong Kong, China	Holding company
Manulife (Cambodia) PLC		Phnom Penh, Cambodia	Life insurance company
Manufacturers Life Reinsurance Limited		St. Michael, Barbados	Provides life and annuity reinsurance to affiliates
Manulife (Vietnam) Limited		Ho Chi Minh City, Vietnam	Life insurance company
Manulife Investment Fund Management (Vietnam) Company Limited		Ho Chi Minh City, Vietnam	Fund management company
Manulife International Holdings Limited		Hong Kong, China	Holding company
Manulife (International) Limited		Hong Kong, China	Life insurance company
Manulife-Sinochem Life Insurance Co. Ltd. (51%)		Shanghai, China	Life insurance company
Manulife Investment Management International Holdings Limited		Hong Kong, China	Holding company
Manulife Investment Management (Hong Kong) Limited		Hong Kong, China	Investment management and advisory company marketing mutual funds
Manulife Investment Management (Taiwan) Co., Ltd.		Taipei, Taiwan (China)	Asset management company
Manulife Life Insurance Company (Japan)		Tokyo, Japan	Life insurance company
Manulife Asset Management (Japan) Limited		Tokyo, Japan	Investment management and advisory company and mutual fund business
Manulife Insurance (Thailand) Public Company Limited (85.6%)(1)		Bangkok, Thailand	Life insurance company
Manulife Asset Management (Thailand) Company Limited (93.0%)(1)		Bangkok, Thailand	Investment management company
Manulife Holdings Berhad (59.5%)		Kuala Lumpur, Malaysia	Holding company
Manulife Insurance Berhad (59.5%)		Kuala Lumpur, Malaysia	Life insurance company
Manulife Investment Management (Malaysia) Bhd (59.5%)		Kuala Lumpur, Malaysia	Asset management company
Manulife (Singapore) Pte. Ltd.		Singapore	Life insurance company
Manulife Investment Management (Singapore) Pte. Ltd.		Singapore	Asset management company
The Manufacturers Life Insurance Co. (Phils.), Inc.		Makati City, Philippines	Life insurance company
Manulife Chinabank Life Assurance Corporation (60%)		Makati City, Philippines	Life insurance company
PT Asuransi Jiwa Manulife Indonesia	812	Jakarta, Indonesia	Life insurance company
PT Manulife Aset Manajemen Indonesia		Jakarta, Indonesia	Investment management and investment advisor
Manulife Investment Management (Europe) Limited	25	London, England	Investment management company for Manulife Financial's international funds
Manulife Assurance Company of Canada	68	Toronto, Ontario	Life insurance company
EIS Services (Bermuda) Limited	980	Hamilton, Bermuda	Investment holding company
Berkshire Insurance Services Inc.	1,637	Toronto, Canada	Investment holding company
JH Investments (Delaware), LLC		Boston, Massachusetts, U.S.A.	Investment holding company

As at December 31, 2019 (100% owned unless otherwise noted in brackets beside company name)	**Equity interest**	**Address**	**Description**
Manulife Securities Incorporated	$ 117	Oakville, Canada	Investment dealer
Manulife Investment Management (North America) Limited	4	Toronto, Canada	Investment advisor

(1) MLI voting rights percentages are the same as the ownership percentages except for Manulife Insurance (Thailand) Public Company Limited and Manulife Asset Management (Thailand) Company Limited where MLI's voting rights are 93.0% and 96.4% respectively.

Note 21 Segregated Funds

The Company manages segregated funds on behalf of policyholders. Policyholders are provided with the opportunity to invest in different categories of segregated funds that respectively hold a range of underlying investments. The Company retains legal title to the underlying investments; however, returns from these investments belong to the policyholders. Accordingly, the Company does not bear the risk associated with these assets outside of guarantees offered on certain variable life and annuity products. Note 8 provides information regarding risk associated with the variable annuity and segregated fund guarantees.

The composition of net assets by categories of segregated funds was within the following ranges for the years ended December 31, 2019 and 2018.

