

2018

Annual Report



The security of experience. The power of innovation.

To Our Shareholders:

RGA delivered another solid year in 2018, highlighted by organic growth in traditional businesses, a high level of capital deployment into in-force transactions, and earnings contributions from throughout our globally diversified operations. 2018 was also a year in which RGA solidified strong positions in our different markets and continued to help lead innovation efforts throughout the industry.

Annual net premiums increased 7% in 2018 to exceed \$10 billion for the first time, extending our organic growth of recent years and boosting total revenues to \$12.9 billion. Net income in 2018 totaled \$716 million, or \$11.00 per diluted share, compared to \$1.8 billion, or \$27.71 per diluted share, in 2017. The prior year included the effects of the reduced corporate tax rate from the enactment of the U.S. Tax Cuts and Jobs Act of 2017, which was recognized as a one-time increase in net income of \$1.0 billion, or \$15.72 per diluted share. In 2018, positive bottom-line results from operations in Europe, Middle East and Africa (“EMEA”) and Asia Pacific helped offset underperformance in other segments to produce solid overall earnings, demonstrating the benefits of our globally diversified platform.

Traditional U.S. and Latin America operations generated \$5.5 billion in net premiums in 2018, up 3% from 2017. Pre-tax income totaled \$286 million, as higher claims experience resulted in a challenging year overall. Unfavorable claims were largely attributable to the impact of a harsh winter and flu season on individual mortality business as well as underperformance in group healthcare excess of loss and disability business, which is in the process of being remediated.

RGA remained an individual life reinsurance market leader in Canada and surpassed \$1 billion in premiums in our traditional lines for the first time, an increase of 14% coming both from organic business and business acquired through in-force transactions. Pre-tax income was \$112 million in the Canadian traditional segment, influenced by somewhat adverse claims experience. With new capital requirements for insurance and reinsurance companies taking effect January 1, 2018, RGA experts from throughout the enterprise collaborated to help clients adapt to the new regulations with innovative solutions.

Net premiums for our EMEA traditional segment increased 9% to reach \$1.4 billion, producing \$55 million in pre-tax income. The EMEA team continued to innovate and deliver new solutions to help our clients succeed. RGA served clients as a trusted partner and advisor amid far-reaching regulatory changes affecting capital, reserves, accounting standards, and data privacy.

Our Asia Pacific operations built on recent years of growth with another strong year in 2018, generating pre-tax income of \$178 million in the region's traditional business. Net premiums of \$2.3 billion in traditional lines, a year-over-year increase of 12%, reflected growth in both new and existing treaties, with demographic trends continuing to drive consumer demand. As an established leader in innovative product development, RGA is leveraging this expertise in our traditional lines with our growing capabilities in financial solutions in the region to create more comprehensive reinsurance solutions.

Our Australia operations experienced elevated claims, primarily in our group business. We continue to focus on improving performance of the Australian portfolio in a difficult market and are taking a selective approach to new business opportunities. With established operations and a seasoned management team, RGA remains well-positioned in the Australian market.

Global Financial Solutions ("GFS") completed another successful year, with pre-tax income totaling \$450 million. In-force transactions executed in 2018 were broad-based, spanning all regions and covering all GFS business lines, including capital-motivated, asset-intensive, and longevity transactions. Globally, ongoing regulatory changes continue to generate demand for reinsurance solutions to free up our clients' capital from large blocks of business. Amid an increasingly competitive environment – including new market entrants such as asset accumulators and private equity firms – RGA remains a financial solutions partner of choice. Our counterparty strength, proven ability to execute, and willingness to take on both biometric and investment risk have solidified RGA's position as an industry leader.

A strong capital position allowed us to deploy approximately \$440 million toward in-force transactions in 2018, our second most active year since 2012. RGA also repurchased \$284 million of common shares during the year. Our balance sheet remains strong, with approximately \$1.0 billion in excess capital.

RGAX continued to gain traction and build momentum in 2018. In partnership with insurance carriers and insurtech entrepreneurs, RGAX is building businesses across the insurance value chain in the areas of data and analytics, digital distribution, consumer engagement, and technology-enabled insurance services.

As RGA moves forward, I continue to be optimistic about the future of our business and confident in our ability to deliver results. RGA's diversified global operations are well-positioned in all of our markets and across all of our business lines. For clients facing fundamental changes due to demographic shifts,

evolving consumer needs, changing regulations, and economic uncertainty, this platform enables RGA to serve as a trusted partner and long-term value creator.

RGA is a mission-driven enterprise. We believe in the noble role that insurance plays in providing financial security against unforeseen events, and we embrace our responsibility as an industry leader and global corporate citizen in bolstering the industry's resilience and sustainability. Our commitment to social responsibility starts with our people, and the culture of diversity, inclusion, and respect we foster throughout the organization. This culture extends outward to inform and inspire our important work as a global reinsurer, our ongoing commitment to societal progress, and our employees' generous contributions to the many communities we serve. We were honored that *Forbes* magazine recognized RGA's efforts in these areas by naming us among the "World's Best Employers" and "Best Regarded Companies" in 2018.

I would like to thank RGA employees, clients, shareholders, and partners for their vital role in making 2018 a successful year. As we continue to grow this remarkable company, our people remain RGA's greatest asset. I look forward to what we will accomplish together in the years ahead.

A handwritten signature in black ink that reads "Anna Manning". The script is fluid and cursive, with the first name "Anna" and last name "Manning" clearly distinguishable.

Anna Manning
President and Chief Executive Officer

This 2018 Annual Report contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995 including, among others, statements relating to projections of the strategies, earnings, revenues, income or loss, ratios, future financial performance, and growth potential of RGA (which we refer to in the previous paragraphs as “we,” “us,” or “our”). The words “intend,” “expect,” “project,” “estimate,” “predict,” “anticipate,” “should,” “believe,” and other similar expressions also are intended to identify forward-looking statements. Forward-looking statements are inherently subject to risks and uncertainties, some of which cannot be predicted or quantified. Future events and actual results, performance, and achievements could differ materially from those set forth in, contemplated by, or underlying the forward-looking statements. See “Item 7 - Management's Discussion and Analysis of Financial Condition and Results of Operations – Cautionary Note Regarding Forward-Looking Statements” of RGA's Annual Report on Form 10-K, included herein.

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, DC 20549
FORM 10-K

☒ Annual report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 for the fiscal year ended December 31, 2018

☐ Transition report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

Commission file number 1-11848

REINSURANCE GROUP OF AMERICA, INCORPORATED

(Exact name of registrant as specified in its charter)

Missouri

(State or other jurisdiction
of incorporation or organization)

43-1627032

(I.R.S. Employer
Identification No.)

16600 Swingley Ridge Road, Chesterfield, Missouri

(Address of principal executive offices)

63017

(Zip Code)

Registrant's telephone number, including area code: **(636) 736-7000**

Securities registered pursuant to Section 12(b) of the Act:

<u>Title of each class</u>	<u>Name of each exchange on which registered</u>
Common Stock, par value \$0.01	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act.

Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☒

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☐
Emerging growth company ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company. Yes ☐ No ☒

The aggregate market value of the stock held by non-affiliates of the registrant, based upon the closing sale price of the common stock on June 30, 2018, as reported on the New York Stock Exchange was approximately \$8.5 billion.

As of January 31, 2019, 62,839,877 shares of the registrant's common stock were outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Part III of this Form 10-K incorporates by reference certain information from the Registrant's Definitive Proxy Statement for the Annual Meeting of Shareholders ("the Proxy Statement") to be held May 22, 2019, to be filed by the Registrant with the Securities and Exchange Commission pursuant to Regulation 14A not later than 120 days after the year ended December 31, 2018.

REINSURANCE GROUP OF AMERICA, INCORPORATED AND SUBSIDIARIES

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Item 1. BUSINESS

A. Overview

Reinsurance Group of America, Incorporated (“RGA”) is an insurance holding company that was formed on December 31, 1992. The consolidated financial statements herein include the assets, liabilities, and results of operations of RGA and its subsidiaries, all of which are wholly owned (collectively, the “Company”).

The Company is a leading global provider of traditional life and health reinsurance and financial solutions with operations in the U.S., Latin America, Canada, Europe, the Middle East, Africa, Asia and Australia. Reinsurance is an arrangement under which an insurance company, the “reinsurer,” agrees to indemnify another insurance company, the “ceding company,” for all or a portion of the insurance and/or investment risks underwritten by the ceding company. Reinsurance is designed to (i) reduce the net amount at risk on individual risks, thereby enabling the ceding company to increase the volume of business it can underwrite, as well as increase the maximum risk it can underwrite on a single risk; (ii) enhance the ceding company’s financial strength and surplus position; (iii) stabilize operating results by leveling fluctuations in the ceding company’s loss experience; and (iv) assist the ceding company in meeting applicable regulatory requirements.

The Company has geographic-based and business-based operational segments: U.S. and Latin America; Canada; Europe, Middle East and Africa; Asia Pacific; and Corporate and Other. Geographic-based operations are further segmented into traditional and financial solutions businesses. The Company’s segments primarily write reinsurance business that is wholly or partially retained in one or more of RGA’s reinsurance subsidiaries. See “Segments” for more information concerning the Company’s operating segments.

Traditional Reinsurance

Traditional reinsurance includes individual and group life and health, disability, and critical illness reinsurance. Life reinsurance primarily refers to reinsurance of individual or group-issued term, whole life, universal life, and joint and last survivor insurance policies. Health and disability reinsurance primarily refers to reinsurance of individual or group health policies. Critical illness reinsurance provides a benefit in the event of the diagnosis of a pre-defined critical illness.

Traditional reinsurance is written on a facultative or automatic treaty basis. Facultative reinsurance is individually underwritten by the reinsurer for each policy to be reinsured, with the pricing and other terms established based upon rates negotiated in advance. Facultative reinsurance is normally purchased by ceding companies for medically impaired lives, unusual risks, or liabilities in excess of the binding limits specified in their automatic reinsurance treaties.

An automatic reinsurance treaty provides that the ceding company will cede risks to a reinsurer on specified blocks of policies where the underlying policies meet the ceding company’s underwriting criteria. In contrast to facultative reinsurance, the reinsurer does not approve each individual policy being reinsured. Automatic reinsurance treaties generally provide that the reinsurer will be liable for a portion of the risk associated with the specified policies written by the ceding company. Automatic reinsurance treaties specify the ceding company’s binding limit, which is the maximum amount of risk on a given life that can be ceded automatically to the reinsurer and that the reinsurer must accept. The binding limit may be stated either as a multiple of the ceding company’s retention or as a stated dollar amount.

Facultative and automatic reinsurance may be written as yearly renewable term, coinsurance, modified coinsurance or coinsurance with funds withheld. Under a yearly renewable term treaty, the reinsurer assumes primarily the mortality or morbidity risk. Under a coinsurance arrangement, depending upon the terms of the contract, the reinsurer may share in the risk of loss due to mortality or morbidity, lapses, and the investment risk, if any, inherent in the underlying policy. Modified coinsurance and coinsurance with funds withheld differ from coinsurance in that the assets supporting the reserves are retained by the ceding company.

Generally, the amount of life and health reinsurance ceded is stated on an excess or a quota share basis. Reinsurance on an excess basis covers amounts in excess of an agreed-upon retention limit. Retention limits vary by ceding company and also may vary by the age or underwriting classification of the insured, the product, and other factors. Under quota share reinsurance, the ceding company states its retention in terms of a fixed percentage of the risk with the remainder to be ceded to one or more reinsurers up to the maximum binding limit.

Many reinsurance agreements include recapture rights that permit the ceding company to reassume all or a portion of the risk formerly ceded to the reinsurer after an agreed-upon period of time or in some cases due to deterioration in the financial condition or ratings of the reinsurer. Recapture of business previously ceded does not affect premiums ceded prior to the recapture of such business, but would reduce premiums in subsequent periods. The potential adverse effects of recapture rights are mitigated by the following factors: (i) recapture rights vary by treaty and the risk of recapture is a factor that is considered when pricing a reinsurance agreement; (ii) ceding companies generally may exercise their recapture rights only to the extent they have increased their retention limits for the reinsured policies; (iii) ceding companies generally must recapture all of the policies eligible for recapture under the agreement in a particular year if any are recaptured, which prevents a ceding company from recapturing only

the most profitable policies; and (iv) the ceding company is sometimes required to pay a fee to the reinsurer upon recapture. In addition, when a ceding company recaptures reinsured policies, the reinsurer releases the reserves it maintained to support the recaptured portion of the policies.

Financial Solutions

Financial solutions include longevity reinsurance, asset-intensive reinsurance, financial reinsurance and stable value products.

Longevity Reinsurance

RGA's longevity reinsurance products are reinsurance contracts from which the Company earns premium for assuming the longevity risk of pension plans and other annuity products that have been insured by third parties. In many countries, companies are increasingly interested in reducing their exposure to longevity risk related to employee retirement benefits. This concern comes from both the absolute size of the risk and also through the volatility that changes in life expectancy can have on their reported earnings. In addition, insurance companies that offer lifetime annuities are seeking ways to manage their current exposure, while also recognizing the potential to take on more risk from employers and individuals.

The Company has entered into transactions on existing longevity business for clients in Europe and Canada. These have been arrangements with traditional insurance companies, as well as customized arrangements for banks dealing with pension schemes.

Asset-Intensive Reinsurance

Asset-intensive reinsurance refers to the full-risk coinsurance of annuities or reinsurance that has a significant investment component. Asset-intensive reinsurance allows the Company's clients to take advantage of growth opportunities that might otherwise not be available due to restrictions on available capital or concerns about the size of the investment risk on their balance sheets.

An ongoing partnership with clients is important with asset-intensive reinsurance because of the active management involved in this type of reinsurance. This active management includes investment decisions, investment and claims management, and the determination of non-guaranteed elements. Some examples of asset-intensive reinsurance are: fixed deferred annuities, indexed annuities, unit-linked variable annuities, universal life corporate-owned life insurance and bank-owned life insurance, unit-linked variable life, immediate/payout annuities, whole life, disabled life reserves, and extended term insurance.

Financial Reinsurance

Financial reinsurance primarily involves assisting ceding companies in meeting applicable regulatory requirements by enhancing the ceding companies' financial strength and regulatory surplus position. Financial reinsurance transactions do not qualify as reinsurance under U.S. generally accepted accounting principles ("GAAP"), due to the low-risk nature of the transactions. These transactions are reported in accordance with deposit accounting guidelines.

Stable Value Products

The Company provides guaranteed investment contracts to retirement plans that include investment-only, stable value wrap products. The assets are owned by the trustees of such plans, who invest the assets under the terms of investment guidelines to which the Company agrees. The contracts contain a guarantee of a minimum rate of return on participant balances supported by the underlying assets, and a guarantee of liquidity to meet certain participant-initiated plan cash flow requirements.

B. Corporate Structure

As a holding company, RGA is separate and distinct from its subsidiaries and has no significant business operations of its own. Therefore, it relies on the dividends from its insurance companies and other subsidiaries as the principal source of cash flow to meet its obligations, pay dividends and repurchase common stock. Information regarding the cash flow and liquidity needs of RGA may be found in Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations - Liquidity and Capital Resources.

Regulation

The following table provides the jurisdiction of the regulatory authority for RGA's primary operating and captive subsidiaries:

Subsidiary	Regulatory Authority Jurisdiction
RGA Reinsurance Company ("RGA Reinsurance")	Missouri
Parkway Reinsurance Company ("Parkway Re")	Missouri
Rockwood Reinsurance Company ("Rockwood Re")	Missouri
Castlewood Reinsurance Company ("Castlewood Re")	Missouri
Chesterfield Reinsurance Company ("Chesterfield Re")	Missouri
Reinsurance Company of Missouri, Incorporated ("RCM")	Missouri
Timberlake Reinsurance Company II ("Timberlake Re")	South Carolina
RGA Life Reinsurance Company of Canada ("RGA Canada")	Canada
RGA Reinsurance Company (Barbados) Ltd. ("RGA Barbados")	Barbados
RGA Americas Reinsurance Company, Ltd. ("RGA Americas")	Bermuda
Manor Reinsurance, Ltd. ("Manor Re")	Barbados
RGA Atlantic Reinsurance Company Ltd. ("RGA Atlantic")	Barbados
RGA Worldwide Reinsurance Company, Ltd. ("RGA Worldwide")	Barbados
RGA Global Reinsurance Company, Ltd. ("RGA Global")	Bermuda
RGA Reinsurance Company of Australia Limited ("RGA Australia")	Australia
RGA International Reinsurance Company dac ("RGA International")	Ireland
RGA Reinsurance Company of South Africa, Limited ("RGA South Africa")	South Africa
Aurora National Life Assurance Company ("Aurora National")	California

Certain of the Company's subsidiaries are subject to regulations in the other jurisdictions in which they are licensed or authorized to do business. Insurance laws and regulations, among other things, establish minimum capital requirements and limit the amount of dividends, distributions, and intercompany payments that affiliates can make without regulatory approval. Additionally, insurance laws and regulations impose restrictions on the amounts and types of investments that insurance companies may hold. New capital standards (discussed below) are being developed and are likely to be applied to one or more of the Company's subsidiaries to either require more capital and/or limit the extent to which some forms of existing capital may be counted in an evaluation of financial strength by its regulators.

U.S. Regulation

Insurance Regulation

The insurance laws and regulations, as well as the level of supervisory authority that may be exercised by the various state insurance departments, vary by jurisdiction. These laws and regulations generally grant broad powers to supervisory agencies or regulators to examine and supervise insurance companies and insurance holding companies with respect to every significant aspect of the conduct of the insurance business. This includes the power to pre-approve the execution or modification of contractual arrangements. These laws and regulations generally require insurance companies to meet certain solvency standards and asset tests, to maintain minimum standards of financial strength and to file certain reports with regulatory authorities (including information concerning their capital structure, ownership and financial condition). These laws and regulations subject insurers to potential assessments for amounts paid by guarantee funds. RGA Reinsurance, Chesterfield Re and RCM are subject to the state of Missouri's adoption of the National Association of Insurance Commissioners ("NAIC") Model Audit Rule, which requires an insurer to have an annual audit by an independent certified public accountant, provide an annual management report of internal control over financial reporting, file the resulting reports with the Director of Insurance and maintain an audit committee. Aurora National is subject to similar regulation by the State of California. Moreover, Insurance Holding Company System Regulatory Acts in the U.S. permit the Missouri regulator to request and consider, in its regulation of the solvency of and capital standards for RGA Reinsurance, Chesterfield Re and RCM and the California regulator to request and consider, in its regulation of the solvency of and capital standards for Aurora National, information about the operations of other subsidiaries of RGA and the extent to which there may be deemed to exist contagion risk posed by those operations. In addition, RGA is subject to a supervisory college, conducted by its group supervisor the Missouri Department of Insurance, Financial Institutions and Professional Registration ("MDOI"). The supervisory college is comprised of insurance regulators of the major jurisdictions in which RGA has established insurance branches and subsidiaries. Since the inception of the supervisory college in October 2012, the MDOI has conducted four more in-person supervisory college meetings in addition to numerous regulator-only conference calls. These meetings bring about requests for information from RGA's regulators as they monitor RGA's solvency, governance and overall management. While the supervisory college has the ability to impose limitations on the activities of the insurance subsidiaries of RGA, particularly since RGA has met the requirements to become an internationally active insurance group, no such limitations have been imposed to date. The existence of the supervisory college does generally help RGA's regulators understand its business to a greater degree and does encourage a more global view by RGA of its own regulation.

RGA's reinsurance subsidiaries are required to file statutory financial statements in each jurisdiction in which they are licensed and may be subject to onsite, periodic examinations by the insurance regulators of the jurisdictions in which each is licensed, authorized, or accredited. To date, none of the regulators' reports related to the Company's periodic examinations have contained material adverse findings.

Although some of the rates and policy terms of U.S. direct insurance agreements are regulated by state insurance departments, the rates, policy terms, and conditions of reinsurance agreements generally are not subject to regulation by any regulatory authority. The same is true outside of the U.S. In the U.S., however, the NAIC Model Law on Credit for Reinsurance, which has been adopted in most states, imposes certain requirements for an insurer to take reserve credit for risk ceded to a reinsurer. Generally, the reinsurer is required to be licensed or accredited in the insurer's state of domicile, or post security for reserves transferred to the reinsurer in the form of letters of credit or assets placed in trust. The NAIC Life and Health Reinsurance Agreements Model Regulation, which has been passed in most states, imposes additional requirements for insurers to claim reserve credit for reinsurance ceded (excluding yearly renewable term reinsurance and non-proportional reinsurance). These requirements include bona fide risk transfer, an insolvency clause, written agreements, and filing of reinsurance agreements involving in force business, among other things. Outside of the U.S., rules for reinsurance and requirements for minimum risk transfer are less specific and are less likely to be published as rules, but nevertheless standards can be imposed to varying extents.

U.S. Valuation of Life Policies Model Regulation (commonly referred to as Regulation XXX), implemented in the U.S. for various types of life insurance business, significantly increased the level of reserves that U.S. life insurance and life reinsurance companies must hold on their statutory financial statements for various types of life insurance business, primarily certain level premium term life products. The reserve levels required under Regulation XXX are normally in excess of reserves required under GAAP. In situations where primary insurers have reinsured business to reinsurers that are unlicensed and unaccredited in the U.S., the reinsurer must provide collateral equal to its reinsurance reserves in order for the ceding company to receive statutory financial statement credit. Reinsurers have historically utilized letters of credit for the benefit of the ceding company, or have placed assets in trust for the benefit of the ceding company, or have used other structures as the primary forms of collateral.

RGA Reinsurance is the primary subsidiary of the Company subject to Regulation XXX. In order to manage the effect of Regulation XXX on its statutory financial statements, RGA Reinsurance has retroceded a majority of Regulation XXX reserves to unaffiliated and affiliated unlicensed reinsurers and special purpose reinsurers, or captives. RGA Reinsurance's statutory capital may be significantly reduced if the unaffiliated or affiliated reinsurer is unable to provide the required collateral to support RGA Reinsurance's statutory reserve credits and RGA Reinsurance cannot find an alternative source for the collateral. The NAIC has requirements for life insurers using special purpose reinsurers. While RGA Reinsurance's reserve financing arrangements using special purpose reinsurers or "captive reinsurers" are permitted, the rules place limitations on RGA Reinsurance's ability to utilize captive reinsurers to finance reserve growth related to future business. Such limitations have caused the Company to utilize alternative retrocession strategies, primarily involving the use of a certified reinsurer as discussed below.

RGA Reinsurance, Chesterfield Re, Parkway Re, Rockwood Re, Castlewood Re and RCM prepare statutory financial statements in conformity with accounting practices prescribed or permitted by the State of Missouri. Timberlake Re prepares statutory financial statements in conformity with accounting practices prescribed or permitted by the State of South Carolina. Aurora National prepares its statutory financial statements in conformity with accounting practices prescribed or permitted by the State of California. Each of these states require domestic insurance companies to prepare their statutory financial statements in accordance with the NAIC Accounting Practices and Procedures manual subject to any deviations permitted by each state's insurance commissioner. The Company's non-U.S. subsidiaries are subject to the regulations and reporting requirements of their respective countries of domicile.

Based on the growth of the Company's business and the pattern of reserve levels under Regulation XXX associated with term life business and other statutory reserve requirements, the amount of ceded reserve credits is expected to grow, albeit at slower rates than in the immediate past. This growth will require the Company to obtain additional letters of credit, put additional assets in trust, or utilize other funding mechanisms to support reserve credits. If the Company is unable to support the reserve credits, the regulatory capital levels of several of its subsidiaries may be significantly reduced, while the regulatory capital requirements for these subsidiaries would not change. The reduction in regulatory capital could affect the Company's ability to write new business and retain existing business.

Affiliated captives are commonly used in the insurance industry to help manage statutory reserve and collateral requirements and are often domiciled in the same state as the insurance company that sponsors the captive. The NAIC has analyzed the insurance industry's use of affiliated captive reinsurers to satisfy certain reserve requirements and has adopted measures to promote uniformity in both the approval and supervision of such reinsurers. Current standards addressing the use of captive reinsurers allow captives organized prior to 2016 to continue in accordance with their currently approved plans. State insurance regulators that regulate the Company's domestic insurance companies have placed additional restrictions on the use of newly established captive reinsurers, which may increase costs and add complexity. As a result, the Company may need to alter the type and volume of business it reinsures, increase prices on those products, raise additional capital to support higher regulatory reserves or implement higher cost strategies.

In the U.S., the introduction of the certified reinsurer has provided an alternative way to manage collateral requirements. In 2014, RGA Americas was designated as a certified reinsurer by the MDOI. This designation allows the Company to retrocede business to RGA Americas in lieu of using captives for collateral requirements. Beginning 2017, the NAIC approved principles-based reserving for U.S. insurers, however implementation required approval by the states. To achieve this, the NAIC amended the standard valuation law to adopt life principles-based reserving that was effective January 1, 2017, allowing a three-year adoption period. The Company continues to evaluate the impact of the new requirements and expects to begin implementation in 2019. The Company has chosen not to establish captives subject to the new regulations as it evaluates the impact of the regulations on new captives, and how these new captives fit into the Company's overall risk management and financing programs.