	Ranges in per cent	
Type of fund	**2019**	2018
Money market funds	**2% to 3%**	2% to 3%
Fixed income funds	**14% to 15%**	14% to 15%
Balanced funds	**24% to 25%**	25% to 26%
Equity funds	**58% to 60%**	58% to 60%

Money market funds consist of investments that have a term to maturity of less than one year. Fixed income funds primarily consist of investments in fixed grade income securities and may contain smaller investments in diversified equities or high-yield bonds. Relative to fixed income funds, balanced funds consist of fixed income securities and a larger equity investment component. The types of equity funds available to policyholders range from low volatility equity funds to aggressive equity funds. Equity funds invest in a varying mix of Canadian, U.S. and global equities.

The underlying investments of the segregated funds consist of both individual securities and mutual funds (collectively "net assets"), some of which may be structured entities. The carrying value and change in segregated funds net assets are as follows. Fair value related information of segregated funds is disclosed in note 3(g).

Segregated funds net assets

As at December 31,	**2019**	2018
Investments at market value		
Cash and short-term securities	**$ 3,364**	$ 3,700
Debt securities	**16,883**	15,313
Equities	**12,989**	11,661
Mutual funds	**304,753**	277,133
Other investments	**4,785**	4,678
Accrued investment income	**1,678**	1,811
Other assets and liabilities, net	**(975)**	(700)
Total segregated funds net assets	**$ 343,477**	$ 313,596
Composition of segregated funds net assets		
Held by policyholders	**$ 343,108**	$ 313,209
Held by the Company	**369**	387
Total segregated funds net assets	**$ 343,477**	$ 313,596

Changes in segregated funds net assets

For the years ended December 31,	2019	2018
Net policyholder cash flow		
Deposits from policyholders	**$ 38,561**	$ 38,236
Net transfers to general fund	**(1,000)**	(1,089)
Payments to policyholders	**(49,372)**	(47,475)
	(11,811)	(10,328)
Investment related		
Interest and dividends	**18,872**	19,535
Net realized and unrealized investment gains (losses)	**37,643**	(34,683)
	56,515	(15,148)
Other		
Management and administration fees	**(3,926)**	(3,985)
Impact of changes in foreign exchange rates	**(10,897)**	18,249
	(14,823)	14,264
Net additions (deductions)	**29,881**	(11,212)
Segregated funds net assets, beginning of year	**313,596**	324,808
Segregated funds net assets, end of year	**$ 343,477**	$ 313,596

Segregated funds assets may be exposed to a variety of financial and other risks. These risks are primarily mitigated by investment guidelines that are actively monitored by professional and experienced portfolio advisors. The Company is not exposed to these risks beyond the liabilities related to guarantees associated with certain variable life and annuity products. Accordingly, the Company's exposure to loss from segregated fund products is limited to the value of these guarantees.

These guarantees are recorded within the Company's insurance contract liabilities. Assets supporting these guarantees are recognized in invested assets according to their investment type.

Note 22 Comparatives

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

Additional Actuarial Disclosures

Source of Earnings

Manulife uses a Source of Earnings ("SOE") to identify the primary sources of gains or losses in each reporting period. It is one of the key tools the Company uses to understand and manage its business. The SOE is prepared following OSFI's regulatory guidelines, and in accordance with educational notes published by the Canadian Institute of Actuaries ("CIA"). The SOE attributes each component of earnings to one of ten categories: expected profit from in-force business, the impact of new business, experience gains or losses (comparing actual to expected outcomes), the impact of management actions and changes in assumptions, earnings on surplus funds, other insurance earnings, Global Wealth and Asset Management earnings, Manulife Bank earnings, unallocated overhead expenses, and income taxes. In aggregate, these elements explain the $5,963 million of net income attributed to shareholders in 2019.

Each of these ten categories is described below:

Expected profit from in-force business represents the formula-driven release of Provisions for Adverse Deviation ("PfADs") on non-fee income insurance businesses, the expected net income on fee businesses, and the planned margins on one-year renewable businesses such as Group Benefits. PfADs are a requirement of the Canadian Actuarial Standards of Practice, and represent additional amounts held in excess of the expected cost of discharging policy obligations in order to provide a margin of conservatism. These amounts are released over time as the Company is released from the risks associated with the policy obligations.

The increase in 2019 over 2018 was primarily due to in-force business growth in Asia, partially offset by actions taken over the last 12 months to improve the capital efficiency of our legacy businesses.