Reinsurers may place assets in trust to satisfy collateral requirements for certain treaties. In addition, the Company holds securities in trust to satisfy collateral requirements under certain third-party reinsurance treaties. Under certain conditions in some treaties, the Company may be obligated to move reinsurance from one subsidiary of RGA to another subsidiary, post additional collateral for the ceding insurer or allow the ceding insurer to cancel the reinsurance. These conditions include change in control, level of capital or ratings of the subsidiary, insolvency, nonperformance under a treaty, or loss of the subsidiary's reinsurance license. If the Company is ever required to perform under these obligations, the risk to the consolidated company under the reinsurance treaties would not change; however, additional capital may be required due to the change in jurisdiction of the subsidiary reinsuring the business and may create a strain on liquidity, possibly causing a reduction in dividend payments or hampering the Company's ability to write new business or retain existing business. In the event of termination of a treaty the future profits as to that treaty may be lost.

Capital Requirements

Risk-Based Capital ("RBC") guidelines promulgated by the NAIC are applicable to RGA Reinsurance, RCM, Aurora National and Chesterfield Re, and identify minimum capital requirements based upon business levels and asset mix. These subsidiaries maintain capital levels in excess of the amounts required by the applicable guidelines. Timberlake Re, Parkway Re, Rockwood Re and Castlewood Re's capital requirements are determined solely by their licensing orders issued by their states of domicile. Pursuant to its licensing order issued by the South Carolina Department of Insurance, Timberlake Re only calculates RBC as a means of demonstrating its ability to pay principal and interest on its surplus note issued to Timberlake Financial, L.L.C. ("Timberlake Financial"). It is not otherwise subject to the RBC guidelines. Similarly, Parkway Re, Rockwood Re and Castlewood Re are not subject to the requirements of the NAIC's RBC guidelines. A decline in the RBC of one or more of the Company's U.S. insurers can cause the appearance of less capitalization in its U.S. insurers, individually, or when considered as a group.

The development of a group capital calculation by the NAIC will also have relevance to RGA Reinsurance, RCM, Aurora National and Chesterfield Re along with captive reinsurers Timberlake Re, Parkway Re, Rockwood Re and Castlewood Re. While the NAIC is still working on its calculation and has not yet articulated the ways in which it intends U.S. states to use the calculation, the calculation is expected to be used to assess the adequacy of capital within an insurance group domiciled in the U.S., particularly where the group is designated an internationally active insurance group ("IAIG") by the group supervisor. The Company cannot currently predict the effect that any proposed or future group capital standard will have on its financial condition or operations or the financial condition or operations of its subsidiaries.

Regulations in international jurisdictions also require certain minimum capital levels, and subject the companies operating in such jurisdictions, to oversight by the applicable regulatory bodies. RGA's subsidiaries meet the minimum capital requirements in their respective jurisdictions. The International Association of Insurance Supervisors continues work on its insurance capital standard. While the insurance capital standard is a model for capital standards and not a standard that must be followed on its own in any jurisdiction, it is likely to influence capital requirements for insurers around the world leading to a need for additional capital in one or more of RGA's subsidiaries. The Company cannot predict the effect that any proposed or future legislation or rulemaking in the countries in which it operates may have on the financial condition or operations of the Company or its subsidiaries.

Insurance Holding Company Regulations

RGA Reinsurance, Chesterfield Re, Parkway Re, Rockwood Re, Castlewood Re and RCM are subject to regulation under the insurance and insurance holding company statutes of Missouri. Aurora National is subject to regulation under the insurance and insurance holding company statutes of California. These insurance holding company laws and regulations generally require insurance and reinsurance subsidiaries of insurance holding companies to register and file with the home state regulator certain reports describing, among other information, capital structure, ownership, financial condition, certain intercompany transactions, and general business operations. The insurance holding company statutes and regulations also require prior approval of, or in certain circumstances, prior notice to the home state regulator of, certain material intercompany transfers of assets, as well as certain transactions between insurance companies, their parent companies and affiliates.

Under current Missouri and California insurance laws and regulations, unless (i) certain filings are made with the home state regulator, (ii) certain requirements are met, including a public hearing, and (iii) approval or exemption is granted by the home state regulator, no person may acquire any voting security or security convertible into a voting security of an insurance holding company, such as RGA, which controls a domestic insurance company, or merge with such an insurance holding company, if as

a result of such transaction such person would “control” the insurance holding company. “Control” is presumed to exist under Missouri law if a person directly or indirectly owns or controls 10% or more of the voting securities of another person. Revisions to the insurance holding company regulations of Missouri and California require increased disclosure to regulators of matters within the RGA group of companies.

Restrictions on Dividends and Distributions

Current Missouri law, applicable to RCM and its subsidiaries, RGA Reinsurance and Chesterfield Re, permits the payment of dividends or distributions that together with dividends or distributions paid during the preceding twelve months do not exceed the greater of (i) 10% of statutory capital and surplus as of the preceding December 31, or (ii) statutory net gain from operations for the preceding calendar year. Any proposed dividend in excess of this amount is considered an “extraordinary dividend” and may not be paid until it has been approved, or a 30-day waiting period has passed during which it has not been disapproved, by the Director of the MDOI. Additionally, dividends may be paid only to the extent the insurer has unassigned surplus (as opposed to contributed surplus). Historically, RGA has not relied upon dividends from its subsidiaries to fund its obligations. However, the regulatory limitations and other restrictions described herein could limit the Company’s financial flexibility in the future should it choose to or need to use subsidiary dividends as a funding source for its obligations. See Note 11 - “Financial Condition and Net Income on a Statutory Basis - Significant Subsidiaries” in the Notes to Consolidated Financial Statements for additional information on the Company’s dividend restrictions.

The California Insurance Holding Company Act defines an extraordinary dividend consistent with the definition found in the Missouri Insurance Holding Company Act and imposes an identical restriction upon the ability of Aurora National to pay dividends to RGA Reinsurance. In contrast to both the Missouri and the California Insurance Holding Company Acts, the NAIC Model Insurance Holding Company System Regulatory Act defines an extraordinary dividend as a dividend or distribution that together with dividends or distributions paid during the preceding twelve months exceeds the lesser of (i) 10% of statutory capital and surplus as of the preceding December 31, or (ii) statutory net gain from operations for the preceding calendar year. The Company is unable to predict whether, when, or if, Missouri will enact a new regulation for extraordinary dividends.

Missouri insurance laws and regulations also require that the statutory surplus of Chesterfield Re, RCM and RGA Reinsurance following any dividend or distribution be reasonable in relation to their outstanding liabilities and adequate to meet their financial needs. The Director of the MDOI may call for a rescission of the payment of a dividend or distribution by these entities that would cause their statutory surplus to be inadequate under the standards of the Missouri insurance regulations. California insurance laws and regulations impose the same restrictions on Aurora National as to the dividends or distributions that are made.

Pursuant to the South Carolina Director of Insurance, Timberlake Re may declare dividends subject to a minimum Total Adjusted Capital threshold, as defined by the NAIC’s RBC regulation. As of December 31, 2018, Timberlake Re met the minimum required threshold. Any dividends paid by Timberlake Re would be paid to Timberlake Financial, which in turn is subject to contractual limitations on the amount of dividends it can pay to RCM.

Dividend payments from non-U.S. operations are subject to similar restrictions established by local regulators. The non-U.S. regulatory regimes also commonly limit the dividend payments to the parent to a portion of the prior year’s statutory income, as determined by the local accounting principles. The regulators of the Company’s non-U.S. operations may also limit or prohibit profit repatriations or other transfers of funds to the U.S. if such transfers are deemed to be detrimental to the solvency or financial strength of the non-U.S. operations, or for other reasons. Most of the non-U.S. operating subsidiaries are second tier subsidiaries that are owned by various non-U.S. holding companies. The capital and rating considerations applicable to the first tier subsidiaries may also impact the dividend flow to RGA.

Default or Liquidation

In the event that RGA defaults on any of its debt or other obligations, or becomes the subject of bankruptcy, liquidation, or reorganization proceedings, the creditors and stockholders of RGA will have no right to proceed against the assets of any of the subsidiaries of RGA. If any of RGA’s reinsurance subsidiaries were to be liquidated or dissolved, the liquidation or dissolution would be conducted in accordance with the rules and regulations of the appropriate governing body in the state or country of the subsidiary’s domicile. The creditors of any such reinsurance company, including, without limitation, holders of its reinsurance agreements and state guaranty associations (if applicable), would be entitled to payment in full from such assets before RGA, as a direct or indirect stockholder, would be entitled to receive any distributions or other payments from the remaining assets of the liquidated or dissolved subsidiary.

Federal Regulation

Since the 2010 enactment of the Dodd-Frank Wall Street Reform and Consumer Protection Act, there has been renewed interest by the U.S. federal government in the manner in which insurance and reinsurance is regulated. Under the Dodd-Frank Act, recent activity by the Federal Insurance Office within the U.S. Treasury Department has resulted in the negotiation of a “covered agreement” with the European Union. The covered agreement, while promoting the recognition of U.S. state insurance

regulators as group supervisors of U.S.-based global reinsurers such as RGA, also provides for an elimination of the collateral that reinsurers based in the European Union must currently post in favor of U.S. ceding insurers. This agreement, coupled with new state credit for reinsurance laws, has the potential to lower the cost at which RGA Reinsurance's competitors are able to provide reinsurance to U.S. insurers. Additionally under the Dodd-Frank Act, one or more of RGA's client ceding insurers domiciled in the U.S. may from time-to-time be designated for solvency supervision by the Federal Reserve. Insurers can be designated systemically important so as to warrant the imposition of an additional layer of regulation over already existing state regulation. While it is not expected that any RGA entity would be deemed to be systemically important and become subject to this additional scrutiny, the reinsurance programs RGA maintains with the insurers so designated as systemically important are subject to scrutiny by the Federal Reserve. It is possible that more of RGA's clients will be given this designation leading to additional scrutiny of those clients' reinsurance programs by the Federal Reserve. With the regulation of some U.S. domiciled insurers by the U.S. government, it is possible that the scope of the federal government's ability to regulate insurers and reinsurers will be expanded. It is not possible to predict the effect of such decisions or changes in law on the operation of the Company, but the Dodd-Frank Act makes it more likely than in the past that insurance or reinsurance may be regulated at the federal level. A shift in regulation from the state to the federal level may bring into question the continued validity of the McCarran-Ferguson Act, which exempts the "business of insurance" from most federal laws, including anti-trust laws. With the McCarran-Ferguson Act exemption for the business of insurance, a reinsurer may set rate, underwriting and claims handling standards for its ceding company clients to follow.

Environmental Considerations

Federal, state and local environmental laws and regulations apply to the Company's ownership and operation of real property. Inherent in owning and operating real property are the risks of hidden environmental liabilities and the costs of any required clean-up. Under the laws of certain states, contamination of a property may give rise to a lien on the property to secure recovery of the costs of clean-up. In several states, this lien has priority over the lien of an existing mortgage against such property. In addition, in some states and under the federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), the Company may be liable, in certain circumstances, as an "owner" or "operator," for costs of cleaning-up releases or threatened releases of hazardous substances at a property mortgaged to it. The Company also risks environmental liability when it forecloses on a property mortgaged to it, although federal legislation provides for a safe harbor from CERCLA liability for secured lenders that foreclose and sell the mortgaged real estate, provided that certain requirements are met. However, there are circumstances in which actions taken could still expose the Company to CERCLA liability. Application of various other federal and state environmental laws could also result in the imposition of liability on the Company for costs associated with environmental hazards.

The Company routinely conducts environmental assessments prior to taking title to real estate through foreclosure on real estate collateralizing mortgages that it holds. Although unexpected environmental liabilities can always arise, the Company seeks to minimize this risk by undertaking these environmental assessments and complying with its internal procedures, and as a result, the Company believes that any costs associated with compliance with environmental laws and regulations or any clean-up of properties would not have a material adverse effect on the Company's results of operations.

International Regulation

RGA's international insurance operations are principally regulated by insurance regulatory authorities in the jurisdictions in which they are located or operate branch offices. The regulation includes minimum capital, solvency and governance requirements. The authority of RGA's international operations to conduct business is subject to licensing requirements, inspections and approvals and these authorizations are subject to modification and revocation. Periodic examinations of the insurance company books and records, financial reporting requirements, risk management processes and governance procedures are among the techniques used by regulators to supervise RGA's non-U.S. insurance businesses. The regulators of RGA's non-U.S. insurance companies and the California Department of Insurance are also invited to be part of the supervisory college held by the Missouri Department of Insurance, RGA's group supervisor.

The Company's subsidiaries domiciled in Bermuda are subject to extensive regulation and supervision by the Bermuda Monetary Authority ("BMA"). Such regulation includes rules regarding privacy, anti-money laundering, bank secrecy, anti-corruption and foreign asset control in addition to insurance regulation. To that end, the BMA has broad powers to regulate business activities of the Company's Bermuda domiciled subsidiaries, mandate capital and surplus requirements, regulate trade and claims practices and require strong enterprise risk management and corporate governance activities. The Company's subsidiaries domiciled in Barbados are subject regulation and supervision by the Financial Services Commission in Barbados.

Much like the adoption of Dodd-Frank in the U.S., regulators around the world are reviewing the causes of the 2008 - 2009 financial crisis and considering ways to avoid similar problems in the future. A group leading this effort is the Financial Stability Board ("FSB"). The FSB consists of representatives of national financial authorities of the G20 nations. The G20 and the FSB and related governmental bodies have developed proposals to address issues such as group supervision, capital and solvency standards, systemic economic risk and corporate governance, including executive compensation and many other related issues associated with the financial crisis. At the direction of the FSB, the International Association of Insurance Supervisors

("IAIS") is developing a model framework for the supervision of IAIG's that contemplates "group-wide supervision" across national boundaries. RGA now qualifies as an IAIG bringing about requirements for RGA to conduct a group-wide risk and solvency assessment to monitor and manage its overall solvency. At this time RGA cannot predict what additional capital requirements, compliance costs or other burdens these requirements would impose on it, if adopted. There is also the potential for inconsistent or conflicting regulation of the RGA group of companies as lawmakers and regulators in multiple jurisdictions simultaneously pursue these initiatives.

Additionally, RGA International, operating in the European Economic Area ("EEA"), is subject to the Solvency II measures developed by the European Insurance and Occupational Pensions Authority and will be required to abide by the evolving risk management practices, capital standards and disclosure requirements of the Solvency II framework. Additionally, the Company's clients located in the EEA will need to abide by these standards in operating their insurance businesses, including the management of their ceded reinsurance. Currently, insurers and reinsurers located in the EEA are operating under Solvency II. The Company expects Solvency II to have a significant influence on not only the regulation of solvency measures applied to insurers and reinsurers operating within the EEA, but the Company also expects the solvency regulation measures to influence future regulatory structures of countries outside of the EEA, including Japan. Influences of the Solvency II - type framework are already present in the insurance regulation of Bermuda and China and currently influence the solvency measures imposed upon RGA Global and RGA Americas.

As a result of the 2016 Brexit referendum, under which the United Kingdom ("UK") may exit the European Union during 2019, the regulatory approval of RGA International as a reinsurer of insurance business written by UK domiciled insurers remains susceptible to termination in or around March of 2019 until a formal agreement is approved. While it currently appears that any post Brexit insurance regulation in the UK will permit the separate registration of RGA International as a branch in the UK, there exists questions as to what requirements will be imposed upon reinsurers domiciled outside of the UK after implementation of the Brexit initiative (if it occurs).

New and proposed restrictions in many European and Asian countries on RGA's ability to transfer data from one country to another also threaten to make its operations less efficient. Many of these restrictions either do not anticipate the processing of data for reinsurance purposes at all or place costly restrictions on the ability of a reinsurer to service its business by requiring processing to be done within the borders of the country in which the insured consumer resides.

Additionally, requirements effective in Indonesia limit the amount of insurance business that can be ceded to reinsurers not domiciled in that country. Requirements of this type are proposed from time-to-time in developing markets. These forced localization requirements have the impact of limiting the amount of reinsurance business RGA can conduct in those countries without the participation of a local reinsurer.

RGA expects the scope and extent of regulation outside of the U.S., as well as group regulatory oversight generally, to continue to increase.

Ratings

Insurer financial strength ratings, sometimes referred to as claims paying ratings, represent the opinions of rating agencies regarding the financial ability of an insurance company to meet its obligations under an insurance policy. The Company's insurer financial strength ratings as of the date of this filing are listed in the table below for each rating agency that meets with the Company's management on a regular basis. As of the date of this filing, all ratings listed below are on stable outlook.

<i>Insurer Financial Strength Ratings</i>	A.M. Best Company ⁽¹⁾	Moody's Investors Service ⁽²⁾	Standard & Poor's ⁽³⁾
RGA Reinsurance Company	A+	A1	AA-
RGA Life Reinsurance Company of Canada	A+	Not Rated	AA-
RGA International Reinsurance Company dac	Not Rated	Not Rated	AA-
RGA Global Reinsurance Company, Ltd.	Not Rated	Not Rated	AA-
RGA Reinsurance Company of Australia Limited	Not Rated	Not Rated	AA-
RGA Americas Reinsurance Company, Ltd.	A+	Not Rated	AA-
RGA Atlantic Reinsurance Company Ltd.	A+	Not Rated	Not Rated

- (1) An A.M. Best Company ("A.M. Best") insurer financial strength rating of "A+" (superior) is the second highest out of sixteen possible ratings and is assigned to companies that have, in A.M. Best's opinion, a superior ability to meet their ongoing insurance obligations.
- (2) A Moody's Investors Service ("Moody's") insurer financial strength rating of "A1" (good) is the fifth highest rating out of twenty-one possible ratings and indicates that Moody's believes the insurance company offers good financial security; however, elements may be present which suggest a susceptibility to impairment sometime in the future.
- (3) A Standard & Poor's ("S&P") insurer financial strength rating of "AA-" (very strong) is the fourth highest rating out of twenty-three possible ratings. According to S&P's rating scale, a rating of "AA-" means that, in S&P's opinion, the insurer has very strong financial security characteristics.

The ability to write reinsurance partially depends on a reinsurer's financial condition and its financial strength ratings. These ratings are based on a company's ability to pay policyholder obligations and are not directed toward the protection of investors. A ratings downgrade could adversely affect the Company's ability to compete. See Item 1A – "Risk Factors" for more on the potential effects of a ratings downgrade.

Underwriting

Automatic. The Company's management determines whether to write automatic reinsurance business by considering many factors, including the types of risks to be covered; the ceding company's retention limit and binding authority, product, and pricing assumptions; and the ceding company's underwriting standards, financial strength and distribution systems. For automatic business, the Company ensures that the underwriting standards, procedures and guidelines of its ceding companies are priced appropriately and consistent with the Company's expectations. To this end, the Company conducts periodic reviews of the ceding companies' underwriting and claims personnel and procedures.

Facultative. The Company has developed underwriting policies, procedures and standards with the objective of controlling the quality of business written as well as its pricing. The Company's underwriting process emphasizes close collaboration between its underwriting, actuarial, and administration departments. Management periodically updates these underwriting policies, procedures, and standards to account for changing industry conditions, market developments, and changes occurring in the field of medical technology. These policies, procedures, and standards are documented in electronic underwriting manuals made available to all the Company's underwriters. The Company regularly performs internal reviews of both its underwriters and underwriting process.

The Company's management determines whether to accept facultative reinsurance business on a prospective insured by reviewing the application, medical information and other underwriting information appropriate to the age of the prospective insured and the face amount of the application. An assessment of medical and financial history follows with decisions based on underwriting knowledge, manual review and consultation with the Company's medical directors as necessary. Many facultative applications involve individuals with multiple medical impairments, such as heart disease, high blood pressure, and diabetes, which require a complex underwriting/mortality assessment. The Company employs medical directors and medical consultants to assist its underwriters in making these assessments.

Pricing

The Company has pricing actuaries dedicated in every geographic market and in every product category who develop reinsurance treaty rates following the Company's policies, procedures and standards. Biometric assumptions are based primarily on the Company's own mortality, morbidity and persistency experience, reflecting industry and client-specific experience. Economic and asset-related pricing assumptions are based on current and long-term market conditions and are developed by actuarial and investment personnel with appropriate experience and expertise. The Company's view of short- and long-term risks are reflected in pricing consistent with its internal capital model. For transactional business with material day-one invested assets there is diligence on the expected asset portfolio that is reflected in the pricing assumption. For transactional business focusing on tail risk the Company has policies and procedures related to views on transaction-specific tail risk events. A transaction process ensures that the business reflects the input of internal areas of expertise in deal teams and has procedures for escalation based on the size and nature of the risks. Management has established a high-level oversight of the processes and results of these activities, which includes peer reviews in every market as well as centralized procedures and processes for reviewing and auditing pricing activities.

Operations

The Company's business has been primarily obtained directly, rather than through brokers. The Company has an experienced sales and marketing staff that works to provide responsive service and maintain existing relationships.

The Company's administration, auditing, valuation and finance departments are responsible for treaty compliance auditing, financial analysis of results, generation of internal management reports, and periodic audits of administrative and underwriting practices. A significant effort is focused on periodic audits of administrative and underwriting practices, and treaty compliance of clients.

The Company's claims departments review and verify reinsurance claims, obtain the information necessary to evaluate claims, and arrange for timely claims payments. Claims are subjected to a detailed review process to ensure that the risk was properly ceded, the claim complies with the contract provisions, and the ceding company is current in the payment of reinsurance premiums to the Company. In addition, the claims departments monitor both specific claims and the overall claims handling procedures of ceding companies.

Customer Base

The Company provides reinsurance products primarily to the largest life insurance companies in the world. In 2018, the Company's five largest clients generated approximately \$2.2 billion or 19.5% of the Company's gross premiums. In addition, 25 other clients each generated annual gross premiums of \$100.0 million or more, and the aggregate gross premiums from these

clients represented approximately 41.3% of the Company's gross premiums. No individual client generated 10% or more of the Company's total gross premiums. For the purpose of this disclosure, companies that are within the same insurance holding company structure are combined.

Competition

New reinsurance opportunities continue to be highly price competitive; however, winning this business also requires companies to be financially strong, provide flexible terms and conditions, have a positive reputation, deliver excellent service, and demonstrate experience in the types of business underwritten. The Company's competition includes other reinsurance companies, other providers of financial services, and more recently, private equity firms. The Company believes that its primary global reinsurance competitors are the following, or their affiliates: Munich Re, Swiss Re, Hannover Re and SCOR Global Re. In addition, the Company may compete with Pacific Life, Prudential Financial, and Canada Life in select risk acquisition. Within the reinsurance industry, the competitors can change from year to year and by region.

Employees

As of December 31, 2018, the Company had 2,767 employees located throughout the world. We believe that our employee relations are satisfactory.

C. Segments

The Company obtains substantially all of its revenues through reinsurance agreements that cover a portfolio of life and health insurance products, including term life, credit life, universal life, whole life, group life and health, joint and last survivor insurance, critical illness, disability, longevity as well as asset-intensive (e.g., annuities) and financial reinsurance. Generally, the Company, through various subsidiaries, has provided reinsurance for mortality, morbidity, lapse and investment-related risks associated with such products. With respect to asset-intensive products, the Company has also provided reinsurance for investment-related risks.

Additional information regarding the operations of the Company's segments and geographic operations is contained in Note 15 – "Segment Information" in the Notes to Consolidated Financial Statements.

U.S. and Latin America Operations

The U.S. and Latin America operations market traditional life and health reinsurance, reinsurance of asset-intensive products, and financial reinsurance, primarily to large U.S. life insurance companies. The U.S. and Latin America operations include business generated by its offices in the U.S., Mexico and Brazil. The offices in Mexico and Brazil provide services to clients in other Latin American countries.

Traditional Reinsurance

The U.S. and Latin America Traditional segment provides individual and group life and health reinsurance to domestic clients for a variety of products through yearly renewable term agreements, coinsurance, and modified coinsurance. This business has been accepted under many different rate scales, with rates often tailored to suit the underlying product and the needs of the ceding company. Premiums typically vary for smokers and non-smokers, males and females, and may include a preferred underwriting class discount. Reinsurance premiums are paid in accordance with the treaty, regardless of the premium mode for the underlying primary insurance. This business is made up of facultative and automatic treaty business.

Automatic business is generated pursuant to treaties that generally require the underlying policies to meet the ceding company's underwriting criteria, although in certain cases such policies may be rated substandard. In contrast to facultative reinsurance, reinsurers do not engage in underwriting assessments of each risk assumed through an automatic treaty.

As the Company does not apply its underwriting standards to each policy ceded to it under automatic treaties, the U.S. and Latin America operations generally require ceding companies to retain a portion of the business written on an automatic basis, thereby increasing the ceding companies' incentives to underwrite risks with due care and, when appropriate, to contest claims diligently.