Impact of new business represents the financial impact of new business written in the period, including acquisition expenses. Writing new business creates economic value, which is offset by PfADs and other limits on capitalization of this economic value in actuarial liabilities.

The new business gain in 2019 has improved compared to 2018, driven by higher sales volume in the U.S., Hong Kong, Asia Other, as well as improved product margins in the U.S. These items were partially offset by lower new business volumes in Japan.

Experience gains or losses arise from items such as claims, policy persistency, fee income, and expenses, where the actual experience in the current period differs from the expected results assumed in the insurance and investment contract liabilities. It also includes experience gains or losses associated with actual investment returns and movements in investment markets differing from those expected on assets supporting insurance and investment contract liabilities. For most businesses, the expected future investment returns underlying policy valuations are updated quarterly for investment market movements and this impact is also included in experience gains and losses. This component also includes the impact of currency changes to the extent they are separately quantified. Experience gains do not include the impact of management actions or changes in assumptions during the reporting period, which are reported in "Management actions and changes in assumptions".

The experience losses in 2019 were primarily driven by the unfavourable impact from interest rates movements, charges related to changes in the URR, as well as unfavourable policyholder experience, partially offset by favourable investment related experience on general fund liabilities and impacts from gross equity markets exposure. The unfavourable impact of interest rate movements was driven by the narrowing of corporate spreads, the impact of lower risk-free rates and a steepening of the yield curve. The favourable investment related experience on general fund liabilities was driven by fixed income reinvestment activities on the measurement of our policy liabilities, strong returns (including changes in fair value) on ALDA, and strong credit experience.

The experience gains in 2018 were primarily driven by favourable investment related experience on general fund liabilities, the favourable impact from interest rate movements and favourable policyholder experience. The favourable investment related experience on general fund liabilities was driven by the favourable impact of fixed income reinvestment activities on the measurement of our policy liabilities and strong credit experience, partially offset by lower than expected returns on alternative long-duration assets ("ALDA"), including oil & gas in the fourth quarter. The favourable impact of interest rate movements was driven by increases in corporate spreads, partially offset by the movement in risk free rates and the increases in swap spreads. The experience gains were partially offset by the unfavourable impacts from gross equity market exposure.

Management actions and changes in assumptions reflect the income impact of changes to valuation methods and assumptions for insurance and investment contract liabilities and other management-initiated actions in the year that are outside the normal course of business.

The 2019 pre-tax earnings impact of changes in methods and assumptions was a $61 million charge compared to a $65 million charge in 2018. The $61 million charge in 2019 was primarily the result of charges from updates to lapse and premium persistency rates across several term and whole life product lines within our Canada Individual Insurance business, partially offset by gains from updates to our senior secured loan default rates to reflect recent experience, as well as updates to our investment and crediting rate strategy for certain universal life products. In addition, U.S. Insurance completed a comprehensive long-term care review, which included all aspects of claim assumptions, the impact of policyholder benefit reductions as well as the progress on future premium rate increases and a review of margins on the business. The impact of the LTC review was approximately net neutral to net income attributed to shareholders. Note 6 of the Consolidated Financial Statements provides additional detail on the changes in actuarial methods and assumptions.

Impacts from material management action items reported in the Corporate segment in 2019 included gains from the sale of bonds designated as available for sale ("AFS"), as well as gains resulting from reinsurance transactions primarily related to our legacy businesses in Canada and the U.S.

Earnings on surplus funds reflect the actual investment returns on assets supporting the Company's surplus (shareholders' equity). These assets comprise a diversified portfolio and returns will vary with the underlying asset categories.

Other represents pre-tax earnings items on insurance business that are not included in any other line of the SOE.

Global Wealth and Asset Management ("Global WAM") represents pre-tax net income from the Global Wealth and Asset Management segment.

Manulife Bank represents pre-tax net income from Manulife Bank.

Unallocated overhead represents pre-tax unallocated overhead expenses from the Corporate and Other segments.

Income taxes represent tax charges to earnings based on the varying tax rates in the jurisdictions in which Manulife conducts business.

Manulife's net income attributed to shareholders for the full year 2019 increased to $5,963 million from $5,076 million the previous year.