The U.S. and Latin America facultative reinsurance operation involves the assessment of the risks inherent in (i) multiple impairments, such as heart disease, high blood pressure, and diabetes; (ii) cases involving large policy face amounts; and (iii) financial risk cases (i.e. cases involving policies disproportionately large in relation to the financial characteristics of the proposed insured). The U.S. and Latin America operations' marketing efforts have focused on developing facultative relationships with client companies because management believes facultative reinsurance represents a substantial segment of the reinsurance activity of many large insurance companies and also serves as an effective means of expanding the U.S. and Latin America operations' automatic business.

Only a portion of approved facultative applications ultimately result in reinsurance, as applicants for impaired risk policies often submit applications to several primary insurers, which in turn seek facultative reinsurance from several reinsurers. Ultimately, only one insurance company and one reinsurer are likely to obtain the business. The Company tracks the percentage of declined and placed facultative applications on a client-by-client basis and generally works with clients to seek to maintain such percentages at levels deemed acceptable. As the Company applies its underwriting standards to each application submitted to it facultatively, it generally does not require ceding companies to retain a portion of the underlying risk when business is written on a facultative basis.

In addition, several of the Company's U.S. and Latin America clients have purchased life insurance policies insuring the lives of their executives. These policies have generally been issued to fund deferred compensation plans and have been reinsured with the Company.

Financial Solutions - Asset-Intensive Reinsurance

The Company's U.S. and Latin America Asset-Intensive operations primarily concentrate on the investment risk within underlying annuities and corporate-owned life insurance policies. These reinsurance agreements are mostly structured as coinsurance, coinsurance with funds withheld, or modified coinsurance of primarily investment risk such that the Company recognizes profits or losses primarily from the spread between the investment earnings and the interest credited on the underlying annuity contract liabilities.

Annuities are normally limited by the size of the deposit from any single depositor. The Company also reinsures certain indexed annuities, variable annuity products that contain guaranteed minimum death or living benefits and corporate-owned life insurance products. Corporate-owned life insurance normally involves a large number of insureds associated with each deposit, and the Company's underwriting guidelines limit the size of any single deposit. The individual policies associated with any single deposit are typically issued within pre-set guaranteed issue parameters.

The Company primarily targets U.S.-based highly rated, financially secure companies as clients for asset-intensive business. These companies may wish to limit their own exposure to certain products. Ongoing asset/liability analysis is required for the management of asset-intensive business. The Company performs this analysis internally, in conjunction with asset/liability analysis performed by the ceding companies.

Financial Solutions - Financial Reinsurance

The Company's U.S. and Latin America Financial Reinsurance operations assist ceding companies in meeting applicable regulatory requirements while enhancing their financial strength and regulatory surplus position. The Company commits cash or assumes regulatory insurance liabilities from the ceding companies. In addition, the Company has committed to provide statutory reserve support to third-parties by funding loans if certain defined events occur. Generally, such amounts are offset by receivables from ceding companies that are repaid by the future profits from the reinsured block of business. The Company structures its financial reinsurance transactions so that the projected future profits of the underlying reinsured business significantly exceed the amount of regulatory surplus provided to the ceding company.

The Company primarily targets highly rated insurance companies for financial reinsurance due to the credit risk associated with this business. A careful analysis is performed before providing any regulatory surplus enhancement to the ceding company. This analysis is intended to ensure that the Company understands the risks of the underlying insurance product and that the transaction has a high likelihood of being repaid through the future profits of the underlying business. If the future profits of the business are not sufficient to repay the Company or if the ceding company becomes financially distressed and is unable to make payments under the treaty, the Company may incur losses. A staff of actuaries and accountants track experience for each treaty on a quarterly basis in comparison to models of expected results.

Customer Base

The U.S. and Latin America operations market life reinsurance primarily to the largest U.S. life insurance companies. The treaties underlying this business generally are terminable by either party on 90 days written notice, but only with respect to future new business. Existing business generally is not terminable, unless the underlying policies terminate or are recaptured. In 2018, the five largest clients generated approximately \$1.8 billion or 28.6% of U.S. and Latin America operation's gross premiums. In addition, 47 other clients each generated annual gross premiums of \$20.0 million or more, and the aggregate gross premiums from these clients represented approximately 63.3% of U.S. and Latin America operation's gross premiums. For the purpose of this disclosure, companies that are within the same insurance holding company structure are combined.

Canada Operations

The Company operates in Canada primarily through RGA Canada. RGA Canada employs its own underwriting, actuarial, claims, pricing, accounting, systems, marketing and administrative staff in offices located in Montreal and Toronto.

Traditional Reinsurance

RGA Canada is a leading life reinsurer in Canada, based on new individual life insurance production. It assists clients with capital management and mortality and morbidity risk management and is primarily engaged in individual life reinsurance, and to a lesser extent creditor, group life and health, critical illness and disability reinsurance, through yearly renewable term and coinsurance agreements. Creditor insurance covers the outstanding balance on personal, mortgage or commercial loans in the event of death, disability or critical illness and is generally shorter in duration than individual life insurance.

The business is generally composed of facultative and automatic treaty business. Automatic business is generated pursuant to treaties that generally require the underlying policies to meet the ceding company's underwriting criteria, although in certain cases such policies may be rated substandard. In contrast to facultative reinsurance, reinsurers do not engage in underwriting assessments of each risk assumed through an automatic treaty.

RGA Canada generally requires ceding companies to retain a portion of the business written on an automatic basis, thereby increasing the ceding companies' incentives to underwrite risks with due care and, when appropriate, to contest claims diligently.

Facultative reinsurance involves the assessment of the risks from a medical and financial perspective. RGA Canada is recognized as a leader in facultative reinsurance, and this has served to maintain a strong market share on automatic business.

RGA Canada supports over half the companies active in the living benefits and in the group insurance markets. Solid claims management expertise and innovative product development capabilities support a growing share of these markets.

Financial Solutions

The Canada Financial Solutions segment concentrates on assisting clients with longevity risk transfer structures within underlying annuities and pension benefit obligations, and on assisting clients in meeting applicable regulatory requirements while enhancing their financial strength and regulatory surplus position through financial reinsurance structures.

Customer Base

Clients include most of the life insurers in Canada, although the number of life insurers is much smaller compared to the U.S. In 2018, the five largest clients generated approximately \$644.1 million or 57.8% of Canada operation's gross premiums. In addition, 11 other clients each generated annual gross premiums of \$20.0 million or more, and the aggregate gross premiums from these clients represented approximately 37.9% of Canada operation's gross premiums. For the purpose of this disclosure, companies that are within the same insurance holding company structure are combined.

Europe, Middle East and Africa Operations

The Europe, Middle East and Africa ("EMEA") operations serve clients from subsidiaries, licensed branch offices and/or representative offices primarily located in France, Germany, Ireland, Italy, the Middle East, the Netherlands, Poland, South Africa, Spain and the UK. EMEA's office in the Middle East is located in the United Arab Emirates ("UAE").

EMEA's operations in the UK, Continental Europe, South Africa and the Middle East employ their own underwriting, actuarial, claims, pricing, accounting, marketing and administration staffs with additional support services provided by the Company's staff in the U.S. and Canada.

Traditional Reinsurance

The principal types of reinsurance for this segment include individual and group life and health, critical illness, disability and underwritten annuities. Traditional reinsurance in the UK, South Africa, Italy and Germany consists predominantly of long term contracts, which are not terminable for existing risk without recapture or natural expiry, whereas in other markets within the region contracts are predominantly short term, renewing annually.

Financial Solutions

The principal types of reinsurance for this segment include longevity, asset-intensive and financial reinsurance. Longevity reinsurance takes the form of closed block annuity reinsurance and longevity swap structures. Asset-intensive business for this segment consists of coinsurance of payout annuities. Financial reinsurance assists ceding companies in meeting applicable regulatory requirements while enhancing their financial strength. These transactions do not qualify as reinsurance under U.S. GAAP, due to low risk nature of transactions and are reported in accordance with deposit accounting guidelines.

Customer Base

In 2018, the five largest clients generated approximately \$838.4 million or 46.9% of EMEA operation's gross premiums. In addition, 18 other clients each generated annual gross premiums of \$20.0 million or more, and the aggregate gross premiums from these clients represented approximately 34.1% of EMEA operation's gross premiums. For the purpose of this disclosure, companies that are within the same insurance holding company structure are combined.

Asia Pacific Operations

The Asia Pacific operations serve clients from subsidiaries, licensed branch offices and/or representative offices in Australia, China, Hong Kong, India, Japan, Malaysia, New Zealand, Singapore, South Korea and Taiwan.

The Asian offices provide full reinsurance services with additional support services provided by the Company's staff in the U.S. and Canada. In addition, a regional team based in Hong Kong has been established in recent years to provide support to the Asian offices to accommodate business growth in the region. RGA Australia employs its own underwriting, actuarial, claims, pricing, accounting, systems, marketing, and administration service with additional support provided by the Company's U.S. and International Division Sydney offices.

Traditional Reinsurance

The principal types of reinsurance for this segment include individual and group life and health, critical illness, disability and superannuation through yearly renewable term and coinsurance agreements. The reinsurance of critical illness coverage provides a benefit in the event of the diagnosis of pre-defined critical illness. Disability reinsurance provides income replacement benefits in the event the policyholder becomes disabled due to accident or illness. Superannuation is the Australian government mandated compulsory retirement savings program. Superannuation funds accumulate retirement funds for employees, and, in addition, typically offer life and disability insurance coverage. Reinsurance agreements may be either facultative or automatic agreements covering primarily individual risks and, in some markets, group risks.

Financial Solutions

The Financial Solutions segment includes financial reinsurance, asset-intensive and certain disability and life blocks. Financial reinsurance assists ceding companies in meeting applicable regulatory requirements while enhancing their financial strength. These transactions do not qualify as reinsurance under GAAP, due to low risk nature of transactions and are reported in accordance with deposit accounting guidelines. Asset-intensive business for this segment primarily concentrates on the investment risk within underlying annuities and life insurance policies. These reinsurance agreements are mostly structured to take on investment risk such that the Company recognizes profits or losses primarily from the spread between the investment earnings and the interest credited on the underlying annuity contract liabilities.

Customer Base

In 2018, the five largest clients generated approximately \$1,074.4 million or 45.8% of Asia Pacific operation's gross premiums. In addition, 18 other clients each generated annual gross premiums of \$20.0 million or more, and the aggregate gross premiums from these clients represented approximately 35.8% of Asia Pacific operation's gross premiums. For the purpose of this disclosure, companies that are within the same insurance holding company structure are combined.

Corporate and Other

Corporate and Other revenues primarily include investment income from unallocated invested assets, investment related gains and losses and service fees. Corporate and Other expenses consist of the offset to capital charges allocated to the operating segments within the policy acquisition costs and other insurance income line item, unallocated overhead and executive costs, interest expense related to debt, and the investment income and expense associated with the Company's collateral finance and securitization transactions and service business expenses. Additionally, Corporate and Other includes results from certain wholly-owned subsidiaries, such as RGAX, and joint ventures that, among other activities, develop and market technology, and provide consulting and outsourcing solutions for the insurance and reinsurance industries. In the past two years, the Company has increased its investment and expenditures in this area in an effort to both support its clients and generate new future revenue streams.

D. Financial Information About Foreign Operations

The Company's foreign operations are primarily in Canada, the Asia Pacific region, Europe, and South Africa. Revenue, income (loss) before income taxes, which include investment related gains (losses), interest expense, depreciation and amortization, and identifiable assets attributable to these geographic regions are identified in Note 15 – "Segment Information" in the Notes to Consolidated Financial Statements. Although there are risks inherent to foreign operations, such as currency fluctuations and restrictions on the movement of funds, as described in Item 1A – "Risk Factors", the Company's financial position and results of operations have not been materially adversely affected thereby to date.

E. Available Information

Copies of the Company's Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and amendments to those reports are available free of charge through the Company's website (www.rgare.com) as soon as reasonably practicable after the Company electronically files such reports with the Securities and Exchange Commission (www.sec.gov). Information provided on such websites does not constitute part of this Annual Report on Form 10-K.

Item 1A. RISK FACTORS

In the Risk Factors below, we refer to the Company as “we,” “us,” or “our.” Investing in our securities involves certain risks. Any of the following risks could materially adversely affect our business, financial condition or results of operations. These risks are not exclusive, and additional risks to which we are subject include, but are not limited to, the factors mentioned under “Cautionary Note Regarding Forward-Looking Statements” in Item 7 below and the risks of our businesses described elsewhere in this Annual Report on Form 10-K. Many of these risks are interrelated and occur under similar business and economic conditions, and the occurrence of certain of them may in turn cause the emergence, or exacerbate the effect, of others. Such a combination could materially increase the severity of the impact on our business, liquidity, financial condition and results of operations.

Risks Related to Our Business

We make assumptions when pricing our products relating to mortality, morbidity, lapsation, investment returns and expenses, and significant deviations in experience could negatively affect our financial condition and results of operations.

Our life reinsurance contracts expose us to mortality risk, which is the risk that the level of death claims may differ from that which we assumed in pricing our reinsurance contracts. Some of our annuity and pension reinsurance contracts expose us to longevity risk, which is the risk that the length of time we pay annuity or pension benefits may exceed that which we assumed in pricing our reinsurance contracts. Some of our reinsurance contracts expose us to morbidity risk, which is the risk that the claims we pay if an insured person becomes critically ill or disabled differ from that which we assumed in pricing our reinsurance contracts. Our risk analysis and underwriting processes are designed with the objective of controlling the quality of the business and establishing appropriate pricing for the risks we assume. Among other things, these processes rely heavily on our underwriting, our analysis of mortality, longevity and morbidity trends, lapse rates, expenses and our understanding of medical impairments and their effect on mortality, longevity or morbidity.

We expect mortality, longevity, morbidity and lapse experience to fluctuate somewhat from period to period, but believe they should remain reasonably predictable over a period of many years. Mortality, longevity, morbidity or lapse experience that is less favorable than the rates that we used in pricing a reinsurance agreement may cause our net income to be less than otherwise expected because the premiums we receive for the risks we assume may not be sufficient to cover the claims and profit margin. Furthermore, even if the total benefits paid over the life of the contract do not exceed the expected amount, unexpected increases in the incidence of deaths or illness can cause us to pay more benefits in a given reporting period than expected, adversely affecting our net income in any particular reporting period. Likewise, adverse experience could impair our ability to offset certain unamortized deferred acquisition costs and adversely affect our net income in any particular reporting period. We perform annual tests to establish that deferred policy acquisition costs remain recoverable at all times. These tests require us to make a significant number of assumptions. If our financial performance significantly deteriorates to the point where a premium deficiency exists, a cumulative charge to current operations will be recorded, which may adversely affect our net income in a particular reporting period.

We regularly review our reserves and associated assumptions as part of our ongoing assessment of our business performance and risks. If we conclude that our reserves are insufficient to cover actual or expected policy and contract benefits and claim payments as a result of changes in experience, assumptions or otherwise, we would be required to increase our reserves and incur charges in the period in which we make the determination. The amounts of such increases may be significant and this could materially adversely affect our financial condition and results of operations and may require us to generate or fund additional capital in our businesses.

Our financial condition and results of operations may also be adversely affected if our actual investment returns and expenses differ from our pricing and reserve assumptions. Changes in economic conditions may lead to changes in market interest rates or changes in our investment strategies, either of which could cause our actual investment returns and expenses to differ from our pricing and reserve assumptions.

Changes in accounting standards may adversely affect our reported results of operations and financial condition.

The Company’s consolidated financial statements are prepared in conformity with GAAP. If we are required to adopt revised accounting standards in the future, it may adversely affect our reported results of operations and financial condition. For a discussion of the impact of accounting pronouncements issued but not yet implemented, see Item 8. “Financial Statements and Supplementary Data - Notes to Consolidated Financial Statements - Note 2 *Significant Accounting Policies and Pronouncements*”. In August 2018, the Financial Accounting Standards Board issued guidance that will significantly change the accounting for long-duration insurance contracts. This guidance will become effective for the Company on January 1, 2021. We are still evaluating the impact this guidance will have on our consolidated financial statements, but it could negatively impact our reported profitability, financial position and financial ratios. In addition, the required adoption of new accounting standards may result in significant incremental costs associated with initial implementation and ongoing compliance.

Our reinsurance subsidiaries are highly regulated, and changes in these regulations could negatively affect our business.

Our reinsurance subsidiaries are subject to government regulation in each of the jurisdictions in which they are licensed or authorized to do business. Governmental agencies have broad administrative power to regulate many aspects of the reinsurance business, which may include reinsurance terms and capital adequacy. These agencies are concerned primarily with the protection of policyholders and their direct insurers rather than shareholders or holders of debt securities of reinsurance companies. Moreover, insurance laws and regulations, among other things, establish minimum capital requirements and limit the amount of dividends, tax distributions and other payments our reinsurance subsidiaries can make without prior regulatory approval, and impose restrictions on the amount and type of investments we may hold. The MDOI, our insurance group supervisor, also regulates our reinsurance subsidiaries as members of an insurance holding company system. The regulation of our reinsurance subsidiaries in this way necessitates restrictions upon RGA as the ultimate parent of these entities.

Over the past several years, insurance regulators have increased their scrutiny of insurance holding company systems both within and outside of the U.S. During 2018, the Company first met the criteria necessary to be identified as an “Internationally Active Insurance Group.” While the full impact of this designation has yet to be determined by regulators, it is clear that one aspect of such designation will be the continued emphasis of the supervisory college in which insurance regulators who are charged with supervising the solvency of one or more of the Company’s insurance subsidiaries meet and discuss the Company’s operations and solvency as a group. These efforts are coordinated and led by the MDOI as group supervisor, but involve input from all insurance regulators that directly supervise the Company’s significant reinsurance subsidiaries. Much of the additional scrutiny under insurance holding company regulatory acts and designation as an International Active Insurance Group is on activities of the insurance company’s entire group, which includes the group’s parent company and any non-insurance subsidiaries. While the laws have not extended direct regulation to RGA and its non-insurance subsidiaries, the manner in which the insurance regulators regulate our reinsurance subsidiaries may influence the activities of all other entities within the Company. Insurance holding company system regulatory acts in the U.S. now provide for an expanded supervision of insurance groups operating in the U.S., including a review of enterprise risk management programs as well as expanded review of agreements between licensed insurers and their group members. Missouri, Arizona and California have each adopted these new standards as law.

The IAIS is in the process of developing the Common Framework for Supervision of Internationally Active Insurance Groups, or “ComFrame.” It is possible that ComFrame could lead to enhanced supervision of and higher capital standards for the Company on a global basis if the IAIS, the NAIC and the U.S. states adopt the proposed provisions or provisions similar to those proposed. While it is not yet known how or the extent to which these measures will impact us, such measures could result in increased costs of compliance, additional disclosure and less flexibility in capital management, which could adversely impact our business and results of operations. Additionally, the NAIC is developing a group capital calculation to be used as an analytical tool applied to U.S.-based insurance groups. The group capital calculation would be used in addition to the risk-based capital requirement that is applied on a legal entity level basis in the U.S. The group capital calculation has the potential to increase the amount of capital that an insurer or reinsurer is required to have and could result in the Company being subject to increased regulatory requirements.

At the U.S. federal level, the Dodd-Frank Wall Street Reform and Consumer Protection Act established a Financial Stability Oversight Council to identify financial institutions, including insurers and reinsurers, which are systemically important to the U.S. financial system. From time to time, one or more of our client insurance companies may be designated systemically important. Such designations could impact us through additional scrutiny of the client’s reinsurance programs with us, including a consideration of the volume of business ceded by the insurer to us. We do not currently anticipate that the Financial Stability Oversight Council will find RGA or any of our U.S. subsidiaries to be systemically important, but such a finding could ultimately subject the identified entity to additional capital requirements based on business levels and asset mix and other supervision. Such additional scrutiny might also impact our ability to pay dividends. Moreover, more stringent restrictions may be adopted from time to time in other jurisdictions in which our reinsurance subsidiaries are domiciled, which could, under certain circumstances, significantly reduce or restrict dividends or other amounts payable to us by our subsidiaries unless they obtain approval from insurance regulatory authorities. We cannot predict the effect that any recommendations of the NAIC or proposed or future legislation or rule-making in the U.S. or elsewhere may have on our business, financial condition or results of operations.

We operate in many jurisdictions around the world and a substantial portion of our operations occur outside of the United States. These international businesses are subject to the insurance, tax and other laws and regulations in the countries in which they are organized and in which they operate. These laws and regulations may apply heightened scrutiny to non-domestic companies, which can adversely affect our operations, liquidity, profitability and regulatory capital. Foreign governments and regulatory bodies from time to time consider legislation and regulations that could subject us to new or different requirements and such changes could negatively impact our operations in the relevant jurisdictions. Certain of our subsidiaries are subject to the Solvency II measures developed by the European Insurance and Occupational Pensions Authority and are required to abide by the evolving risk management practices, capital standards and disclosure requirements of the Solvency II framework. We may also be subject to similar solvency regulations in other regions, such as Bermuda and China, where influences of the Solvency II - type framework are already present in the insurance regulation, and Japan. See “Regulation - International Regulation” in Item 1, Business. There can be no assurance at this time that Solvency II and such similar solvency regulations will not result in broader consequences to

the Company or negatively impact our business, financial condition or results of operations. We also expect to adopt new International Financial Reporting Standards for insurance contracts in many jurisdictions in which our subsidiaries operate effective in 2022. While we expect the adoption of these standards to create implementation demands, we are still evaluating the new requirements and it is unclear what impact there will be in the financial positions of the affected subsidiaries.

A downgrade in our ratings or in the ratings of our reinsurance subsidiaries could adversely affect our ability to compete.

Our financial strength and credit ratings are important factors in our competitive position. Rating organizations periodically review the financial performance and condition of insurers, including our reinsurance subsidiaries. These ratings are based on an insurance company's ability to pay its obligations and are not directed toward the protection of investors. Rating organizations assign ratings based upon several factors. While most of the factors considered relate to the rated company, some of the factors relate to general economic conditions and circumstances outside the rated company's control. The various rating agencies periodically review and evaluate our capital adequacy in accordance with their established guidelines and capital models. In order to maintain our existing ratings, we may commit from time to time to manage our capital at levels commensurate with such guidelines and models. If our capital levels are insufficient to fulfill any such commitments, we could be required to reduce our risk profile by, for example, retroceding some of our business or by raising additional capital by issuing debt, hybrid or equity securities. Any such actions could have a material adverse impact on our earnings or materially dilute our shareholders' equity ownership interests.

Any downgrade in the ratings of our reinsurance subsidiaries could adversely affect their ability to sell products, retain existing business, and compete for attractive acquisition opportunities. The ability of our subsidiaries to write reinsurance partially depends on their financial condition and is influenced by their ratings. Ratings are subject to revision or withdrawal at any time by the assigning rating organization. A rating is not a recommendation to buy, sell or hold securities, and each rating should be evaluated independently of any other rating.

We believe that the rating agencies consider the financial strength and flexibility of a parent company and its consolidated operations when assigning a rating to a particular subsidiary of that company. A downgrade in the rating or outlook of RGA, among other factors, could adversely affect our ability to raise and then contribute capital to our subsidiaries for the purpose of facilitating their operations and growth. A downgrade could also increase our own cost of capital. For example, the facility fee and interest rate for our syndicated revolving credit facility are based on our senior long-term debt ratings. A decrease in those ratings could result in an increase in costs for that credit facility and others. Also, if there is a downgrade in the rating of RGA, or any of our rated subsidiaries, some of our reinsurance contracts would either permit our client ceding insurers to terminate such reinsurance contracts or require us to post collateral to secure our obligations under these reinsurance contracts. Accordingly, we believe a ratings downgrade of RGA, or any of our rated subsidiaries, could have a negative effect on our ability to conduct business.

We cannot assure you that actions taken by ratings agencies would not result in a material adverse effect on our business, financial condition or results of operations. In addition, it is unclear what effect, if any, a ratings change would have on the price of our securities in the secondary market.

The availability and cost of collateral, including letters of credit, asset trusts and other credit facilities, as well as regulatory changes relating to the use of captive insurance companies, could adversely affect our business, financial condition or results of operations.

Regulatory reserve requirements in various jurisdictions in which we operate may be significantly higher than the reserves required under GAAP. Accordingly, we reinsure, or retrocede, business to affiliated and unaffiliated reinsurers to reduce the amount of regulatory reserves and capital we are required to hold in certain jurisdictions.

A regulation in the U.S., commonly referred to as Regulation XXX, requires a relatively high level of regulatory, or statutory, reserves that U.S. life insurance and life reinsurance companies must hold on their statutory financial statements for various types of life insurance business, primarily certain level term life products. The reserve levels required under Regulation XXX increase over time and are normally in excess of reserves required under GAAP. The degree to which these reserves will increase and the ultimate level of reserves will depend upon the mix of our business and future production levels in the U.S. Based on the assumed rate of growth in our current business plan, and the increasing level of regulatory reserves associated with some of this business, we expect the amount of our required regulatory reserves to grow significantly.

In order to reduce the effect of Regulation XXX, our principal U.S. operating subsidiary, RGA Reinsurance Company, has retroceded Regulation XXX-related reserves to affiliated and unaffiliated reinsurers, including affiliated insurers governed by captive insurance laws. Additionally, some of our reinsurance subsidiaries in foreign jurisdictions enter into various reinsurance arrangements with affiliated and unaffiliated reinsurers from time to time in order to reduce statutory capital and reserve requirements.

During 2013 and 2014, U.S. state insurance regulators reviewed the life insurance industries' use of affiliated captive reinsurers to satisfy certain reserve requirements. As a result of this review, measures were adopted and implemented in 2015 to promote uniformity in both the approval and supervision of such reinsurers. These standards allow current captives to continue in accordance with their previously approved plans, but place restrictions on the use of such captive reinsurers for new programs making them less effective than previous captive programs. As a result, captive reinsurance has become less a part of our reserve growth financing than earlier. It is also possible that additional restrictions could be introduced and this could further limit our ability to reinsure certain products, maintain risk based capital ratios and deploy excess capital. As a result, we may need to alter the type and volume of business we reinsure, increase prices on those products, raise additional capital to support higher regulatory reserves or implement higher cost strategies, all of which could adversely impact our competitive position and our financial condition and results of operations. We cannot estimate the impact of discontinuing or altering our captive strategy in response to potential regulatory changes due to many unknown variables such as the cost and availability of alternative capital, potential changes in regulatory reserve requirements under a principle-based reserving approach, changes in acceptable collateral for statutory reserves, the potential introduction of the concept of a "certified reinsurer" in the laws and regulations of certain jurisdictions where we operate, the potential for increased pricing of products offered by us and the potential change in the mix of products sold or offered by us or our clients.

Recently, the U.S. and the European Union negotiated a covered agreement under the authority provided in the Dodd-Frank Wall Street Reform and Consumer Protection Act. The covered agreement is a bilateral trade agreement under which both the U.S. and the member countries of the European Union agreed to eliminate collateral for reinsurance cessions from insurers domiciled in their home jurisdiction to reinsurers domiciled in the foreign jurisdiction, accept each other's regulators as the group supervisor and rely on the group capital calculation at use in the insurer's/reinsurer's home jurisdiction. It is unclear as to how the U.S. regulators will implement the terms of the covered agreement, but it is possible that the certified reinsurer concept could be altered or eliminated in U.S. reinsurance reserve credit regulation. Such alteration or elimination may impact the cost or the availability of alternative capital, which may or may not be offset by the reduction in collateral that may ultimately result from the covered agreement.

As a general matter, for us to reduce regulatory reserves on business that we retrocede, the affiliated or unaffiliated reinsurer must provide an equal amount of regulatory-compliant collateral. Such collateral may be provided in the form of a letter of credit from a commercial bank, through the placement of assets in trust for our benefit, or through a capital markets securitization.

In connection with these reserve requirements, we face the following risks:

- The availability of collateral and the related cost of such collateral in the future could affect the type and volume of business we reinsure and could increase our costs.
- We may need to raise additional capital to support higher regulatory reserves, which could increase our overall cost of capital.
- If we, or our retrocessionaires, are unable to obtain or provide sufficient collateral to support our statutory ceded reserves, we may be required to increase regulatory reserves. In turn, this reserve increase could significantly reduce our statutory capital levels and adversely affect our ability to satisfy required regulatory capital levels, unless we are able to raise additional capital to contribute to our operating subsidiaries.
- Because term life insurance is a particularly price-sensitive product, any increase in insurance premiums charged on these products by life insurance companies, in order to compensate them for the increased statutory reserve requirements or higher costs of insurance they face, may result in a significant loss of volume in their life insurance operations, which could, in turn, adversely affect our life reinsurance operations.

We cannot assure you that we will be able to implement actions to mitigate the effect of increasing regulatory reserve requirements.

In addition, we maintain credit and letter of credit facilities with various financial institutions as a potential source of collateral and excess liquidity. Our ability to utilize these facilities is conditioned on our satisfaction of covenants and other requirements contained in the facilities. Our ability to utilize these facilities is also subject to the continued willingness and ability of the lenders to provide funds or issue letters of credit. Our failure to comply with the covenants in these facilities, or the failure of the lenders to meet their commitments, would restrict our ability to access these facilities when needed, adversely affecting our liquidity, financial condition and results of operations.

Changes in the equity markets, interest rates and volatility affect the profitability of variable annuities with guaranteed living benefits that we reinsure, which may have a material adverse effect on our business and profitability.

We reinsure variable annuity products that include guaranteed minimum living benefits. These include guaranteed minimum withdrawal benefits, guaranteed minimum accumulation benefits and guaranteed minimum income benefits. The amount of reserves related to these benefits is based on their fair value and is affected by changes in equity markets, interest rates and volatility. Accordingly, strong equity markets, increases in interest rates and decreases in volatility will generally decrease the fair value of the liabilities underlying the benefits.

Conversely, a decrease in the equity markets along with a decrease in interest rates and an increase in volatility will generally result in an increase in the fair value of the liabilities underlying the benefits, which increases the amount of reserves that we must carry. Such an increase in reserves would result in a charge to our earnings in the quarter in which we increase our reserves. We maintain a customized dynamic hedge program that is designed to mitigate the risks associated with income volatility around the change in reserves on guaranteed benefits. However, the hedge positions may not be effective to fully offset the changes in the carrying value of the guarantees due to, among other things, the time lag between changes in such values and corresponding changes in the hedge positions, high levels of volatility in the equity and derivatives markets, extreme swings in interest rates, contract holder behavior different than expected, and divergence between the performance of the underlying funds and hedging indices. These factors, individually or collectively, may have a material adverse effect on our liquidity, capital levels, financial condition or results of operations.

RGA is an insurance holding company, and our ability to pay principal, interest and dividends on securities is limited.

RGA is an insurance holding company, with our principal assets consisting of the stock of our reinsurance company subsidiaries, and substantially all of our income is derived from those subsidiaries. Our ability to pay principal and interest on any debt securities or dividends on any preferred or common stock depends, in part, on the ability of our reinsurance company subsidiaries, our principal sources of cash flow, to declare and distribute dividends or advance money to RGA. We are not permitted to pay common stock dividends or make payments of interest or principal on securities that rank equal or junior to our subordinated debentures and junior subordinated debentures, until we pay any accrued and unpaid interest on such debentures. Our reinsurance company subsidiaries are subject to various statutory and regulatory restrictions, applicable to insurance companies generally, that limit the amount of cash dividends, loans and advances that those subsidiaries may pay to us. Covenants contained in certain of our debt agreements also restrict the ability of certain subsidiaries to pay dividends and make other distributions or loans to us. In addition, we cannot assure you that more stringent dividend restrictions will not be adopted, as discussed above under “Our reinsurance subsidiaries are highly regulated, and changes in these regulations could negatively affect our business.”

As a result of our insurance holding company structure, upon the insolvency, liquidation, reorganization, dissolution or other winding-up of one of our reinsurance subsidiaries, all creditors of that subsidiary would be entitled to payment in full out of the assets of such subsidiary before we, as shareholder, would be entitled to any payment. Our subsidiaries would have to pay their direct creditors in full before our creditors, including holders of common stock, preferred stock or debt securities of RGA, could receive any payment from the assets of such subsidiaries.

We are exposed to foreign currency risk.

We are a multi-national company with operations in numerous countries and, as a result, are exposed to foreign currency risk to the extent that exchange rates of foreign currencies are subject to adverse change over time. The U.S. dollar value of our net investments in foreign operations, our foreign currency transaction settlements and the periodic conversion of the foreign-denominated earnings to U.S. dollars (our reporting currency) are each subject to adverse foreign exchange rate movements. A significant portion of our revenues and our fixed maturity securities available for sale are denominated in currencies other than the U.S. dollar. We use foreign-denominated revenues and investments to fund foreign-denominated expenses and liabilities when possible to mitigate exposure to foreign currency fluctuations.

Our international operations involve inherent risks.

A significant portion of our net premiums come from our operations outside of the U.S. One of our strategies is to grow these international operations. International operations subject us to various inherent risks. In addition to the regulatory and foreign currency risks identified above, other risks include the following:

- managing the growth of these operations effectively, particularly given the recent rates of growth;
- changes in mortality and morbidity experience and the supply and demand for our products that are specific to these markets and that may be difficult to anticipate;
- political and economic instability in the regions of the world, and the potential for deteriorating economic and political relationships between the countries, where we operate;
- uncertainty arising out of foreign government sovereignty over our international operations;

- potentially uncertain or adverse tax consequences, including the repatriation of earnings from our non-U.S. subsidiaries; and
- potential reduction in opportunities resulting from market access restrictions.

Some of our international operations are in emerging markets where these risks are heightened and we anticipate that we will continue to do business in such markets. Our pricing assumptions may be less predictable in emerging markets, and deviations in actual experience from these assumptions could impact our profitability in these markets. Additionally, lack of legal certainty and stability in the emerging markets exposes us to increased risk of disruption and adverse or unpredictable actions by regulators and may make it more difficult for us to enforce our contracts, which may negatively impact our business.

The vote in 2016 by the UK to exit the European Union (“EU”), or Brexit, has created significant volatility in the global financial markets. However, the eventual effects of the UK’s withdrawal from the EU (if it in fact occurs) on our business or our investment portfolios is uncertain at this time and will depend on agreements the UK makes to retain access to EU markets either during a transitional period or more permanently. It is possible that there will be greater restrictions, requirements and regulatory complexities on reinsurance provided in the UK by entities located outside of the UK, which may adversely affect our business, financial condition or results of operations. Furthermore, Brexit could adversely affect European and worldwide economic conditions and could contribute to greater instability in the global financial markets before and after the terms of the UK’s future relationship with the EU are settled.

We cannot assure you that we will be able to manage the risks associated with our international operations effectively or that they will not have an adverse effect on our business, financial condition or results of operations.

We depend on the performance of others, and their failure to perform in a satisfactory manner would negatively affect us.

In the normal course of business, we seek to limit our exposure to losses from our reinsurance contracts by ceding a portion of the reinsurance to other insurance enterprises or retrocessionaires. We cannot assure you that these insurance enterprises or retrocessionaires will be able to fulfill their obligations to us. As of December 31, 2018, the retrocession pool members participating in our excess retention pool that have been reviewed by A.M. Best Company, were rated “A-” or better, except for one pool member that was rated “B+.” A rating of “A-” is the fourth highest rating out of sixteen possible ratings. We are also subject to the risk that our clients will be unable to fulfill their obligations to us under our reinsurance agreements with them.

We rely upon our insurance company clients to provide timely, accurate information. We may experience volatility in our earnings as a result of erroneous or untimely reporting from our clients. We work closely with our clients and monitor their reporting to minimize this risk. We also rely on original underwriting decisions made by our clients. We cannot assure you that these processes or those of our clients will adequately control business quality or establish appropriate pricing.

For some reinsurance agreements, the ceding company withholds and legally owns and manages assets equal to the net statutory reserves, and we reflect these assets as funds withheld at interest on our balance sheet. If a ceding company was to become insolvent, we would need to assert a claim on the assets supporting our reserve liabilities. We attempt to mitigate our risk of loss by offsetting amounts for claims or allowances that we owe the ceding company with amounts that the ceding company owes to us. We are subject to the investment performance on the withheld assets, although we do not directly control them. We help to set, and monitor compliance with, the investment guidelines followed by these ceding companies. However, to the extent that such investment guidelines are not appropriate, or to the extent that the ceding companies do not adhere to such guidelines, our risk of loss could increase, which could materially adversely affect our financial condition and results of operations. For additional information on funds withheld at interest, see “Investments-Funds Withheld at Interest” in Management’s Discussion and Analysis of Financial Condition and Results of Operations.

We use the services of third-parties such as asset managers, software vendors and administrators to perform various functions that are important to our business. For instance, we have engaged third party investment managers to manage certain assets where our investment management expertise is limited, who we rely on to provide investment advice and execute investment transactions that are within our investment policy guidelines. Our third party service providers rely on their computer systems and their ability to maintain the security, confidentiality, integrity and privacy of those systems and the data residing on such systems. Our service providers may be subject to cybersecurity attacks and may not sufficiently protect their information technology and related data, which may impact their ability to provide us services and protect our data, which may subject us to losses and harm our reputation. Poor performance on the part of these outside vendors could negatively affect our operations and financial performance.

As with all financial services companies, our ability to conduct business depends on consumer confidence in the industry and our financial strength. Actions of competitors, and financial difficulties of other companies in the industry, and related adverse publicity, could undermine consumer confidence and harm our reputation and business.

Epidemics and pandemics, natural and man-made disasters, catastrophes and events, including terrorist attacks, could adversely affect our business, financial condition and results of operations.

Epidemics and pandemics, as well as natural disasters, climate change and terrorist attacks and other catastrophes and events can adversely affect our business, financial condition and results of operations because they exacerbate mortality and morbidity risk. The likelihood, timing, and severity of these events cannot be predicted. A pandemic or other disaster could have a major impact on the global economy or the economies of particular countries or regions, including travel, trade, tourism, the health system, food supply, consumption, overall economic output, as well as on the financial markets. In addition, a pandemic or other disaster that affected our employees or the employees of companies with which we do business could disrupt our business operations. The effectiveness of external parties, including governmental and non-governmental organizations, in combating the spread and severity of such an event could have a material impact on the losses we experience. These events could cause a material adverse effect on our results of operations in any period and, depending on their severity, could also materially and adversely affect our financial condition.

Additionally, the impact of an increase in global average temperatures could cause changes in weather patterns, resulting in more severe and more frequent natural disasters such as forest fires, hurricanes, tornadoes, floods and storm surges and may impact disease incidence and severity, food and water supplies and the general health of impacted populations. These climate change trends are expected to continue in the future and may impact nearly all sectors of the economy to varying degrees. We cannot predict the long-term impacts of climate change for the Company and our clients, but such events may adversely impact our mortality and morbidity rates and also may impact asset prices, financial markets and general economic conditions.

We believe our reinsurance programs are sufficient to reasonably limit our net losses for individual life claims relating to potential future natural disasters and terrorist attacks under some circumstances. However, the consequences of natural disasters, climate change, terrorist attacks, armed conflicts, epidemics and pandemics are unpredictable, and we may not be able to foresee events that could have an adverse effect on our business.

We operate in a highly competitive and dynamic industry.

The reinsurance industry is highly competitive, and we encounter significant competition in all lines of business from other reinsurance companies, as well as competition from other providers of financial services. Our competitors vary by geographic market, and many of our competitors have greater financial resources than we do. Our ability to compete depends on, among other things, pricing and other terms and conditions of reinsurance agreements, our ability to maintain strong financial strength ratings from rating agencies, and our service and experience in the types of business that we underwrite. Competition from other reinsurers could adversely affect our competitive position.

We compete based on the strength of our underwriting operations, insights on mortality trends based on our large book of business, our ability to efficiently execute transactions, our client relationships and responsive service. We believe our quick response time to client requests for individual underwriting quotes, our underwriting expertise and our ability to structure solutions to meet clients' needs are important elements to our strategy and lead to other business opportunities with our clients. Our business will be adversely affected if we are unable to maintain these competitive advantages.

The insurance and reinsurance industries are subject to ongoing changes from market pressures brought about by customer demands, changes in law, changes in economic conditions such as interest rates and investment performance, technological innovation, marketing practices and new providers of insurance and reinsurance solutions. Because of these and other factors, we are required to anticipate market trends and make changes to differentiate our products and services from those of our competitors. Failure to anticipate these market trends or to differentiate our products and services may affect our ability to grow or to maintain our current position in the industry. A failure to meet evolving consumer demands by the insurance industry and us through innovative product development, effective distribution channels and investments in technology could adversely affect the insurance industry and our operating results. Similarly, our failure to meet the changing demands of our insurance company clients could negatively impact our financial performance. Additionally, our failure to adjust our strategies in response to changing economic conditions could impact our competitive position and have a material adverse effect on our business, financial condition and results of operations.

Tax law changes or a prolonged economic downturn could reduce the demand for insurance products, which could adversely affect our business.

Under the U.S. Internal Revenue Code, income tax payable by policyholders on investment earnings is deferred during the accumulation period of some life insurance and annuity products. To the extent that the U.S. Internal Revenue Code is revised to reduce benefits associated with the tax-deferred status of life insurance and annuity products, or to increase the tax-deferred status of competing products, all life insurance companies would be adversely affected with respect to their ability to sell such products, and, depending on grandfathering provisions, by the surrenders of existing annuity contracts and life insurance policies. In addition, life insurance products are often used to fund estate tax obligations. The estate tax provisions of the U.S. Internal Revenue Code have been revised frequently in the past. If Congress adopts legislation in the future to reduce or eliminate the

estate tax, our U.S. life insurance company customers could face reduced demand for some of their life insurance products, which in turn could negatively affect our reinsurance business. We cannot predict whether any tax legislation impacting corporate taxes or insurance products will be enacted, what the specific terms of any such legislation will be or whether any such legislation would have a material adverse effect on our business, financial condition and results of operations.

A general economic downturn or a downturn in the capital markets could adversely affect the market for many life insurance and annuity products. Factors such as consumer spending, business investment, government spending, the volatility and strength of the capital markets, deflation and inflation affect the economic environment and thus the profitability of our business. An economic downturn may yield higher unemployment and lower family income, corporate earnings, business investment and consumer spending, and could result in decreased demand for life insurance and annuity products. Because we obtain substantially all of our revenues through reinsurance arrangements that cover a portfolio of life insurance products and annuities, our business would be harmed if the market for annuities or life insurance was adversely affected. Therefore, adverse changes in the economy could adversely affect our business, financial condition and results of operations.

We could be subject to additional income tax liabilities.

We are subject to income taxes in the U.S. and numerous foreign jurisdictions. Tax laws, regulations and administrative practices in various jurisdictions may be subject to significant change, with or without notice, due to economic, political and other conditions, and significant judgment is required in evaluating and estimating our provision and accruals for these taxes. The U.S. recently enacted tax reform legislation commonly referred to as the U.S. Tax Cuts and Jobs Act of 2017 (“U.S. Tax Reform”), which among other things, includes changes to U.S. federal tax rates, imposes significant additional limitations on the deductibility of interest and net operating losses, allows for the expensing of certain capital expenditures and implements a number of changes impacting operations outside of the U.S. including, but not limited to, imposing a one-time tax on accumulated post-1986 deferred foreign income that has not previously been subject to tax, modifying the treatment of certain intercompany transactions that are viewed as eroding the U.S. tax base and imposing a minimum tax on overseas operations that operate in low tax jurisdictions.

In addition, a number of countries are actively pursuing changes to their tax laws applicable to multinational corporations. Foreign governments may enact tax laws in response to U.S. Tax Reform that could result in further changes to global taxation and materially affect our financial position and results of operations.

Our ability to minimize additional tax payments by restructuring various aspects of our business operations may be hindered by uncertainty regarding U.S. Tax Reform, other new tax laws and future guidance issued by the U.S. Treasury Department, foreign taxing authorities or insurance regulators. For instance, the U.S. Treasury Department, the IRS, and other standard-setting bodies could interpret or issue guidance on how U.S. Tax Reform will be applied that is different from our interpretations. We continue to examine the impact that U.S. Tax Reform and other tax legislation may have on our business. The impact of such tax legislation on our financial position and operations is uncertain and could be adverse.

Acquisitions and significant transactions involve varying degrees of risk that could affect our profitability.

We have made, and may in the future make, acquisitions, either of selected blocks of business or other companies. The success of these acquisitions depends on, among other factors, our ability to appropriately price and evaluate the risks of the acquired business. Additionally, acquisitions may expose us to operational challenges and various risks, including:

- the ability to integrate the acquired business operations and data with our systems;
- the availability of funding sufficient to meet increased capital needs;
- the ability to fund cash flow shortages that may occur if anticipated revenues are not realized or are delayed, whether by general economic or market conditions or unforeseen internal difficulties; and
- the possibility that the value of investments acquired in an acquisition may be lower than expected or may diminish due to credit defaults or changes in interest rates and that liabilities assumed may be greater than expected (due to, among other factors, less favorable than expected mortality or morbidity experience).

A failure to successfully manage the operational challenges and risks associated with or resulting from significant transactions, including acquisitions, could adversely affect our business, financial condition or results of operations.

Our risk management policies and procedures could leave us exposed to unidentified or unanticipated risk, which could negatively affect our business, financial condition or results of operations.

Our risk management policies and procedures, designed to identify, monitor and manage both internal and external risks, may not adequately predict future exposures, which could be significantly greater than expected. In addition, these identified risks may not be the only risks facing us. Additional risks and uncertainties not currently known to us, or that we currently deem to be immaterial, may adversely affect our business, financial condition or results of operations.

There are inherent limitations to risk management strategies because there may exist, or develop in the future, risks that we have not appropriately anticipated or identified. If our risk management framework proves ineffective, we may suffer unexpected losses and could be materially adversely affected. As our businesses change and the markets in which we operate evolve, our risk management framework may not evolve at the same pace as those changes. As a result, there is a risk that new business strategies may present risks that are not appropriately identified, monitored or managed. In times of market stress, unanticipated market movements or unanticipated claims experience resulting from adverse mortality, morbidity or policyholder behavior, the effectiveness of our risk management strategies may be limited, resulting in losses. In addition, under difficult or less liquid market conditions, our risk management strategies may not be effective because other market participants may be using the same or similar strategies to manage risk under the same challenging market conditions. In such circumstances, it may be difficult or more expensive for us to mitigate risk due to the activity of such other market participants.

Past or future misconduct by our employees or employees of our vendors could result in violations of law by us, regulatory sanctions and serious reputational or financial harm and the precautions we take to prevent and detect this activity may not be effective in all cases. There can be no assurance that controls and procedures that we employ, which are designed to monitor associates' business decisions and prevent us from taking excessive or inappropriate risks, will be effective. We review our compensation policies and practices as part of our overall risk management program, but it is possible that our compensation policies and practices could inadvertently incentivize excessive or inappropriate risk taking. If our associates take excessive or inappropriate risks, those risks could harm our reputation and have a material adverse effect on our results of operations or financial condition.

The failure in cyber or other information security systems, including a failure to maintain the security, confidentiality, integrity or privacy of sensitive data residing on such systems, as well as the occurrence of unanticipated events affecting our disaster recovery systems and business continuity planning, could impair our ability to conduct business effectively.

Our business is highly dependent upon the effective operation of our computer systems. The failure of our computer systems or disaster recovery capabilities for any reason could cause significant interruptions in our operations and result in a failure to maintain the security, confidentiality, integrity or privacy of sensitive or personal data, related to our customers, insured individuals or employees. Like other global companies, we have experienced threats to our data and systems from time to time. However, we have not detected or identified any evidence to indicate we have experienced a material breach of cybersecurity. Administrative and technical controls, security measures and other preventative actions we take to reduce the risk of such incidents and protect our information technology may not be sufficient to prevent physical and electronic break-ins, and similar disruptions from unauthorized tampering with our computer systems. Such a failure could harm our reputation, subject us to investigations, litigation, regulatory sanctions and other claims and expenses, lead to loss of customers and revenues and otherwise adversely affect our business, financial condition or results of operations.

We rely on our computer systems for a variety of business functions across our global operations, including for the administration of our business, underwriting, claims, performing actuarial analysis and maintaining financial records. We depend heavily upon these computer systems to provide reliable service, data and reports. Upon a disaster such as a natural catastrophe, epidemic, industrial accident, blackout, computer virus, terrorist attack or war, unanticipated problems with our disaster recovery systems could have a material adverse impact on our ability to conduct business and on our financial condition and results of operations, particularly if those problems affect our computer-based data processing, transmission, storage and retrieval systems and destroy valuable data. While we maintain liability insurance for cybersecurity and network interruption losses, our insurance may not be sufficient to protect us against all losses. In addition, if a significant number of our managers were unavailable upon a disaster, our ability to effectively conduct business could be severely compromised. These interruptions also may interfere with our clients' ability to provide data and other information to us, and our employees' ability to perform their job responsibilities.

Failure to protect the confidentiality of information could adversely affect our reputation and have a material adverse effect on our business, financial condition and results of operations.

Many jurisdictions in which we operate have enacted laws to safeguard the privacy and security of personal information. Additionally, various government agencies have established rules protecting the privacy and security of such information. These laws and rules vary greatly by jurisdiction. Some of our employees have access to personal information of policy holders. We rely on internal controls to protect the confidentiality of this information. It is possible that an employee could, intentionally or unintentionally, disclose or misappropriate confidential information or our data could be the subject of a cybersecurity attack. If we fail to maintain adequate internal controls or if our employees fail to comply with our policies, misappropriation or intentional or unintentional inappropriate disclosure or misuse of client information could occur. Such internal control inadequacies or non-compliance could materially damage our reputation or lead to civil or criminal penalties, which, in turn, could have a material adverse effect on our business, financial condition and results of operations. In addition, we analyze customer data to better manage our business. There has been increased scrutiny, including from U.S. state regulators, regarding the use of "big data" techniques. We cannot predict what, if any, actions may be taken with regard to "big data," but any inquiries could cause reputational harm and any limitations could have a material impact on our business, financial condition and results of operations.