For the year ended December 31, 2019 (C$ millions)	Asia	Canada	U.S.	Corporate and Other	Global WAM	Total
Expected Profit from In-force Business	**$ 1,131**	**$ 1,003**	**$ 1,798**	**$ 96**	**$ –**	**4,028**
Impact of New Business	**747**	**44**	**205**	**–**	**–**	**996**
Experience gains (losses)	**(29)**	**(214)**	**(1,066)**	**(55)**	**–**	**(1,364)**
Management actions and changes in assumptions	**(13)**	**(193)**	**242**	**566**	**–**	**602**
Earnings on surplus	**219**	**342**	**483**	**491**	**–**	**1,535**
Other	**157**	**(3)**	**26**	**32**	**–**	**212**
Insurance	**2,212**	**979**	**1,688**	**1,130**	**–**	**6,009**
Global Wealth and Asset Management	**–**	**–**	**–**	**–**	**1,144**	**1,144**
Manulife Bank	**–**	**202**	**–**	**–**	**–**	**202**
Unallocated overhead	**–**	**–**	**–**	**(459)**	**–**	**(479)**
Income (loss) before income taxes	**$ 2,212**	**$ 1,181**	**$ 1,688**	**$ 671**	**$ 1,144**	**6,896**
Income tax (expense) recovery	**(277)**	**(59)**	**(260)**	**(215)**	**(122)**	**(933)**
Net income (loss) attributed to shareholders	**$ 1,935**	**$ 1,122**	**$ 1,428**	**$ 456**	**$ 1,022**	**5,963**

For the year ended December 31, 2018 (C$ millions)	Asia	Canada	U.S.	Corporate and Other	Global WAM	Total
Expected Profit from In-force Business	$ 1,010	$ 1,015	$ 1,753	$ 79	$ –	3,857
Impact of New Business	844	27	45	1	–	917
Experience gains (losses)	(192)	29	303	35	–	175
Management actions and changes in assumptions	39	(377)	283	(703)	–	(758)
Earnings on surplus	196	375	468	(289)	–	750
Other	166	3	(174)	28	–	23
Insurance	2,063	1,072	2,678	(849)	–	4,964
Global Wealth and Asset Management	–	–	–	–	1,062	1,062
Manulife Bank	–	173	–	–	–	173
Unallocated overhead	–	–	–	(400)	–	(400)
Income (loss) before income taxes	$ 2,063	$ 1,245	$ 2,678	$ (1,249)	$ 1,062	5,799
Income tax (expense) recovery	(359)	(263)	(387)	394	(108)	(723)
Net income (loss) attributed to shareholders	$ 1,704	$ 982	$ 2,291	$ (855)	$ 954	5,076

Performance and Non-GAAP Measures

The Company uses certain non-GAAP financial measures to measure overall performance and to assess each of its 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: assets under management and administration; constant exchange rate basis; and sales. 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. **Assets under management and administration** is a non-GAAP measure of the size of the Company. It is comprised of the non-GAAP measures assets under management, which includes both assets of general account and external client assets for which the Company provides investment management services, and assets under administration, which includes assets for which the Company provides administrative services only. Assets under management and administration is a common industry metric for wealth and asset management ("WAM") businesses. **Constant exchange rate basis** is a non-GAAP measure that excludes 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 exchange rate basis for assets under management and administration in this report are calculated using balance sheet exchange rates effective for the fourth quarter of 2019. **Sales** for insurance and wealth-based accumulation products are measured on an annualized premium equivalent ("APE") basis. APE sales is comprised of 100% of annualized regular premiums/ deposits ("new annualized premiums") and 10% of single premiums/deposits. Premiums/deposits are measured according to product type. 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. Insurance- based wealth accumulation product sales include all new deposits into variable and fixed annuity contracts. As the Company 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.

Manulife

The Manufacturers Life Insurance Company

Corporate Headquarters
200 Bloor Street East
Toronto, ON M4W 1E5 Canada
+1 416 926-3000

manulife.ca

Policyholder contact information

Canada
1-888-626-8543
Valued_customer_centre@manulife.ca

United States
1-800-387-2747
webmail@jhancock.com

Hong Kong
852-2510-3941
Service_hk@manulife.com

Philippines
Metro Manila: 632-8884-7000
Toll free: 1-800-1888-6268
Trunk line: 8884-54-33
phcustomercare@manulife.com