Managing key employee attraction, retention and succession is critical to our success.

Our success depends in large part upon our ability to identify, hire, retain and motivate highly skilled employees. We would be adversely affected if we fail to adequately plan for the succession of our senior management and other key employees. While we have succession plans and long-term compensation plans designed to retain our existing employees and attract and retain additional qualified personnel in the future, our succession plans may not operate effectively and our compensation plans cannot guarantee that the services of these employees will continue to be available to us.

Risks Related to Our Investments**Adverse capital and credit market conditions and access to credit facilities may significantly affect our ability to meet liquidity needs, access to capital and cost of capital.**

The capital and credit markets experience varying degrees of volatility and disruption. In some periods, the markets have exerted downward pressure on availability of liquidity and credit capacity for certain issuers.

We need liquidity to make our benefit payments, pay our operating expenses, interest on our debt and dividends on our capital stock and to replace certain maturing liabilities. Without sufficient liquidity, we will be forced to curtail our operations, and our business will be adversely affected. The principal sources of our liquidity are reinsurance premiums under reinsurance treaties and cash flows from our investment portfolio and other assets. Sources of liquidity in normal markets also include proceeds from the issuance of a variety of short- and long-term instruments, including medium- and long-term debt, subordinated and junior subordinated debt securities, capital securities and common stock.

If current resources do not satisfy our needs, we may have to seek additional financing. The availability of additional financing will depend on a variety of factors such as market conditions, the general availability of equity and credit, the volume of trading activities, the overall availability of credit to the financial services industry, our credit ratings and credit capacity, as well as the possibility that customers or lenders could develop a negative perception of our long- or short-term financial prospects. Similarly, our access to funds may be impaired if regulatory authorities or rating agencies take negative actions against us. Our internal sources of liquidity may prove to be insufficient, and in such case, we may not be able to successfully obtain additional financing on favorable terms, or at all.

Disruptions, uncertainty or volatility in the capital and credit markets may also limit our access to capital required to operate our business, most significantly our reinsurance operations. Such market conditions may limit our ability to replace maturing liabilities in a timely manner, satisfy statutory capital requirements, generate fee income and market-related revenue to meet liquidity needs and access the capital necessary to grow our business. As such, we may be forced to delay raising capital, issue shorter tenor securities than we prefer, or bear an unattractive cost of capital, which could decrease our profitability and significantly reduce our financial flexibility. Further, our ability to finance our statutory reserve requirements depends on market conditions. If market capacity is limited for a prolonged period of time, our ability to obtain new funding for such purposes may be hindered and, as a result, our ability to write additional business in a cost-effective manner may be limited or otherwise adversely affected.

We also rely on our unsecured credit facilities, including our \$850 million syndicated credit facility, as potential sources of liquidity. Our credit facilities contain administrative, reporting, legal and financial covenants, and our syndicated credit facility includes requirements to maintain a specified minimum consolidated net worth and a minimum ratio of consolidated indebtedness to total capitalization. If we were unable to access our credit facilities it could materially impact our capital position. The availability of these facilities could be critical to our credit and financial strength ratings and our ability to meet our obligations as they come due in a market when alternative sources of credit are unavailable.

Difficult conditions in the global capital markets and the economy generally may materially adversely affect our business, financial condition and results of operations.

Our results of operations, financial condition, cash flows and statutory capital position are materially affected by conditions in the global capital markets and the economy generally, both in the U.S. and elsewhere around the world. Poor economic conditions, volatility and disruptions in capital markets or financial asset classes and geopolitical upheaval (including trade disputes) can have an adverse effect on our business because our investment portfolio and some of our liabilities are sensitive to changing market factors. Additionally, disruptions in one market or asset class can also spread to other markets or asset classes.

Concerns over U.S. fiscal policy and the trajectory of the U.S. national debt could have severe repercussions to the U.S. and global credit and financial markets, further exacerbate concerns over sovereign debt and disrupt economic activity in the U.S. and elsewhere. As a result, our access to, or cost of, liquidity may deteriorate. As a result of uncertainty regarding U.S. national debt, the market value of some of our investments may decrease, and our capital adequacy could be adversely affected. Further downgrades, together with the sustained current trajectory of the U.S. national debt, could have adverse effects on our business, financial condition and results of operations.

Past economic uncertainties and weakness and disruption of the financial markets around the world, such as the results of Brexit, the solvency of certain European Union member states and of financial institutions that have significant direct or indirect exposure to debt issued by such countries, have led and may lead to concerns over capital markets access. In addition, there are ongoing risks around the world related to interest rate fluctuations, slowing global growth, commodity prices and the devaluation of certain currencies. These events and continuing market upheavals may have an adverse effect on us, in part because we have a large investment portfolio and are also dependent upon customer behavior. Our revenues may decline in such circumstances and our profit margins may erode. In addition, upon prolonged market events, such as the global credit crisis, we could incur significant investment-related losses. Even in the absence of a market downturn, we are exposed to substantial risk of loss due to market volatility.

If our investment strategy is unsuccessful, we could suffer losses.

The success of our investment strategy is crucial to the success of our business. In particular, we structure our investments to match our anticipated liabilities under reinsurance treaties to the extent we believe necessary. If our calculations with respect to these reinsurance liabilities are incorrect, or if we improperly structure our investments to match such liabilities, we could be forced to liquidate investments prior to maturity at a significant loss.

Our investment guidelines permit us to invest up to 6.5% of our investment portfolio in non-investment grade fixed maturity securities. While any investment carries some risk, the risks associated with lower-rated securities are greater than the risks associated with investment grade securities. The risk of loss of principal or interest through default is greater because lower-rated securities are usually unsecured and are often subordinated to an issuer's other obligations. Additionally, the issuers of these securities frequently have relatively high debt levels and are thus more sensitive to difficult economic conditions, specific corporate developments and rising interest rates, which could impair an issuer's capacity or willingness to meet its financial commitment on such lower-rated securities. As a result, the market price of these securities may be quite volatile, and the risk of loss is greater.

The success of any investment activity is affected by general economic conditions, including the level and volatility of interest rates and the extent and timing of investor participation in such markets, which may adversely affect the markets for interest rate sensitive securities, mortgages and equity securities. Unexpected volatility or illiquidity in the markets in which we directly or indirectly hold positions could adversely affect us.

Interest rate fluctuations could negatively affect the income we derive from the difference between the interest rates we earn on our investments and interest we pay under our reinsurance contracts.

Significant changes in interest rates expose reinsurance companies to the risk of reduced investment income or actual losses based on the difference between the interest rates earned on investments and the credited interest rates paid on outstanding reinsurance contracts. Both rising and declining interest rates can negatively affect the income we derive from these interest rate spreads. During periods of rising interest rates, we may be contractually obligated to reimburse our clients for the greater amounts they credit on certain interest-sensitive products. However, we may not have the ability to immediately acquire investments with interest rates sufficient to offset the increased crediting rates on our reinsurance contracts. During periods of falling interest rates, our investment earnings will be lower because new investments in fixed maturity securities will likely bear lower interest rates. We may not be able to fully offset the decline in investment earnings with lower crediting rates on underlying annuity products related to certain of our reinsurance contracts. Our asset/liability management programs and procedures may not reduce the volatility of our income when interest rates are rising or falling, and thus we cannot assure you that changes in interest rates will not affect our interest rate spreads.

Changes in interest rates may also affect our business in other ways. Higher interest rates may result in increased surrenders on interest-based products of our clients, which may affect our fees and earnings on those products. Lower interest rates may result in lower sales of certain insurance and investment products of our clients, which would reduce the demand for our reinsurance of these products. If interest rates remain low for an extended period of time, it may adversely affect our cash flows, financial condition and results of operations.

The liquidity and value of some of our investments may become significantly diminished.

There may be illiquid markets for certain investments we hold in our investment portfolio. These include privately-placed fixed maturity securities, options and other derivative instruments, mortgage loans, policy loans, limited partnership interests, and real estate equity, such as real estate joint ventures and funds. Additionally, markets for certain of our investments that are currently liquid may experience reduced liquidity during periods of market volatility or disruption. If we were forced to sell certain of our investments into illiquid markets, prices may be lower than our carrying value in such investments. This could result in realized losses which could have a material adverse effect on our results of operations and financial condition, as well as our financial ratios, which could affect compliance with our credit instruments and rating agency capital adequacy measures.

We could be forced to sell investments at a loss to cover policyholder withdrawals, recaptures of reinsurance treaties or other events.

Some of the products offered by our insurance company customers allow policyholders and contract holders to withdraw their funds under defined circumstances. Our reinsurance subsidiaries manage their liabilities and configure their investment portfolios so as to provide and maintain sufficient liquidity to support anticipated withdrawal demands and contract benefits and maturities under reinsurance treaties with these customers. While our reinsurance subsidiaries own a significant amount of liquid assets, a portion of their assets are relatively illiquid. Unanticipated withdrawal or surrender activity could, under some circumstances, require our reinsurance subsidiaries to dispose of assets on unfavorable terms, which could have an adverse effect on us. Reinsurance agreements may provide for recapture rights on the part of our insurance company customers. Recapture rights permit these customers to reassume all or a portion of the risk formerly ceded to us after an agreed-upon time, usually ten years, subject to various conditions.

Recapture of business previously ceded does not affect premiums ceded prior to the recapture, but may result in immediate payments to our insurance company customers and a charge to income for costs that we deferred when we acquired the business but are unable to recover upon recapture. Under some circumstances, payments to our insurance company customers could require our reinsurance subsidiaries to dispose of assets on unfavorable terms.

Defaults, downgrades or other events impairing the value of our fixed maturity securities portfolio may reduce our earnings.

We are subject to the risk that the issuers, or guarantors, of fixed maturity securities we own may default on principal and interest payments they owe us. Fixed maturity securities represent a substantial portion of our total cash and invested assets. The occurrence of a major economic downturn (or a prolonged downturn in the economy), acts of corporate malfeasance, widening risk spreads, or other events that adversely affect the issuers or guarantors of these securities could cause the value of our fixed maturity securities portfolio and our net income to decline and the default rate of the fixed maturity securities in our investment portfolio to increase. A ratings downgrade affecting issuers or guarantors of particular securities, or similar trends that could worsen the credit quality of issuers, such as the corporate issuers of securities in our investment portfolio, could also have a similar effect. With economic uncertainty, credit quality of issuers or guarantors could be adversely affected. Any event reducing the value of these securities other than on a temporary basis could have a material adverse effect on our business, financial condition or results of operations.

The defaults or deteriorating credit of other financial institutions could adversely affect us.

We have exposure to many different industries and counterparties, and routinely execute transactions with counterparties in the financial services industry, including brokers and dealers, insurance companies, commercial banks, investment banks, investment funds and other institutions. Many of these transactions expose us to credit risk upon default of our counterparty. In addition, with respect to secured and other transactions that provide for us to hold collateral posted by the counterparty, our credit risk may be exacerbated when the collateral we hold cannot be liquidated at prices sufficient to recover the full amount of our exposure. We also have exposure to these financial institutions in the form of unsecured debt instruments, derivative transactions and equity investments. There can be no assurance that losses or impairments to the carrying value of these assets would not materially and adversely affect our business, financial condition or results of operations.

Defaults on our mortgage loans or the mortgage loans underlying our investments in mortgage-backed securities and volatility in performance of our investments in real-estate related assets may adversely affect our profitability.

A portion of our investment portfolio consists of assets linked to real estate, including mortgage loans on commercial properties and investments in commercial mortgage-backed securities (“CMBS”) and residential mortgage-backed securities (“RMBS”). Delinquency and defaults by third parties in the payment or performance of their obligations underlying these assets could reduce our investment income and realized investment gains or result in the recognition of investment losses. Mortgage loans are stated on our balance sheet at unpaid principal balance, adjusted for any unamortized premium or discount, deferred fees or expenses, and are net of valuation allowances. We establish valuation allowances for estimated impairments as of the balance sheet date. Such valuation allowances are based on the excess carrying value of the loan over the present value of expected future cash flows discounted at the loan’s original effective interest rate, the value of the loan’s collateral if the loan is in the process of foreclosure or is otherwise collateral-dependent, or the loan’s market value if the loan is being sold. CMBS and RMBS are stated on our balance sheet at fair value. The performance of our mortgage loan investments and our investments in CMBS and RMBS, however, may fluctuate in the future. An increase in the default rate of our mortgage loan investments or the mortgage loans underlying our investments in CMBS and RMBS could have a material adverse effect on our financial condition or results of operations.

Further, any geographic or sector concentration of our mortgage loans or the mortgage loans underlying our investments in CMBS and RMBS may have adverse effects on our investment portfolios and consequently on our consolidated results of operations or financial condition. While we seek to mitigate this risk by having a broadly diversified portfolio, events or

developments that have a negative effect on any particular geographic region or sector may have a greater adverse effect on the investment portfolios to the extent that the portfolios are concentrated. Moreover, our ability to sell assets relating to such particular groups of related assets may be limited if other market participants are seeking to sell at the same time.

Our valuation of fixed maturity and equity securities and derivatives include methodologies, estimations and assumptions that are subject to differing interpretations and could result in changes to investment valuations that may have a material adverse effect on our financial condition or results of operations.

Fixed maturity, equity securities and short-term investments, which are primarily reported at fair value on the consolidated balance sheets, represent the majority of our total cash and invested assets. We have categorized these securities into a three-level hierarchy, based on the priority of the inputs to the respective valuation technique. The fair value hierarchy gives the highest priority to quoted prices in active markets for identical assets or liabilities (Level 1) and the lowest priority to unobservable inputs (Level 3). An asset or liability's classification within the fair value hierarchy is based on the lowest level of significant input to its valuation. For example, a Level 3 fair value measurement may include inputs that are observable (Levels 1 and 2) and unobservable (Level 3). Therefore, gains and losses for such assets and liabilities categorized within Level 3 may include changes in fair value that are attributable to both observable market inputs (Levels 1 and 2) and unobservable market inputs (Level 3).

The determination of fair values in the absence of quoted market prices is based on: (i) valuation methodologies; (ii) securities we deem to be comparable; and (iii) assumptions deemed appropriate based on market conditions specific to the security. The fair value estimates are made at a specific point in time, based on available market information and judgments about assets and liabilities, including estimates of the timing and amounts of expected future cash flows and the credit standing of the issuer or counterparty. Factors considered in estimating fair value include: coupon rate, maturity, estimated duration, call provisions, sinking fund requirements, credit rating, industry sector of the issuer, and quoted market prices of comparable securities. The use of different methodologies and assumptions may have a material effect on the estimated fair value amounts.

During periods of market disruption, including periods of significantly rising or high interest rates, rapidly widening credit spreads or illiquidity, it may be difficult to value certain of our securities if trading becomes less frequent or market data becomes less observable. There may be certain asset classes that were in active markets with significant observable data that become illiquid due to the financial environment. In such cases, more securities may fall to Level 3 and thus require more subjectivity and management judgment. As such, valuations may include inputs and assumptions that are less observable or require greater estimation as well as valuation methods that are more sophisticated or require greater estimation thereby resulting in values that may be different than the value at which the investments may be ultimately sold. Further, rapidly changing or disruptive credit and equity market conditions could materially impact the valuation of securities as reported within our consolidated financial statements and the period-to-period changes in value could vary significantly. Decreases in value may have a material adverse effect on our financial condition or results of operations.

The reported value of our relatively illiquid types of investments, our investments in the asset classes described in the paragraph above and, at times, our high-quality, generally liquid asset classes, do not necessarily reflect the lowest current market price for the asset. If we were forced to sell certain of our assets in disruptive or volatile market conditions, there can be no assurance that we will be able to sell them for the prices at which we have recorded them and we may be forced to sell them at significantly lower prices.

The determination of the amount of allowances and impairments taken on our investments is highly subjective and could materially affect our financial condition or results of operations.

The determination of the amount of allowances and impairments vary by investment type and is based upon our periodic evaluation and assessment of known and inherent risks associated with the respective asset class. Such evaluations and assessments are revised as conditions change and new information becomes available. Management updates its evaluations regularly and reflects changes in allowances and impairments in operations as such evaluations are revised.

For example, the cost of our fixed maturity securities is adjusted for impairments in value deemed to be other-than-temporary in the period in which the determination is made. The assessment of whether impairments have occurred is based on management's case-by-case evaluation of the underlying reasons for the decline in fair value. Our management considers a wide range of factors about the security issuer and uses their best judgment in evaluating the cause of the decline in the estimated fair value of the security and in assessing the prospects for near-term recovery. Inherent in management's evaluation of the security are assumptions and estimates about the operations of the issuer and its future earnings potential. There can be no assurance that our management has accurately assessed the level of impairments taken, or allowances reflected in our financial statements and their potential impact on regulatory capital. Furthermore, additional impairments or additional allowances may be needed in the future.

Our investments are reflected within the consolidated financial statements utilizing different accounting bases and accordingly we may not have recognized differences, which may be significant, between cost and fair value in our consolidated financial statements.

Certain of our principal investments are in fixed maturity securities, short-term investments, mortgage loans, policy loans, funds withheld at interest and other invested assets. The carrying value of such investments is as follows:

- Fixed maturity securities are classified as available-for-sale and are reported at their estimated fair value. Unrealized investment gains and losses on these securities are recorded as a separate component of accumulated other comprehensive income or loss, net of related deferred acquisition costs and deferred income taxes.
- Short-term investments include investments with remaining maturities of one year or less, but greater than three months, at the time of acquisition and are stated at estimated fair value or amortized cost, which approximates estimated fair value.
- Mortgage and policy loans are stated at unpaid principal balance. Additionally, mortgage loans are adjusted for any unamortized premium or discount, deferred fees or expenses, net of valuation allowances.
- Funds withheld at interest represent amounts contractually withheld by ceding companies in accordance with reinsurance agreements. The value of the assets withheld and interest income are recorded in accordance with specific treaty terms.
- We use the cost method of accounting for investments in real estate joint ventures and other limited partnership interests in which we have a minor equity investment and virtually no influence over the joint ventures or the partnership's operations. The equity method of accounting is used for investments in real estate joint ventures and other limited partnership interests in which we have significant influence over the operating and financing decisions but are not required to be consolidated. These investments are reflected in other invested assets on the consolidated balance sheets.

Investments not carried at fair value in our consolidated financial statements — principally, mortgage loans, policy loans, real estate joint ventures and other limited partnerships — may have fair values that are substantially higher or lower than the carrying value reflected in our consolidated financial statements. Each of such asset classes is regularly evaluated for impairment under the accounting guidance appropriate to the respective asset class.

Uncertainty relating to the LIBOR calculation process and potential phasing out of LIBOR after 2021 may adversely affect the value of certain of our LIBOR-based assets and liabilities.

Actions by regulators or law enforcement agencies in the UK and elsewhere may result in changes to the manner in which the London Interbank Offered Rate ("LIBOR") is determined or the establishment of alternative reference rates. For example, on July 27, 2017, the U.K. Financial Conduct Authority announced that it intends to stop persuading or compelling banks to submit LIBOR rates after 2021. At this time, it is not possible to predict the effect of any such changes, any establishment of alternative reference rates or any other reforms to LIBOR that may be enacted in the UK or elsewhere. The U.S. Federal Reserve, based on the recommendations of the New York Federal Reserve's Alternative Reference Rate Committee (constituted of major derivative market participants and their regulators), began publishing a Secured Overnight Funding Rate (SOFR) in April 2018 which is intended to replace U.S. dollar LIBOR. Plans for alternative reference rates for other currencies have also been announced. At this time, it is not possible to predict how markets will respond to these new rates, and the effect of any changes or reforms to LIBOR or discontinuation of LIBOR on new or existing financial instruments to which we have exposure. If LIBOR ceases to exist or if the methods of calculating LIBOR change from current methods for any reason, interest rates on our LIBOR-based assets and liabilities may be adversely affected. Further, any uncertainty regarding the continued use and reliability of LIBOR as a benchmark interest rate could adversely affect the trading market for and value of LIBOR-based securities, including certain of our LIBOR-based assets and liabilities. More generally, any of the above changes or any other consequential changes to LIBOR or any other "benchmark" as a result of international, national or other proposals for reform or other initiatives or investigations, or any further uncertainty in relation to the timing and manner of implementation of such changes, could have a material adverse effect on the value of and return on any securities based on or linked to a "benchmark," such as certain of our LIBOR-based assets and liabilities. We are not able to predict what the impact of such changes may be on our cash flows, financial condition and results of operations.

Risks Related to Ownership of Our Common Stock

We may not pay dividends on our common stock.

Our shareholders may not receive future dividends. Historically, we have paid quarterly dividends ranging from \$0.027 per share in 1993 to \$0.60 per share in 2018. All future payments of dividends, however, are at the discretion of our board of directors and will depend on our earnings, capital requirements, insurance regulatory conditions, operating conditions and such other factors as our board of directors may deem relevant. The amount of dividends that we can pay will depend in part on the

operations of our reinsurance subsidiaries. Under certain circumstances, we may be contractually prohibited from paying dividends on our common stock due to restrictions associated with certain of our debt securities.

Certain provisions in our articles of incorporation and bylaws, and in Missouri law, may delay or prevent a change in control, which could adversely affect the price of our common stock.

Certain provisions in our articles of incorporation and bylaws, as well as Missouri corporate law and state insurance laws, may delay or prevent a change of control of RGA, which could adversely affect the price of our common stock. Our articles of incorporation and bylaws contain some provisions that may make the acquisition of control of RGA without the approval of our board of directors more difficult, including provisions relating to the nomination, election and removal of directors and limitations on actions by our shareholders. In addition, Missouri law also imposes some restrictions on mergers and other business combinations between RGA and holders of 20% or more of our outstanding common stock.

These provisions may have unintended anti-takeover effects, including to delay or prevent a change in control of RGA, which could adversely affect the price of our common stock.

Applicable insurance laws may make it difficult to effect a change of control of RGA.

Before a person can acquire control of a U.S. insurance company, prior written approval must be obtained from the insurance commission of the state where the domestic insurer is domiciled. Missouri insurance laws and regulations as well as the insurance laws and regulations of Arizona and California provide that no person may acquire control of us, and thus indirect control of our U.S. domiciled reinsurance subsidiaries, including RGA Reinsurance and Aurora National, unless:

- such person has provided certain required information to the domiciliary state insurance department; and
- such acquisition is approved by the domestic state Director of Insurance, to whom we refer as the Director of Insurance, after a public hearing.

Under U.S. state insurance laws and regulations, any person acquiring 10% or more of the outstanding voting securities of a corporation, such as our common stock, is presumed to have acquired control of that corporation and its subsidiaries.

Canadian federal insurance laws and regulations provide that no person may directly or indirectly acquire “control” of or a “significant interest” in our Canadian insurance subsidiary, RGA Canada, unless:

- such person has provided information, material and evidence to the Canadian Superintendent of Financial Institutions as required by him; and
- such acquisition is approved by the Canadian Minister of Finance.

For this purpose, “significant interest” means the direct or indirect beneficial ownership by a person, or group of persons acting in concert, of shares representing 10% or more of a given class, and “control” of an insurance company exists when:

- a person, or group of persons acting in concert, beneficially owns or controls an entity that beneficially owns securities, such as our common stock, representing more than 50% of the votes entitled to be cast for the election of directors and such votes are sufficient to elect a majority of the directors of the insurance company, or
- a person has any direct or indirect influence that would result in control in fact of an insurance company.

Similar laws in other countries where we operate limit our ability to effect changes of control for subsidiaries organized in such jurisdictions without the approval of local insurance regulatory officials. Prior to granting approval of an application to directly or indirectly acquire control of a domestic or foreign insurer, an insurance regulator in any jurisdiction may consider such factors as the financial strength of the applicant, the integrity of the applicant’s board of directors and executive officers, the applicant’s plans for the future operations of the domestic insurer and any anti-competitive results that may arise from the consummation of the acquisition of control.

Issuing additional shares may dilute the value or affect the price of our common stock.

Our board of directors has the authority, without action or vote of the shareholders, to issue any or all authorized but unissued shares of our common stock, including securities convertible into, or exchangeable for, our common stock and authorized but unissued shares under our equity compensation plans. In the future, we may issue such additional securities, through public or private offerings, in order to raise additional capital. Any such issuance will dilute the percentage ownership of shareholders and may dilute the per share projected earnings or book value of our common stock. In addition, option holders may exercise their options at any time when we would otherwise be able to obtain additional equity capital on more favorable terms.

The price of our common stock may fluctuate significantly.

The overall market and the price of our common stock may continue to fluctuate as a result of many factors in addition to those discussed in the preceding risk factors. These factors, some or all of which are beyond our control, include:

- actual or anticipated fluctuations in our operating results;
- changes in expectations as to our future financial performance or changes in financial estimates of securities analysts;
- success of our operating and growth strategies;
- investor anticipation of strategic and technological threats, whether or not warranted by actual events;
- operating and stock price performance of other comparable companies; and
- realization of any of the risks described in these risk factors or those set forth in any subsequent Annual Report on Form 10-K or Quarterly Reports on Form 10-Q.

In addition, the stock market has historically experienced volatility that often has been unrelated or disproportionate to the operating performance of particular companies. These broad market and industry fluctuations may adversely affect the trading price of our common stock, regardless of our actual operating performance.

The occurrence of various events may adversely affect the ability of RGA and its subsidiaries to fully utilize any net operating losses (“NOL”s) and other tax attributes.

RGA and its subsidiaries may, from time to time, have a substantial amount of NOLs and other tax attributes, for U.S. federal income tax purposes, to offset taxable income and gains. If a corporation experiences an ownership change, it is generally subject to an annual limitation, which limits its ability to use its NOLs and other tax attributes. Events outside of our control may cause RGA (and, consequently, its subsidiaries) to experience an “ownership change” under Sections 382 and 383 of the Internal Revenue Code and the related Treasury regulations, and limit the ability of RGA and its subsidiaries to utilize fully such NOLs and other tax attributes. If we were to experience an ownership change, we could potentially have higher U.S. federal income tax liabilities than we would otherwise have had, which would negatively impact our financial condition and results of operations.

Item 1B. UNRESOLVED STAFF COMMENTS

The Company has no unresolved staff comments from the Securities and Exchange Commission.

Item 2. PROPERTIES

The Company’s headquarters is located at 16600 Swingley Ridge Road, Chesterfield, Missouri, which comprises approximately 400,000 square feet. In addition, the Company leases approximately 405,000 square feet of office space in 50 locations throughout the world.

Most of the Company’s leases have terms of three to five years; while some leases have longer terms, none exceed 15 years. As provided in Note 12 – “Commitments, Contingencies and Guarantees” in the Notes to Consolidated Financial Statements, the rental expense on operating leases for office space and equipment totaled \$17.5 million for 2018.

The Company believes its facilities have been generally well maintained and are in good operating condition. The Company believes the facilities are sufficient for its current requirements.

Item 3. LEGAL PROCEEDINGS

The Company is subject to litigation in the normal course of its business. The Company currently has no material litigation. A legal reserve is established when the Company is notified of an arbitration demand or litigation or is notified that an arbitration demand or litigation is imminent, it is probable that the Company will incur a loss as a result and the amount of the probable loss is reasonably capable of being estimated.

Item 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

Item 5. MARKET FOR REGISTRANT’S COMMON EQUITY, RELATED STOCKHOLDER MATTERS, AND ISSUER PURCHASES OF EQUITY SECURITIES

Insurance companies are subject to statutory regulations that restrict the payment of dividends. See Item 1 under the caption Regulation – “Restrictions on Dividends and Distributions”. See Item 8, Note 17 – “Equity” in the Notes to Consolidated Financial Statements for information regarding board-approved stock repurchase plans. See Item 12 for information about the Company’s compensation plans.

Reinsurance Group of America, Incorporated common stock is traded on the New York Stock Exchange (NYSE) under the symbol “RGA”. On January 31, 2019, there were 25,527 stockholders of record of RGA’s common stock and 62.8 million shares outstanding.

Issuer Purchases of Equity Securities

The following table summarizes RGA’s repurchase activity of its common stock during the quarter ended December 31, 2018:

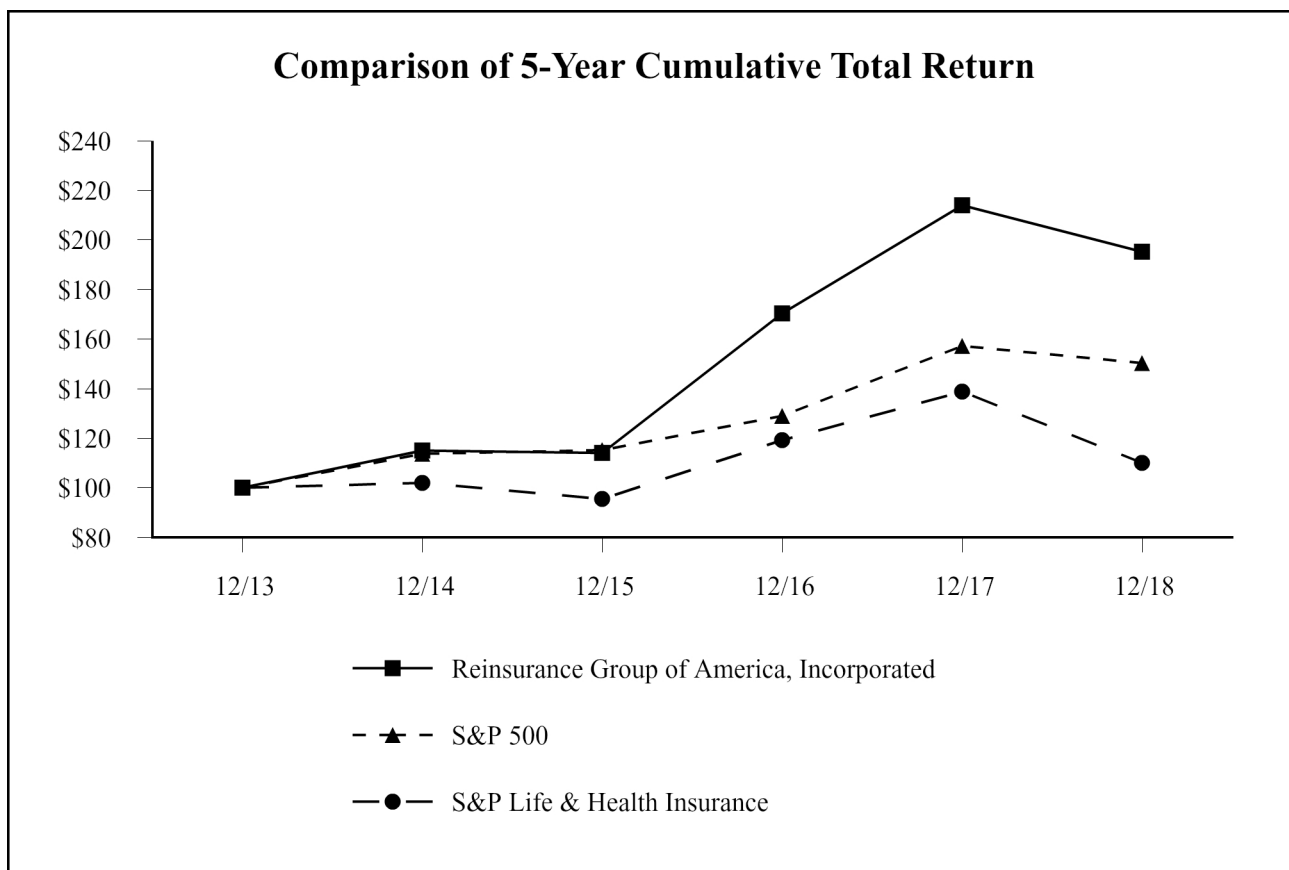
	Total Number of Shares Purchased (1)	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs	Maximum Number (or Approximate Dollar Value) of Shares that May Yet Be Purchased Under the Plan or Program
October 1, 2018 - October 31, 2018	181,910	\$ 137.54	181,760	\$ 89,579,317
November 1, 2018 - November 30, 2018	5,382	\$ 145.09	—	\$ 89,579,317
December 1, 2018 - December 31, 2018	36	\$ 136.81	—	\$ 89,579,317

- (1) RGA repurchased 181,760 of common stock under its share repurchase program for \$25.0 million during October 2018 and had no repurchases of common stock under its share repurchase program for November and December 2018. The Company net settled - issuing 394, 14,315 and 117 shares from treasury and repurchasing from recipients 150, 5,382 and 36 shares in October, November and December 2018, respectively, in settlement of income tax withholding requirements incurred by the recipients of equity incentive awards.

On January 24, 2019, RGA’s board of directors authorized a share repurchase program for up to \$400.0 million of RGA’s outstanding common stock. The authorization was effective immediately and does not have an expiration date. In connection with this new authorization, the board of directors terminated the stock repurchase authority granted in 2017.

Comparison of 5-Year Cumulative Total Return

Set forth below is a graph for the Company's common stock for the period beginning December 31, 2013 and ending December 31, 2018, assuming \$100 was invested on December 31, 2013. The graph compares the cumulative total return on the Company's common stock, based on the market price of the common stock and assuming reinvestment of dividends, with the cumulative total return of companies in the Standard & Poor's 500 Stock Index and the Standard & Poor's Insurance (Life/Health) Index. The indices are included for comparative purposes only. They do not necessarily reflect management's opinion that such indices are an appropriate measure of the relative performance of the Company's common stock, and are not intended to forecast or be indicative of future performance of the common stock.



	Base Period	Cumulative Total Return				
	12/13	12/14	12/15	12/16	12/17	12/18
Reinsurance Group of America, Incorporated	\$ 100.00	\$ 115.00	\$ 114.00	\$ 170.40	\$ 213.99	\$ 195.33
S & P 500	100.00	113.69	115.26	129.05	157.22	150.33
S & P Life & Health Insurance	100.00	101.95	95.51	119.26	138.85	110.01

Item 6. SELECTED FINANCIAL DATA

The following selected financial data has been derived from the Company's audited consolidated financial statements. The consolidated statement of income data for the years ended December 31, 2018, 2017 and 2016, and the consolidated balance sheet data at December 31, 2018 and 2017 have been derived from the Company's audited consolidated financial statements included elsewhere herein. The consolidated statement of income data for the years ended December 31, 2015 and 2014, and the consolidated balance sheet data at December 31, 2016, 2015 and 2014 have been derived from the Company's audited consolidated financial statements not included herein. The selected financial data set forth below should be read in conjunction with "Management's Discussion and Analysis of Financial Condition and Results of Operations" and the consolidated financial statements and related notes included elsewhere herein.

Selected Consolidated Financial and Operating Data

(in millions, except per share and operating data)

Income Statement Data	As of or For the Years Ended December 31,				
	2018	2017	2016	2015	2014
Revenues:					
Net premiums	\$ 10,544	\$ 9,841	\$ 9,249	\$ 8,571	\$ 8,670
Investment income, net of related expenses	2,139	2,155	1,912	1,734	1,714
Investment related gains (losses), net:					
Other-than-temporary impairments on fixed maturity securities	(28)	(43)	(39)	(57)	(8)
Other investment related gains (losses), net	(142)	211	133	(108)	194
Total investment related gains (losses), net	(170)	168	94	(165)	186
Other revenues	363	352	267	278	334
Total revenues	12,876	12,516	11,522	10,418	10,904
Benefits and expenses:					
Claims and other policy benefits	9,319	8,519	7,993	7,489	7,407
Interest credited	425	502	365	337	451
Policy acquisition costs and other insurance expenses	1,323	1,467	1,311	1,127	1,391
Other operating expenses	786	710	645	554	538
Interest expense	147	146	138	143	97
Collateral finance and securitization expense	30	29	26	23	12
Total benefits and expenses	12,030	11,373	10,478	9,673	9,896
Income before income taxes	846	1,143	1,044	745	1,008
Provision for income taxes ⁽¹⁾	130	(679)	343	243	324
Net income	\$ 716	\$ 1,822	\$ 701	\$ 502	\$ 684
Earnings Per Share					
Basic earnings per share	\$ 11.25	\$ 28.28	\$ 10.91	\$ 7.55	\$ 9.88
Diluted earnings per share	11.00	27.71	10.79	7.46	9.78
Weighted average diluted shares, in thousands	65,094	65,753	64,989	67,292	69,962
Dividends per share on common stock	\$ 2.20	\$ 1.82	\$ 1.56	\$ 1.40	\$ 1.26
Balance Sheet Data					
Total investments	\$ 54,205	\$ 51,691	\$ 44,841	\$ 41,978	\$ 36,696
Total assets	64,535	60,515	53,098	50,383	44,654
Policy liabilities ⁽²⁾	48,933	43,583	37,874	37,371	30,892
Long-term debt	2,788	2,788	3,089	2,298	2,298
Collateral finance and securitization notes	682	784	841	899	774
Total stockholders' equity	8,451	9,570	7,093	6,135	7,023
Total stockholders' equity per share	134.53	148.48	110.31	94.09	102.13
Operating Data (in billions)					
Assumed ordinary life reinsurance in force	\$ 3,329	\$ 3,297	\$ 3,063	\$ 2,995	\$ 2,944
Assumed new business production	407	395	405	491	482

(1) 2017 reflects adjustments related to the initial adoption of U.S. Tax Reform. See Note 9 - "Income Tax" in the Notes to Consolidated Financial Statements for additional information.

(2) Policy liabilities include future policy benefits, interest-sensitive contract liabilities, and other policy claims and benefits.

Item 7. MANAGEMENT’S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

Index to Management’s Discussion and Analysis of Financial Condition and Results of Operations

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Cautionary Note Regarding Forward-Looking Statements

This report contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995 including, among others, statements relating to projections of the strategies, earnings, revenues, income or loss, ratios, future financial performance, and growth potential of the Company. The words “intend,” “expect,” “project,” “estimate,” “predict,” “anticipate,” “should,” “believe,” and other similar expressions also are intended to identify forward-looking statements. Forward-looking statements are inherently subject to risks and uncertainties, some of which cannot be predicted or quantified. Future events and actual results, performance, and achievements could differ materially from those set forth in, contemplated by, or underlying the forward-looking statements.

Numerous important factors could cause actual results and events to differ materially from those expressed or implied by forward-looking statements including, without limitation, (1) adverse capital and credit market conditions and their impact on the Company’s liquidity, access to capital and cost of capital, (2) the impairment of other financial institutions and its effect on the Company’s business, (3) requirements to post collateral or make payments due to declines in market value of assets subject to the Company’s collateral arrangements, (4) the fact that the determination of allowances and impairments taken on the Company’s investments is highly subjective, (5) adverse changes in mortality, morbidity, lapsation or claims experience, (6) changes in the Company’s financial strength and credit ratings and the effect of such changes on the Company’s future results of operations and financial condition, (7) inadequate risk analysis and underwriting, (8) general economic conditions or a prolonged economic downturn affecting the demand for insurance and reinsurance in the Company’s current and planned markets, (9) the availability and cost of collateral necessary for regulatory reserves and capital, (10) market or economic conditions that adversely affect the value of the Company’s investment securities or result in the impairment of all or a portion of the value of certain of the Company’s investment securities, that in turn could affect regulatory capital, (11) market or economic conditions that adversely affect the Company’s ability to make timely sales of investment securities, (12) risks inherent in the Company’s risk management and investment strategy, including changes in investment portfolio yields due to interest rate or credit quality changes, (13) fluctuations in U.S. or foreign currency exchange rates, interest rates, or securities and real estate markets, (14) adverse litigation or arbitration results, (15) the adequacy of reserves, resources and accurate information relating to settlements, awards and terminated and discontinued lines of business, (16) the stability of and actions by governments and economies in the markets in which the Company operates, including ongoing uncertainties regarding the amount of U.S. sovereign debt and the credit ratings thereof, (17) competitive factors and competitors’ responses to the Company’s initiatives, (18) the success of the Company’s clients, (19) successful execution of the Company’s entry into new markets, (20) successful development and introduction of new products and distribution opportunities, (21) the Company’s ability to successfully integrate acquired blocks of business and entities, (22) action by regulators who have authority over the Company’s reinsurance operations in the jurisdictions in which it operates, (23) the Company’s dependence on third parties, including those insurance companies and reinsurers to which the Company cedes some reinsurance, third-party investment managers and others, (24) the threat of natural disasters, catastrophes, terrorist attacks, epidemics or pandemics anywhere in the world where the Company or its clients do business, (25) interruption or failure of the Company’s telecommunication, information technology or other operational systems, or the Company’s failure to maintain adequate security to protect the confidentiality or privacy of personal or sensitive data stored on such systems, (26) changes in laws, regulations, and accounting standards applicable to the Company, its subsidiaries, or its business, (27) the benefits or burdens associated with the Tax Cuts and Jobs Act of 2017 may be different than expected, (28) the effect of the Company’s status as an insurance holding company and regulatory restrictions on its ability to pay principal of and interest on its debt obligations, and (29) other risks and uncertainties described in this document and in the Company’s other filings with the Securities and Exchange Commission (“SEC”).

Forward-looking statements should be evaluated together with the many risks and uncertainties that affect the Company’s business, including those mentioned in this document and described in the periodic reports the Company files with the SEC. These forward-looking statements speak only as of the date on which they are made. The Company does not undertake any obligations to update these forward-looking statements, even though the Company’s situation may change in the future. For a discussion of these risks and uncertainties that could cause actual results to differ materially from those contained in the forward-looking statements, you are advised to see Item 1A – “Risk Factors”.

Overview

The Company is among the leading global providers of life reinsurance and financial solutions, with \$3.3 trillion of life reinsurance in force and assets of \$64.5 billion as of December 31, 2018. Traditional reinsurance includes individual and group life and health, disability, and critical illness reinsurance. Financial solutions includes longevity reinsurance, asset-intensive reinsurance, financial reinsurance and stable value products. The Company derives revenues primarily from renewal premiums from existing reinsurance treaties, new business premiums from existing or new reinsurance treaties, fee income from financial solutions business and income earned on invested assets.

The Company’s underwriting expertise and industry knowledge has allowed it to expand into international markets and now has operations in over 25 countries including locations in the Asia Pacific region, Europe, the Middle East, Africa and Latin America. The Company generally starts operations from the ground up in new markets as opposed to acquiring existing operations,

and it often enters new markets to support its clients as they expand internationally. Based on the compilation of information from competitors' annual reports, the Company believes it is the third-largest global life and health reinsurer in the world based on 2017 life and health reinsurance revenues. The Company conducts business with the majority of the largest U.S. and international life insurance companies. The Company has also developed its capacity and expertise in the reinsurance of longevity risks, asset-intensive products (primarily annuities and corporate-owned life insurance) and financial reinsurance. More recently, the Company has increased its investment and expenditures in client service and technology oriented initiatives to both support its clients and generate new future revenue streams.

Historically, the Company's primary business has been traditional life reinsurance, which involves reinsuring life insurance policies that are often in force for the remaining lifetime of the underlying individuals insured, with premiums earned typically over a period of 10 to 30 years. Each year, however, a portion of the business under existing treaties terminates due to, among other things, lapses or voluntary surrenders of underlying policies, deaths of insureds, and the exercise of recapture options by ceding companies. The Company has expanded its financial solutions business, including significant asset-intensive and longevity risk transactions, which allow its clients to take advantage of growth opportunities and manage their capital, longevity and investment risk.

The Company's long-term profitability largely depends on the volume and amount of death- and health-related claims incurred and the ability to adequately price the risks it assumes. While death claims are reasonably predictable over a period of many years, claims become less predictable over shorter periods and are subject to significant fluctuation from quarter to quarter and year to year. For longevity business, the Company's profitability depends on the lifespan of the underlying contract holders and the investment performance for certain contracts. Additionally, the Company generates profits on investment spreads associated with the reinsurance of investment type contracts and generates fees from financial reinsurance transactions, which are typically shorter duration than its traditional life reinsurance business. The Company believes its sources of liquidity are sufficient to cover potential claims payments on both a short-term and long-term basis.

Segment Presentation

The Company has geographic-based and business-based operational segments. Geographic-based operations are further segmented into traditional and financial solutions businesses.

The Company allocates capital to its segments based on an internally developed economic capital model, the purpose of which is to measure the risk in the business and to provide a consistent basis upon which capital is deployed. The economic capital model considers the unique and specific nature of the risks inherent in RGA's businesses. As a result of the economic capital allocation process, a portion of investment income is credited to the segments based on the level of allocated capital. In addition, the segments are charged for excess capital utilized above the allocated economic capital basis. This charge is included in policy acquisition costs and other insurance expenses. Segment investment performance varies with the composition of investments and the relative allocation of capital to the operating segments.

Segment revenue levels can be significantly influenced by currency fluctuations, large transactions, mix of business and reporting practices of ceding companies, and therefore may fluctuate from period to period. Although reasonably predictable over a period of years, segment claims experience can be volatile over shorter periods.

The following table sets forth the Company's premiums attributable to each of its segments for the periods indicated on both a gross assumed basis and net of premiums ceded to third parties:

Gross and Net Premiums by Segment
(in millions)

	Year Ended December 31,					
	2018		2017		2016	
	Gross	Net	Gross	Net	Gross	Net
U.S. and Latin America:						
Traditional	\$ 6,127.0	\$ 5,533.3	\$ 5,966.7	\$ 5,356.3	\$ 5,865.6	\$ 5,249.6
Financial Solutions	27.2	27.2	23.7	23.7	64.6	24.4
Total U.S. and Latin America	6,154.2	5,560.5	5,990.4	5,380.0	5,930.2	5,274.0
Canada:						
Traditional	1,070.9	1,024.0	940.1	902.0	965.1	928.6
Financial Solutions	43.4	43.4	38.2	38.2	38.7	38.7
Total Canada	1,114.3	1,067.4	978.3	940.2	1,003.8	967.3
Europe, Middle East and Africa:						
Traditional	1,449.1	1,423.2	1,336.6	1,301.7	1,171.0	1,140.1
Financial Solutions	339.0	195.3	288.7	163.7	264.7	180.3
Total Europe, Middle East and Africa	1,788.1	1,618.5	1,625.3	1,465.4	1,435.7	1,320.4
Asia Pacific:						
Traditional	2,346.2	2,296.4	2,107.5	2,053.0	1,731.8	1,681.5
Financial Solutions	0.9	0.9	2.4	2.4	5.4	5.4
Total Asia Pacific	2,347.1	2,297.3	2,109.9	2,055.4	1,737.2	1,686.9
Corporate and Other	0.1	0.1	0.1	0.1	0.3	0.3
Total	\$ 11,403.8	\$ 10,543.8	\$ 10,704.0	\$ 9,841.1	\$ 10,107.2	\$ 9,248.9

The following table sets forth selected information concerning assumed life reinsurance business in force and assumed new business volume by segment for the periods indicated. The terms "in force" and "new business" refer to insurance policy face amounts or net amounts at risk.

Reinsurance Business In Force and New Business by Segment
(in billions)

	As of December 31,					
	2018		2017		2016	
	In Force	New Business	In Force	New Business	In Force	New Business
U.S. and Latin America:						
Traditional	\$ 1,610.1	\$ 106.5	\$ 1,609.8	\$ 99.4	\$ 1,609.3	\$ 126.4
Financial Solutions	2.1	—	2.1	—	2.1	—
Total U.S. and Latin America	1,612.2	106.5	1,611.9	99.4	1,611.4	126.4
Canada:						
Traditional	383.5	43.1	393.9	35.6	355.7	34.9
Financial Solutions	—	—	—	—	—	—
Total Canada	383.5	43.1	393.9	35.6	355.7	34.9
Europe, Middle East and Africa:						
Traditional	716.3	190.2	739.0	181.5	603.0	169.8
Financial Solutions	—	—	—	—	—	—
Total Europe, Middle East and Africa	716.3	190.2	739.0	181.5	603.0	169.8
Asia Pacific:						
Traditional	616.9	66.9	552.3	78.9	492.2	73.7
Financial Solutions	0.3	—	0.2	—	0.2	—
Total Asia Pacific	617.2	66.9	552.5	78.9	492.4	73.7
Total	\$ 3,329.2	\$ 406.7	\$ 3,297.3	\$ 395.4	\$ 3,062.5	\$ 404.8

Reinsurance business in force reflects the addition or acquisition of new life reinsurance business, offset by terminations (e.g., life and group contract terminations, lapses of underlying policies, deaths of insureds, and recapture), changes in foreign currency exchange, and any other changes in the amount of insurance in force. As a result of terminations and other changes, assumed in force amounts at risk of \$374.8 billion, \$160.6 billion, and \$337.4 billion were released in 2018, 2017 and 2016, respectively.

See “Results of Operations by Segment” below for further information about the Company’s segments.

Industry Trends

The Company believes that the following trends in the life insurance industry will continue to create demand for life reinsurance.

Outsourcing of Mortality and Morbidity. The Company believes life insurance companies will continue to utilize reinsurance to manage capital and mortality/morbidity risk and to develop competitive products. The Company believes there has been a decline in the percentage of new business being reinsured in recent years, which has caused premium growth rates in select markets, notably in North America, to moderate. The Company believes a decline in new business being reinsured is likely a reaction by ceding companies to a broad-based increase in reinsurance rates in the market, stronger capital positions maintained by ceding companies in recent years and a desire by ceding companies to adjust their risk profiles. However, the Company believes reinsurers will continue to be an integral part of the life insurance market due to their ability to efficiently aggregate a significant volume of life insurance in force, creating economies of scale and greater diversification of risk. As a result of having larger amounts of data at their disposal compared to primary life insurance companies, reinsurers tend to have better insights into mortality/morbidity trends, creating more efficient pricing for mortality/morbidity risk.

Capital Management. Changing regulatory environments, rating agencies and competitive business pressures are causing life insurers to evaluate reinsurance as a means to:

- manage risk-based capital by shifting mortality and other risks to reinsurers, thereby reducing amounts of reserves and capital they need to maintain;
- release capital to pursue new business initiatives;
- unlock the capital supporting, and value embedded in, non-core product lines; and
- exit certain lines of business.

Consolidation and Reorganization within the Life Reinsurance and Life Insurance Industry. As a result of consolidations over the last decade within the life reinsurance industry, there are fewer competitors. As a consequence, the Company believes the life reinsurance pricing environment will remain attractive for the remaining life reinsurers, particularly those with a significant market presence and strong ratings.

Additionally, merger and acquisition transactions within the life insurance industry continue to occur. The Company believes that reorganizations and consolidations of life insurers will continue. As reinsurance services are used to facilitate these transactions and manage risk, the Company expects demand for its products to continue.

Changing Demographics of Insured Populations. The aging of the population in North America is increasing demand for financial products among “baby boomers” who are concerned about protecting their peak income stream and are considering retirement and estate planning. The Company believes that this trend is likely to result in continuing demand for annuity products and life insurance policies, larger face amounts of life insurance policies and higher mortality and longevity risk taken by life insurers, all of which should fuel the need for insurers to seek reinsurance coverage. The Company continues to follow a two-part business strategy to capitalize on industry trends.

1) Continue Growth of North American Mortality Business. The Company’s strategy includes continuing to grow each of the following components of its North American mortality operations:

- **Facultative Reinsurance.** Based on discussions with the Company’s clients, an industry survey and informal knowledge about the industry, the Company believes it is a leader in facultative underwriting in North America. The Company intends to maintain that status by emphasizing its underwriting standards, prompt response on quotes, competitive pricing, capacity, value added services and flexibility in meeting customer needs. The Company believes its facultative business has allowed it to develop close, long-standing client relationships and generate additional business opportunities with its facultative clients.
- **Automatic Reinsurance.** The Company intends to maintain its presence in the North American automatic reinsurance market by leveraging its mortality expertise and breadth of products and services to gain additional market share.
- **In Force Block Reinsurance.** Increasingly, there are occasions to grow the business by reinsuring in force blocks, as insurers and reinsurers seek to exit various non-core businesses and increase financial flexibility in order to, among

other things, redeploy capital and pursue merger and acquisition activity. The Company continually seeks these types of opportunities.

2) *Continue Growth in Selected International Markets and Products.* The Company's strategy includes building upon the expertise and relationships developed in its North American business platform to continue its growth in selected international markets and products, including:

- **International Markets.** Management believes that international markets continue to offer opportunities for long-term growth, and the Company intends to capitalize on these opportunities by growing its presence in selected markets. Since 1994, the Company has entered new markets internationally, including, in the mid-to-late 1990s, Australia, Hong Kong, Japan, Malaysia, New Zealand, South Africa, Spain, Taiwan and the UK, and beginning in 2002, China, India and South Korea. The Company received regulatory approval to open a representative office in China in 2005 and received its branch license there in 2014; opened representative offices in Poland and Germany in 2006; opened new offices in France and Italy in 2007; opened a representative office in the Netherlands in 2009; and commenced operations in the UAE in 2011 and in Brazil in 2015. Before entering new markets, the Company evaluates several factors including:
 - the size of the insured population,
 - competition,
 - the level of reinsurance penetration,
 - regulation,
 - existing clients with a presence in the market, and
 - the economic, social and political environment.

As previously indicated, the Company generally starts new operations in these markets from the ground up as opposed to acquiring existing operations, and it often enters these markets to support its large international clients as they expand into additional markets. Many of the markets that the Company has entered since 1994, or may enter in the future, are not utilizing life reinsurance, including facultative life reinsurance, at the same levels as the North American market, and therefore, the Company believes these markets represent opportunities for increasing reinsurance penetration. In particular, management believes markets such as Japan, Southeast Asia and South Korea are beginning to realize the benefits that reinsurers bring to the life insurance market. Markets such as China and India represent longer-term opportunities for growth as the underlying direct life insurance markets grow to meet the needs of growing middle-class populations. Additionally, the Company believes that regulatory changes (e.g., Solvency II) in European markets may cause ceding companies to reduce counterparty exposure to their existing life reinsurers and reinsure more business, creating opportunities for the Company.

- **Asset-intensive and Longevity Reinsurance and Other Products and Services.** In recent years, the Company has experienced growth in asset-intensive and longevity reinsurance. The Company intends to continue leveraging its existing client relationships and reinsurance expertise to create customized reinsurance products and solutions. Industry trends, particularly the increased pace of consolidation and reorganization among life insurance companies and changes in products and product distribution along with new solvency requirements, are expected to enhance existing opportunities for asset-intensive and longevity reinsurance and financial solutions products. The Company began reinsuring annuities with guaranteed minimum benefits on a limited basis in 2007. To date, most of the Company's asset-intensive reinsurance business has been written in the U.S. and the UK; however, additional opportunities outside of the U.S. continue to develop. The Company also provides longevity reinsurance in Europe and Canada, and in 2008 entered the U.S. healthcare reinsurance market with a primary focus on long-term care and Medicare supplement insurance. Additionally, the Company is experiencing growth in health related product offerings, such as critical illness, most notably in select Asian markets. In 2010, the Company expanded into the group reinsurance market in North America with the acquisition of Reliastar Life Insurance Company's U.S. and Canada operations. The Company has more recently increased its investment and expenditures in client service and technology oriented initiatives to both support its clients and generate new future revenue streams.

Consolidated Results of Operations

The following table summarizes net income for the periods presented.

	For the years ended December 31,		
	2018	2017	2016
	(Dollars in thousands, except per share data)		
Revenues			
Net premiums	\$ 10,543,776	\$ 9,841,130	\$ 9,248,871
Investment income, net of related expenses	2,138,525	2,154,651	1,911,886
Investment related gains (losses), net:			
Other-than-temporary impairments on fixed maturity securities	(28,494)	(42,639)	(38,805)
Other-than-temporary impairments on fixed maturity securities transferred to (from) accumulated other comprehensive income	—	—	74
Other investment related gains (losses), net	(141,594)	210,519	132,926
Total investment related gains (losses), net	(170,088)	167,880	94,195
Other revenues	363,451	352,108	266,559
Total revenues	12,875,664	12,515,769	11,521,511
Benefits and expenses			
Claims and other policy benefits	9,318,929	8,518,917	7,993,375
Interest credited	425,204	502,040	364,691
Policy acquisition costs and other insurance expenses	1,322,520	1,466,646	1,310,540
Other operating expenses	786,137	710,690	645,509
Interest expense	147,355	146,025	137,623
Collateral finance and securitization expense	29,699	28,636	25,827
Total benefits and expenses	12,029,844	11,372,954	10,477,565
Income before income taxes	845,820	1,142,815	1,043,946
Provision for income taxes	129,978	(679,366)	342,503
Net income	\$ 715,842	\$ 1,822,181	\$ 701,443
Earnings per share			
Basic earnings per share	\$ 11.25	\$ 28.28	\$ 10.91
Diluted earnings per share	11.00	27.71	10.79
Dividends declared per share	\$ 2.20	\$ 1.82	\$ 1.56

Consolidated net income decreased \$1.1 billion, or 60.7% in 2018, and increased \$1.1 billion, or 159.8%, in 2017. Diluted earnings per share were \$11.00 in 2018 compared to \$27.71 in 2017 and \$10.79 in 2016. During 2017, a net tax benefit was recorded of approximately \$1.0 billion or \$15.72 per diluted share, primarily related to the revaluation of the Company's net deferred tax liabilities as a result of the U.S. corporate income tax rate being reduced from 35% to 21% as part of the Tax Cuts and Jobs Act of 2017 ("U.S. Tax Reform").

Consolidated income before income taxes decreased \$297.0 million in 2018, or 26.0%, and increased \$98.9 million, or 9.5%, in 2017. The decrease in income before income taxes in 2018 was due to investment related losses, unfavorable claims experience in the individual and group businesses in the U.S., and unfavorable results in the Company's Australian disability business due to adverse claims development and an increase in claims incurred in the current year. The increase in income before income taxes in 2017 was primarily due to higher investment income, increased other revenues and improved claims experience in Europe, Middle East and Africa ("EMEA") partially offset by higher interest expense. Foreign currency exchange fluctuations resulted an increase to income before income taxes of approximately \$9.7 million and a decrease of \$1.4 million in 2018 and 2017, respectively.

The Company recognizes in consolidated income, any changes in the fair value of embedded derivatives on modified coinsurance ("modco") or funds withheld treaties, equity-indexed annuity treaties ("EIAs") and variable annuities with guaranteed minimum benefit riders. The Company utilizes freestanding derivatives to minimize the income statement volatility due to changes in the fair value of embedded derivatives associated with guaranteed minimum benefit riders. The following table presents the effect of embedded derivatives and related freestanding derivatives on income before income taxes for the periods indicated (dollars in thousands):

	Twelve months ended December 31,		
	2018	2017	2016
Modco/Funds withheld:			
Unrealized gains (losses)	\$ (12,597)	\$ 144,724	\$ 54,169
Deferred acquisition costs/retrocession	14,658	(70,392)	(40,077)
Net effect	2,061	74,332	14,092
EIAs:			
Unrealized gains (losses)	17,378	40,260	28,137
Deferred acquisition costs/retrocession	(10,935)	(25,797)	(17,091)
Net effect	6,443	14,463	11,046
Guaranteed minimum benefit riders:			
Unrealized gains (losses)	(15,455)	32,166	7,834
Deferred acquisition costs/retrocession	38,852	50,365	(71,221)
Net effect	23,397	82,531	(63,387)
Related freestanding derivatives	(28,508)	(95,848)	34,538
Net effect after related freestanding derivatives	(5,111)	(13,317)	(28,849)
Total net effect of embedded derivatives	31,901	171,326	(38,249)
Related freestanding derivatives	(28,508)	(95,848)	34,538
Total net effect after freestanding derivatives	\$ 3,393	\$ 75,478	\$ (3,711)

Consolidated net premiums increased \$702.6 million, or 7.1%, and \$592.3 million, or 6.4%, in 2018 and 2017, respectively. The increases in 2018 and 2017 are primarily due to growth in life reinsurance in force. Foreign currency fluctuations relative to the prior year affected net premiums favorably by approximately \$43.0 million and \$25.9 million in 2018 and 2017, respectively. Consolidated assumed life insurance in force was \$3,329.2 billion, \$3,297.3 billion and \$3,062.5 billion as of December 31, 2018, 2017 and 2016, respectively. Foreign currency fluctuations affected the increases in assumed life insurance in force unfavorably by \$101.5 billion in 2018 and favorably by \$121.1 billion in 2017. The Company added new business production, measured by face amount of insurance in force, of \$406.7 billion, \$395.4 billion and \$404.8 billion during 2018, 2017 and 2016, respectively.

Consolidated investment income, net of related expenses, decreased \$16.1 million, or 0.7% in 2018, and increased \$242.8 million, or 12.7%, in 2017. The decrease in 2018 is primarily the result of decreases in investment yield and funds withheld at interest, partially offset by increases in the average invested asset base. The increase in 2017 was primarily due to an increase in the average invested asset base. Investment income is affected by changes in the fair value of the Company's funds withheld at interest assets associated with the reinsurance of certain EIA products. The re-measurement of these funds withheld assets decreased investment income by \$133.0 million in 2018 and increased investment income by \$117.0 million in 2017 when compared to prior periods. The effect on investment income of the EIAs' market value changes is substantially offset by a corresponding change in interest credited to policyholder account balances resulting in an insignificant effect on net income.

The average invested assets at amortized cost, excluding spread related business, totaled \$26.6 billion, \$25.2 billion and \$23.2 billion in 2018, 2017 and 2016, respectively. The average yield earned on investments, excluding spread related business, was 4.45%, 4.55% and 4.57% in 2018, 2017 and 2016, respectively. The average yield will vary from year to year depending on several variables, including the prevailing interest rate and credit spread environment, prepayment fees and make-whole premiums, changes in the mix of the underlying investments and cash balances, and the timing of dividends and distributions on certain investments. Investment income in 2018 and 2017 benefited from distributions from joint ventures and limited partnerships, which can be highly variable from year to year. A continued low interest rate environment is expected to put downward pressure on this yield in future reporting periods.

Total investment related gains (losses), net, decreased by \$337.8 million or 201.3% in 2018 and increased by \$73.7 million, or 78.2%, in 2017. Fluctuations in investment related gains (losses), net are primarily due to unfavorable and favorable changes in the value of embedded derivatives related to reinsurance treaties written on a modco or funds withheld basis of \$157.3 million and \$90.6 million in 2018 and 2017, respectively. In addition, 2018 reflects net realized losses on investment sales compared to net realized gains in 2017. Net realized losses in 2018 are primarily related to repositioning of fixed maturity securities in a rising interest rate environment. Investment impairments on fixed maturity securities decreased by \$14.1 million in 2018 and increased by \$3.8 million in 2017, compared to the prior years. See Note 4 - "Investments" and Note 5 - "Derivative Instruments" in the Notes to Consolidated Financial Statements for additional information on investment related gains (losses), net, and derivatives. Investment income is allocated to the operating segments based upon average assets and related capital levels deemed appropriate to support segment operations.

The effective tax rate on a consolidated basis was 15.4%, (59.4)%, and 32.8% for 2018, 2017, and 2016, respectively. The 2018 effective tax rate was lower than the U.S. Statutory rate of 21% primarily as a result of the release of a valuation allowance on foreign tax credits, which was partially offset by tax expense related to global intangible low-taxed income (“GILTI”) and valuation allowance increases. The 2017 effective tax rate includes the tax effects of the U.S. Tax Reform. The Company recorded an estimated net tax benefit of approximately \$1.0 billion resulting in a reduction to the effective tax rate. See Note 9 - “Income Tax” in the Notes to Consolidated Financial Statements for additional information on the Company’s consolidated effective tax rate.

Critical Accounting Policies

The Company’s accounting policies are described in Note 2 – “Significant Accounting Policies and Pronouncements” in the Notes to Consolidated Financial Statements. The Company believes its most critical accounting policies include the establishment of premiums receivable; amortization of deferred acquisition costs (“DAC”); the establishment of liabilities for future policy benefits and incurred but not reported claims; the valuation of investments and investment impairments; the valuation of embedded derivatives; and accounting for income taxes. The balances of these accounts require extensive use of assumptions and estimates, particularly related to the future performance of the underlying business.

Differences in experience compared with the assumptions and estimates utilized in establishing premiums receivable, the justification of the recoverability of DAC, in establishing reserves for future policy benefits and claim liabilities, or in the determination of other-than-temporary impairments to investment securities can have a material effect on the Company’s results of operations and financial condition.

Premiums Receivable

Premiums are accrued when due and in accordance with information received from the ceding company. When the Company enters into a new reinsurance agreement, it records accruals based on the terms of the reinsurance treaty. Similarly, when a ceding company fails to report information on a timely basis, the Company records accruals based on the terms of the reinsurance treaty as well as historical experience. Other management estimates include adjustments for increased insurance in force on existing treaties, lapsed premiums given historical experience, the financial health of specific ceding companies, collateral value and the legal right of offset on related amounts (i.e. allowances and claims) owed to the ceding company. Under the legal right of offset provisions in its reinsurance treaties, the Company can withhold payments for allowances and claims from unpaid premiums.

Deferred Acquisition Costs

Costs of acquiring new business, which vary with and are directly related to the production of new business, have been deferred to the extent that such costs are deemed recoverable from future premiums or gross profits. Such costs include commissions and allowances as well as certain costs of policy issuance and underwriting. Non-commission costs related to the acquisition of new and renewal insurance contracts may be deferred only if they meet the following criteria:

- Incremental direct costs of a successful contract acquisition.
- Portions of employees’ salaries and benefits directly related to time spent performing specified acquisition activities for a contract that has been acquired or renewed.
- Other costs directly related to the specified acquisition or renewal activities that would not have been incurred had that acquisition contract transaction not occurred.

The Company tests the recoverability for each year of business at issue before establishing additional DAC. The Company also performs annual tests to establish that DAC remain recoverable at all times, and if financial performance significantly deteriorates to the point where a deficiency exists, a cumulative charge to current operations will be recorded. No such adjustments related to DAC recoverability were made in 2018, 2017 and 2016.

DAC related to traditional life insurance contracts are amortized with interest over the premium-paying period of the related policies in proportion to the ratio of individual period premium revenues to total anticipated premium revenues over the life of the policy. Such anticipated premium revenues are estimated using the same assumptions used for computing liabilities for future policy benefits.

DAC related to interest-sensitive life and investment-type contracts is amortized over the lives of the contracts, in relation to the present value of estimated gross profits (“EGP”) from mortality, investment income, and expense margins. The EGP for asset-intensive products include the following components: (1) estimates of fees charged to policyholders to cover mortality, surrenders and maintenance costs, less amount of risk upon death; (2) expected interest rate spreads between income earned and amounts credited to policyholder accounts; and (3) estimated costs of administration. EGP is also reduced by the Company’s estimate of future losses due to defaults in fixed maturity securities as well as the change in reserves for embedded derivatives.

DAC is sensitive to changes in assumptions regarding these EGP components, and any change in such assumptions could have an effect on the Company's profitability.

The Company periodically reviews the EGP valuation model and assumptions so that the assumptions reflect best estimates of future experience. Two assumptions are considered to be most significant: (1) estimated interest spread, and (2) estimated future policy lapses. As of December 31, 2018, the Company had \$420.2 million of DAC related to asset-intensive products, all within the U.S. and Latin America Financial Solutions segment. The following table reflects the possible change that would occur in a given year if assumptions, as a percentage of current DAC related to asset-intensive products, are changed as illustrated:

Quantitative Change in Significant Assumptions	One-Time Increase in DAC	One-Time Decrease in DAC
Estimated interest spread increasing (decreasing) 25 basis points from the current spread	4.43%	(4.65)%
Estimated future policy lapse rates decreasing (increasing) 20% on a permanent basis (including surrender charges)	5.22%	(4.66)%

In general, a change in assumption that improves the Company's expectations regarding EGP is going to have the effect of deferring the amortization of DAC into the future, thus increasing earnings and the current DAC balance. DAC can be no greater than the initial DAC balance plus interest and would be subject to recoverability testing, which is ignored for purposes of this analysis. Conversely, a change in assumption that decreases EGP will have the effect of speeding up the amortization of DAC, thus reducing earnings and lowering the DAC balance. The Company also adjusts DAC to reflect changes in the unrealized gains and losses on available-for-sale fixed maturity securities since these changes affect EGP. This adjustment to DAC is reflected in accumulated other comprehensive income.

The DAC associated with the Company's non-asset-intensive business is less sensitive to changes in estimates for investment yields, mortality and lapses. In accordance with generally accepted accounting principles, the estimates include provisions for the risk of adverse deviation and are not adjusted unless experience significantly deteriorates to the point where a premium deficiency exists.

The following table displays DAC balances for the Traditional and Financial Solutions segments as of December 31, 2018:

(dollars in thousands)	Traditional	Financial Solutions	Total
U.S. and Latin America	\$ 1,824,874	\$ 420,154	\$ 2,245,028
Canada	192,661	—	192,661
Europe, Middle East and Africa	239,161	—	239,161
Asia Pacific	702,439	18,481	720,920
Total	<u>\$ 2,959,135</u>	<u>\$ 438,635</u>	<u>\$ 3,397,770</u>

As of December 31, 2018, the Company estimates that all of its DAC balance is collateralized by surrender fees due to the Company and the reduction of policy liabilities, in excess of termination values, upon surrender or lapse of a policy.

Liabilities for Future Policy Benefits and Incurred but not Reported Claims

Liabilities for future policy benefits under long-duration life insurance policies (policy reserves) are computed based upon expected investment yields, mortality and withdrawal (lapse) rates, and other assumptions, including a provision for adverse deviation from expected claim levels. Liabilities for policy claims and benefits for short-duration contracts are accounted for based on actuarial estimates of the amount of loss inherent in that period's claims, including losses incurred for which claims have not been reported. Short-duration contract loss estimates rely on actuarial observations of ultimate loss experience for similar historical events. The Company primarily relies on its own valuation and administration systems to establish policy reserves. The policy reserves the Company establishes may differ from those established by the ceding companies due to the use of different mortality and other assumptions. However, the Company relies upon its ceding company clients to provide accurate data, including policy-level information, premiums and claims, which is the primary information used to establish reserves. The Company's administration departments work directly with clients to help ensure information is submitted in accordance with the reinsurance contracts. Additionally, the Company performs periodic audits of the information provided by clients. The Company establishes reserves for processing backlogs with a goal of clearing all backlogs within a ninety-day period. The backlogs are usually due to data errors the Company discovers or computer file compatibility issues, since much of the data reported to the Company is in electronic format and is uploaded to its computer systems.

The Company periodically reviews actual historical experience and relative anticipated experience compared to the assumptions used to establish aggregate policy reserves. Further, the Company establishes premium deficiency reserves if actual and anticipated experience indicates that existing aggregate policy reserves, together with the present value of future gross premiums, are not sufficient to cover the present value of future benefits, settlement and maintenance costs and to recover

unamortized acquisition costs. The premium deficiency reserve is established through a charge to income, as well as a reduction to unamortized acquisition costs and, to the extent there are no unamortized acquisition costs, an increase to future policy benefits. Because of the many assumptions and estimates used in establishing reserves and the long-term nature of the Company's reinsurance contracts, the reserving process, while based on actuarial science, is inherently uncertain. If the Company's assumptions, particularly on mortality, are inaccurate, its reserves may be inadequate to pay claims and there could be a material adverse effect on its results of operations and financial condition.

Claims payable for incurred but not reported losses for long-duration life policies are determined using case-basis estimates and lag studies of past experience. The time lag from the date of the claim or death to the date when the ceding company reports the claim to the Company can be several months and can vary significantly by ceding company, business segment and product type. Incurred but not reported claims are estimates on an undiscounted basis, using actuarial estimates of historical claims expense, adjusted for current trends and conditions. These estimates are continually reviewed and the ultimate liability may vary significantly from the amount recognized, which are reflected in net income in the period in which they are determined.

Claims payable for incurred but not reported losses for disability, medical and other short-duration contracts are determined using actuarial methods based on historical claim patterns as well as estimated changes in cost trends. The Company also reviews and evaluates how prior periods' estimates are developed when estimating the accrual for the current period. To the extent appropriate, changes in such development are recorded as a change to the current period expense. Historically, the amount of the claim development adjustment made in subsequent reporting periods for prior period estimates has been in a reasonable range given the Company's normal claim fluctuations.

Valuation of Investments and Other-than-Temporary Impairments

The Company primarily invests in fixed maturity securities, mortgage loans, short-term investments, and other invested assets. For investments reported at fair value, the Company utilizes, when available, fair values based on quoted prices in active markets that are regularly and readily obtainable. Generally, these are very liquid investments and the valuation does not require management judgment. When quoted prices in active markets are not available, fair value is based on market valuation techniques, market comparable pricing and the income approach. The Company may utilize information from third parties, such as pricing services and brokers, to assist in determining the fair value for certain investments; however, management is ultimately responsible for all fair values presented in the Company's consolidated financial statements. This includes responsibility for monitoring the fair value process, ensuring objective and reliable valuation practices and pricing of assets and liabilities, and approving changes to valuation methodologies and pricing sources. The selection of the valuation technique(s) to apply considers the definition of an exit price and the nature of the investment being valued and significant expertise and judgment is required.

Fixed maturity securities are classified as available-for-sale and are carried at fair value. Unrealized gains and losses on fixed maturity securities classified as available-for-sale, less applicable deferred income taxes as well as related adjustments to deferred acquisition costs, if applicable, are reflected as a direct charge or credit to accumulated other comprehensive income ("AOCI") in stockholders' equity on the consolidated balance sheets.

See "Investments" in Note 2 – "Significant Accounting Policies and Pronouncements" and Note 6 – "Fair Value of Assets and Liabilities" in the Notes to the Consolidated Financial Statements for additional information regarding the valuation of the Company's investments.

Mortgage loans on real estate are carried at unpaid principal balances, net of any unamortized premium or discount and valuation allowances. For a discussion regarding the valuation allowance for mortgage loans see "Mortgage Loans on Real Estate" in Note 2 – "Significant Accounting Policies and Pronouncements" in the Notes to the Consolidated Financial Statements.

In addition, investments are subject to impairment reviews to identify when a decline in value is other-than-temporary. Other-than-temporary impairment losses related to non-credit factors are recognized in AOCI whereas the credit loss portion is recognized in investment related gains (losses), net. See "Other-than-Temporary Impairment" in Note 2 – "Significant Accounting Policies and Pronouncements" in the Notes to the Consolidated Financial Statements for a discussion of the policies regarding other-than-temporary impairments.

Valuation of Embedded Derivatives

The Company reinsures certain annuity products that contain terms that are deemed to be embedded derivatives, primarily equity-indexed annuities and variable annuities with guaranteed minimum benefits. The Company assesses each identified embedded derivative to determine whether it is required to be bifurcated under the general accounting principles for *Derivatives and Hedging*. If the instrument would not be reported in its entirety at fair value and it is determined that the terms of the embedded derivative are not clearly and closely related to the economic characteristics of the host contract, and that a separate instrument with the same terms would qualify as a derivative instrument, the embedded derivative is bifurcated from the host contract and accounted for as a freestanding derivative. Such embedded derivatives are carried on the consolidated balance sheets at fair value with the host contract.

Additionally, reinsurance treaties written on a modified coinsurance or funds withheld basis are subject to the general accounting principles for *Derivatives and Hedging* related to embedded derivatives. The majority of the Company's funds withheld at interest balances are associated with its reinsurance of annuity contracts, the majority of which are subject to the general accounting principles for *Derivatives and Hedging* related to embedded derivatives. Management believes the embedded derivative feature in each of these reinsurance treaties is similar to a total return swap on the assets held by the ceding companies.

The valuation of the various embedded derivatives requires complex calculations based on actuarial and capital markets inputs and assumptions related to estimates of future cash flows and interpretations of the primary accounting guidance continue to evolve in practice. The valuation of embedded derivatives is sensitive to the investment credit spread environment. Changes in investment credit spreads are also affected by the application of a credit valuation adjustment ("CVA"). The fair value calculation of an embedded derivative in an asset position utilizes a CVA based on the ceding company's credit risk. Conversely, the fair value calculation of an embedded derivative in a liability position utilizes a CVA based on the Company's credit risk. Generally, an increase in investment credit spreads, ignoring changes in the CVA, will have a negative impact on the fair value of the embedded derivative (decrease in income). See "Derivative Instruments" in Note 2 – "Significant Accounting Policies and Pronouncements" and Note 6 – "Fair Value of Assets and Liabilities" in the Notes to the Consolidated Financial Statements for additional information regarding the valuation of the Company's embedded derivatives.

Income Taxes

The U.S. consolidated tax return includes the operations of RGA and all eligible subsidiaries. Certain RGA subsidiaries file separate U.S. income tax returns as these companies are currently ineligible for inclusion in the consolidated federal tax return. The Company's foreign subsidiaries are taxed under applicable local statutes.

The Company provides for federal, state and foreign income taxes currently payable, as well as those deferred due to temporary differences between the tax basis of assets and liabilities and the reported amounts, and are recognized in net income or in certain cases in other comprehensive income. The Company's accounting for income taxes represents management's best estimate of various events and transactions considering the laws enacted as of the reporting date. U.S. Tax Reform creates additional complexity due to various provisions that require management judgment and assumptions, which are subject to change.

Deferred tax assets and liabilities are measured by applying the relevant jurisdictions' enacted tax rate to the temporary difference in the period in which the temporary differences are expected to reverse. The Company will establish a valuation allowance if management determines, based on available information, that it is more likely than not that deferred income tax assets will not be realized. The Company has deferred tax assets including those related to net operating and capital losses. The Company has projected its ability to utilize its U.S. and foreign deferred tax assets and has determined that all of the U.S. assets including losses are expected to be utilized and established a valuation allowance on the portion of the foreign deferred tax assets the Company believes more likely than not will not be realized.

Significant judgment is required in determining whether valuation allowances should be established as well as the amount of such allowances. When making such a determination, consideration is given to, among other things, the following:

- (i) future taxable income exclusive of reversing temporary differences and carryforwards;
- (ii) future reversals of existing taxable temporary differences;
- (iii) taxable income in prior carryback years; and
- (iv) tax planning strategies.

Any such changes could significantly affect the amounts reported in the consolidated financial statements in the year these changes occur.

The Company reports uncertain tax positions in accordance with generally accepted accounting principles. In order to recognize the benefit of an uncertain tax position, the position must meet the more likely than not criteria of being sustained. Unrecognized tax benefits due to tax uncertainties that do not meet the more likely than not criteria are included within other liabilities and are charged to earnings in the period that such determination is made. The Company classifies interest related to tax uncertainties as interest expense whereas penalties related to tax uncertainties are classified as a component of income tax.

See Note 9 - "Income Tax" for further discussion including the impact of the December 22, 2017 enactment of U.S. Tax Reform.

Results of Operations by Segment

U.S. and Latin America Operations

The U.S. and Latin America operations include business generated by its offices in the U.S., Mexico and Brazil. The offices in Mexico and Brazil provide services to clients in other Latin American countries. U.S. and Latin America operations consist of two major segments: Traditional and Financial Solutions. The Traditional segment primarily specializes in the reinsurance of individual mortality-risk, health and long-term care and to a lesser extent, group reinsurance. The Financial Solutions segment consists of Asset-Intensive and Financial Reinsurance. Asset-Intensive within the Financial Solutions segment includes coinsurance of annuities and corporate-owned life insurance policies and to a lesser extent, fee-based synthetic guaranteed investment contracts, which include investment-only, stable value contracts. Financial Reinsurance within the Financial Solutions segment primarily involves assisting ceding companies in meeting applicable regulatory requirements by enhancing the ceding companies' financial strength and regulatory surplus position through relatively low risk reinsurance transactions. Typically these transactions do not qualify as reinsurance under GAAP, due to the low-risk nature of the transactions, so only the related net fees are reflected in other revenues on the consolidated statements of income.

For the year ended December 31, 2018

	Financial Solutions			Total U.S. and Latin America
	Traditional	Asset-Intensive	Financial Reinsurance	
(dollars in thousands)				
Revenues:				
Net premiums	\$ 5,533,256	\$ 27,203	\$ —	\$ 5,560,459
Investment income, net of related expenses	729,757	700,041	6,583	1,436,381
Investment related gains (losses), net	8,177	(57,228)	—	(49,051)
Other revenues	24,543	128,124	102,522	255,189
Total revenues	<u>6,295,733</u>	<u>798,140</u>	<u>109,105</u>	<u>7,202,978</u>
Benefits and expenses:				
Claims and other policy benefits	5,048,749	130,234	—	5,178,983
Interest credited	82,046	311,837	—	393,883
Policy acquisition costs and other insurance expenses	738,574	158,929	16,017	913,520
Other operating expenses	139,954	29,346	10,404	179,704
Total benefits and expenses	<u>6,009,323</u>	<u>630,346</u>	<u>26,421</u>	<u>6,666,090</u>
Income before income taxes	<u>\$ 286,410</u>	<u>\$ 167,794</u>	<u>\$ 82,684</u>	<u>\$ 536,888</u>

For the year ended December 31, 2017

	Financial Solutions			Total U.S. and Latin America
	Traditional	Asset-Intensive	Financial Reinsurance	
(dollars in thousands)				
Revenues:				
Net premiums	\$ 5,356,321	\$ 23,683	\$ —	\$ 5,380,004
Investment income, net of related expenses	728,073	769,932	8,541	1,506,546
Investment related gains (losses), net	(1,606)	144,343	—	142,737
Other revenues	17,383	98,782	105,097	221,262
Total revenues	<u>6,100,171</u>	<u>1,036,740</u>	<u>113,638</u>	<u>7,250,549</u>
Benefits and expenses:				
Claims and other policy benefits	4,760,194	78,447	—	4,838,641
Interest credited	82,218	379,921	—	462,139
Policy acquisition costs and other insurance expenses	753,336	229,506	22,804	1,005,646
Other operating expenses	130,989	28,158	9,958	169,105
Total benefits and expenses	<u>5,726,737</u>	<u>716,032</u>	<u>32,762</u>	<u>6,475,531</u>
Income before income taxes	<u>\$ 373,434</u>	<u>\$ 320,708</u>	<u>\$ 80,876</u>	<u>\$ 775,018</u>

For the year ended December 31, 2016

For the year ended December 31, 2016		Financial Solutions		
	Traditional	Asset-Intensive	Financial Reinsurance	Total U.S. and Latin America
(dollars in thousands)				
Revenues:				
Net premiums	\$ 5,249,571	\$ 24,349	\$ —	\$ 5,273,920
Investment income, net of related expenses	699,833	623,974	7,123	1,330,930
Investment related gains (losses), net	(4,229)	13,648	—	9,419
Other revenues	19,793	93,614	77,738	191,145
Total revenues	5,964,968	755,585	84,861	6,805,414
Benefits and expenses:				
Claims and other policy benefits	4,632,821	81,860	—	4,714,681
Interest credited	85,029	251,247	—	336,276
Policy acquisition costs and other insurance expenses	749,487	174,225	14,650	938,362
Other operating expenses	126,530	24,111	10,973	161,614
Total benefits and expenses	5,593,867	531,443	25,623	6,150,933
Income before income taxes	\$ 371,101	\$ 224,142	\$ 59,238	\$ 654,481

Income before income taxes decreased by \$238.1 million, or 30.7%, and increased by \$120.5 million, or 18.4%, in 2018 and 2017, respectively. The decrease in 2018 was primarily due to unfavorable claims experience in the group disability and healthcare excess lines of business. Additionally, the individual life line of business experienced higher claims, partially related to a severe influenza season in 2018. Also contributing to the year over year decline in income were lower investment related gains and changes in the value of the embedded derivatives associated with reinsurance treaties structured on a modco or funds withheld basis. The increase in 2017 was the result of several factors, including changes in the value of the embedded derivatives associated with reinsurance treaties structured on a modco or funds withheld, an increase in investment related capital gains and additional variable investment income.

Traditional Reinsurance

Income before income taxes for the U.S. and Latin America Traditional segment decreased by \$87.0 million, or 23.3%, and increased by \$2.3 million, or 0.6% in 2018 and 2017, respectively. The decrease in 2018 reflects unfavorable claims experience from the group disability and healthcare excess business as well as higher individual life claims, in part relating to the severe influenza season. The increase in 2017 was primarily due to higher investment income from variable investment income and a growing asset base offset somewhat by lower investment yields and a slightly lower underwriting margin.

Net premiums increased \$176.9 million, or 3.3%, and \$106.8 million, or 2.0% in 2018 and 2017, respectively. The increase in 2018 and 2017 was primarily due to organic premium growth in yearly renewable term and coinsurance business. The segment added new life business production, measured by face amount of insurance in force, of \$106.5 billion, \$99.4 billion and \$126.4 billion during 2018, 2017 and 2016, respectively. Total face amount of life business in force was \$1,610.1 billion, \$1,609.8 billion and \$1,609.3 billion as of December 31, 2018, 2017 and 2016, respectively.

Net investment income increased \$1.7 million, or 0.2%, and \$28.2 million, or 4.0%, in 2018 and 2017, respectively. The increase in 2018 was due to a higher asset base largely offset by lower investment yields with variable investment income relatively consistent for both periods. The increase in 2017 was primarily due to strong variable investment income associated with a higher level of bond make-whole premiums and distributions from joint ventures and limited partnerships, and an increase in the average invested asset base partially offset by a lower investment yield.

Claims and other policy benefits as a percentage of net premiums ("loss ratios") were 91.2%, 88.9% and 88.3% in 2018, 2017 and 2016, respectively. The increase in the loss ratio for 2018 was primarily due to unfavorable claims experience in the individual line of business and higher claims from the group disability and healthcare excess lines of business. Similarly, the increase in the loss ratio for 2017 was primarily related to unfavorable claims experience in the individual mortality and group health lines of business.

Interest credited expense decreased by \$0.2 million, or 0.2%, in 2018 and \$2.8 million, or 3.3%, in 2017. There was a minimal decrease in interest credited expense in 2018, while the decrease in 2017 relates primarily to one treaty in which the interest credited varies depending on the number of deaths in any given year. The decrease is primarily offset by a decrease in investment income. The variances in interest credited expense are largely offset by variances in investment income. Interest credited in this segment relates to amounts credited on cash value products, which also have a significant mortality component. Income before income taxes is affected by the spread between the investment income and the interest credited on the underlying products.

Policy acquisition costs and other insurance expenses as a percentage of net premiums were 13.3%, 14.1% and 14.3% in 2018, 2017 and 2016, respectively. Overall, these ratios are expected to remain in a predictable range and may fluctuate from period to period due to varying allowance levels within coinsurance-type arrangements. In addition, the amortization pattern of previously capitalized amounts, which are subject to the form of the reinsurance agreement and the underlying insurance policies may vary. Also, the mix of first year coinsurance business versus yearly renewable term business can cause the percentage to fluctuate from period to period. In recent years, reinsurance treaties weighted toward yearly renewable term structures have contributed to relatively stable rates.

Other operating expenses increased \$9.0 million, or 6.8%, and \$4.5 million, or 3.5% in 2018 and 2017, respectively. In addition to reflecting normal growth in employee related costs, the increase in operating expenses for 2018 reflects expense growth associated with key business line initiatives focused on enhancing the services and reinsurance options for clients. Other operating expenses, as a percentage of net premiums, were 2.5%, 2.4% and 2.4% in 2018, 2017 and 2016, respectively. The expense ratio tends to fluctuate only slightly from period to period due to maturity and scale of this segment.

Financial Solutions - Asset-Intensive Reinsurance

Asset-Intensive within the U.S. and Latin America Financial Solutions segment primarily assumes investment risk within underlying annuities and corporate-owned life insurance policies. Most of these agreements are coinsurance, coinsurance with funds withheld or modco. The Company recognizes profits or losses primarily from the spread between the investment income earned and the interest credited on the underlying deposit liabilities, income associated with longevity risk, and fees associated with variable annuity account values and guaranteed investment contracts.

Impact of certain derivatives

Income from the asset-intensive business tends to be volatile due to changes in the fair value of certain derivatives, including embedded derivatives associated with reinsurance treaties structured on a modco or funds withheld basis, as well as embedded derivatives associated with the Company's reinsurance of EIAs and variable annuities with guaranteed minimum benefit riders. Fluctuations occur period to period primarily due to changing investment conditions including, but not limited to, interest rate movements (including risk-free rates and credit spreads), implied volatility, the Company's own credit risk and equity market performance, all of which are factors in the calculations of fair value. Therefore, management believes it is helpful to distinguish between the effects of changes in these derivatives, net of related hedging activity, and the primary factors that drive profitability of the underlying treaties, namely investment income, fee income (included in other revenues), and interest credited. These fluctuations are considered unrealized by management and do not affect current cash flows, crediting rates or spread performance on the underlying treaties.

The following table summarizes the asset-intensive results and quantifies the impact of these embedded derivatives for the periods presented. Revenues before certain derivatives, benefits and expenses before certain derivatives, and income before income taxes and certain derivatives, should not be viewed as substitutes for GAAP revenues, GAAP benefits and expenses, and GAAP income before income taxes.

For the year ended December 31, (dollars in thousands)	2018	2017	2016
Revenues:			
Total revenues	\$ 798,140	\$ 1,036,740	\$ 755,585
Less:			
Embedded derivatives – modco/funds withheld treaties	(20,991)	146,329	58,737
Guaranteed minimum benefit riders and related free standing derivatives	6,241	(18,686)	(39,786)
Revenues before certain derivatives	812,890	909,097	736,634
Benefits and expenses:			
Total benefits and expenses	630,346	716,032	531,443
Less:			
Embedded derivatives – modco/funds withheld treaties	(14,658)	70,392	40,077
Guaranteed minimum benefit riders and related free standing derivatives	11,352	(5,369)	(10,937)
Equity-indexed annuities	(6,443)	(14,463)	(11,046)
Benefits and expenses before certain derivatives	640,095	665,472	513,349
Income (loss) before income taxes:			
Income before income taxes	167,794	320,708	224,142
Less:			
Embedded derivatives – modco/funds withheld treaties	(6,333)	75,937	18,660
Guaranteed minimum benefit riders and related free standing derivatives	(5,111)	(13,317)	(28,849)
Equity-indexed annuities	6,443	14,463	11,046
Income before income taxes and certain derivatives	\$ 172,795	\$ 243,625	\$ 223,285

Embedded Derivatives - Modco/Funds Withheld Treaties - Represents the change in the fair value of embedded derivatives on funds withheld at interest associated with treaties written on a modco or funds withheld basis. The fair value changes of embedded derivatives on funds withheld at interest associated with treaties written on a modco or funds withheld basis are reflected in revenues, while the related impact on deferred acquisition expenses is reflected in benefits and expenses. The Company's utilization of a credit valuation adjustment did not have a material effect on the change in fair value of these embedded derivatives for the years ended December 31, 2018, 2017 and 2016.

The change in fair value of the embedded derivatives - modco/funds withheld treaties increased (decreased) income before income taxes by \$(6.3) million, \$75.9 million and \$18.7 million in 2018, 2017 and 2016, respectively. The decrease in income for 2018 was primarily due to the repositioning in the funds withheld portfolio. The increases in income in 2017 and 2016 were primarily due to tightening credit spreads.

Guaranteed Minimum Benefit Riders - Represents the impact related to guaranteed minimum benefits associated with the Company's reinsurance of variable annuities. The fair value changes of the guaranteed minimum benefits along with the changes in fair value of the free standing derivatives (interest rate swaps, financial futures and equity options), purchased by the Company to substantially hedge the liability are reflected in revenues, while the related impact on deferred acquisition expenses is reflected in benefits and expenses. The Company's utilization of a credit valuation adjustment did not have a material effect on the change in fair value of these embedded derivatives for the years ended December 31, 2018, 2017 and 2016.

The change in fair value of the guaranteed minimum benefits, after allowing for changes in the associated free standing derivatives, decreased income before income taxes by \$5.1 million, \$13.3 million and \$28.8 million in 2018, 2017 and 2016, respectively. The decrease in income for 2018 is primarily associated with unfavorable policyholder termination experience. The decrease in income for 2017 and 2016 was primarily due to the annual update of best estimate actuarial assumptions to account for lower policyholder termination experience.

Equity-Indexed Annuities - Represents changes in the liability for equity-indexed annuities in excess of changes in account value, after adjustments for related deferred acquisition expenses. The change in fair value of embedded derivative liabilities associated with equity-indexed annuities increased income before income taxes by \$6.4 million, \$14.5 million and \$11.0 million, in 2018, 2017 and 2016, respectively. The increase in income in 2018 was primarily due to lower policyholder lapses and withdrawals. The increase in income in 2017 and 2016 was primarily due to declining long-term interest rates and the flattening of the treasury yield curve.

Discussion and analysis before certain derivatives

Income before income taxes and certain derivatives decreased by \$70.8 million and increased by \$20.3 million in 2018 and 2017, respectively. The decrease in income in 2018 was primarily due to lower investment related gains (losses,) partially due to the repositioning of coinsurance portfolios associated with new transactions, net of the corresponding impact to deferred acquisition costs. The increase in income in 2017, was primarily due to the impact of rising equity markets associated with the Company's reinsurance of EIAs and variable annuities and higher variable investment income.

Revenue before certain derivatives decreased by \$96.2 million and increased by \$172.5 million in 2018 and 2017, respectively. The decrease in 2018 was primarily due to the change in fair value of equity options associated with the reinsurance of EIAs and lower investment related gains (losses) associated with coinsurance portfolios, partially offset by revenues from new transactions. The increase in 2017 was primarily due to the change in fair value of equity options associated with the reinsurance of EIAs, investment income from a new coinsurance transaction in 2017, and higher investment related gains (losses) associated with coinsurance and funds withheld portfolios. The effect on investment income related to equity options is substantially offset by a corresponding change in interest credited.

Benefits and expenses before certain derivatives decreased by \$25.4 million and increased by \$152.1 million in 2018 and 2017, respectively. The decrease in benefits and expenses in 2018 was primarily due to lower interest credited associated with the reinsurance of EIAs, partially offset by the impact from new transactions. The increase in 2017 was primarily due to higher interest credited associated with the reinsurance of EIAs, interest credited from a new coinsurance transaction in 2017 and the corresponding impact to deferred acquisition costs from investment related gains (losses) in coinsurance and funds withheld portfolios. The effect on interest credited related to equity options is substantially offset by a corresponding change in investment income.

The invested asset base supporting this segment increased to \$20.1 billion as of December 31, 2018 from \$15.4 billion as of December 31, 2017. The increase in the asset base was due primarily to new coinsurance transactions in the second half of 2018. As of December 31, 2018 and 2017, \$3.8 billion and \$4.1 billion, respectively, of the invested assets were funds withheld at interest, of which greater than 90% is associated with one client.

Financial Solutions - Financial Reinsurance

Financial Reinsurance within the U.S. Financial Solutions segment income before income taxes consists primarily of net fees earned on financial reinsurance transactions. Additionally, a portion of the business is brokered business in which the Company

does not participate in the assumption of risk. The fees earned from financial reinsurance contracts and brokered business are reflected in other revenues, and the fees paid to retrocessionaires are reflected in policy acquisition costs and other insurance expenses.

Income before income taxes increased by \$1.8 million, or 2.2%, and \$21.6 million, or 36.5%, in 2018 and 2017, respectively. The increases in 2018 and 2017 were primarily related to the growth from new transactions.

At December 31, 2018, 2017 and 2016, the amount of reinsurance assumed from client companies, as measured by pre-tax statutory surplus, risk based capital and other financial reinsurance structures, was \$14.2 billion, \$13.1 billion and \$8.8 billion, respectively. The increases in both 2018 and 2017 can primarily be attributed to an increase in the number of new transactions executed each year and is consistent with the increase in related income. Fees earned from this business can vary significantly depending on the size of the transactions and the timing of their completion and, therefore, can fluctuate from period to period.

Canada Operations

The Company conducts reinsurance business in Canada primarily through RGA Canada, which assists clients with capital management activity and mortality and morbidity risk management. The Canada operations are primarily engaged in Traditional reinsurance, which consists mainly of traditional individual life reinsurance, and to a lesser extent creditor, group life and health, critical illness and disability reinsurance. Creditor insurance covers the outstanding balance on personal, mortgage or commercial loans in the event of death, disability or critical illness and is generally shorter in duration than traditional individual life insurance. The Canada Financial Solutions segment consists of longevity and financial reinsurance.

For the year ended December 31, 2018

(dollars in thousands)

Revenues:

	Traditional	Financial Solutions	Total Canada
Net premiums	\$ 1,024,021	\$ 43,372	\$ 1,067,393
Investment income, net of related expenses	199,412	1,334	200,746
Investment related gains (losses), net	(733)	—	(733)
Other revenues	1,704	3,882	5,586
Total revenues	1,224,404	48,588	1,272,992

Benefits and expenses:

Claims and other policy benefits	847,745	36,808	884,553
Interest credited	83	—	83
Policy acquisition costs and other insurance expenses	231,258	766	232,024
Other operating expenses	33,010	1,438	34,448
Total benefits and expenses	1,112,096	39,012	1,151,108
Income before income taxes	\$ 112,308	\$ 9,576	\$ 121,884

For the year ended December 31, 2017

(dollars in thousands)

Revenues:

	Traditional	Financial Solutions	Total Canada
Net premiums	\$ 901,976	\$ 38,229	\$ 940,205
Investment income, net of related expenses	189,018	5,115	194,133
Investment related gains (losses), net	10,619	—	10,619
Other revenues	1,907	5,594	7,501
Total revenues	1,103,520	48,938	1,152,458

Benefits and expenses:

Claims and other policy benefits	757,892	29,639	787,531
Interest credited	20	—	20
Policy acquisition costs and other insurance expenses	192,183	789	192,972
Other operating expenses	33,207	1,867	35,074
Total benefits and expenses	983,302	32,295	1,015,597
Income before income taxes	\$ 120,218	\$ 16,643	\$ 136,861

For the year ended December 31, 2016

(dollars in thousands)

Revenues:

	Traditional	Financial Solutions	Total Canada
Net premiums	\$ 928,642	\$ 38,701	\$ 967,343
Investment income, net of related expenses	178,927	2,692	181,619
Investment related gains (losses), net	10,528	—	10,528
Other revenues	(93)	5,545	5,452
Total revenues	1,118,004	46,938	1,164,942

Benefits and expenses:

Claims and other policy benefits	707,409	36,275	743,684
Interest credited	19	—	19
Policy acquisition costs and other insurance expenses	238,252	1,231	239,483
Other operating expenses	37,619	1,487	39,106
Total benefits and expenses	983,299	38,993	1,022,292
Income before income taxes	\$ 134,705	\$ 7,945	\$ 142,650

Income before income taxes decreased by \$15.0 million, or 10.9%, and \$5.8 million, or 4.1%, in 2018 and 2017, respectively. The decrease in income for 2018 was primarily due to unfavorable traditional individual life mortality experience as compared to 2017. The decrease in income for 2017 was primarily due to unfavorable traditional individual life mortality experience compared to favorable experience in 2016, partially offset by favorable experience on longevity business. Foreign currency exchange fluctuation in the Canadian dollar resulted in a decrease in income before income taxes of \$1.0 million and an increase of \$3.7 million in 2018 and 2017, respectively.

Traditional Reinsurance

Income before income taxes decreased by \$7.9 million, or 6.6%, and \$14.5 million, or 10.8%, in 2018 and 2017, respectively. The decrease in income for 2018 was primarily due to unfavorable traditional individual life mortality experience. The decrease in income for 2017 was primarily due to unfavorable traditional individual life mortality experience compared to favorable experience in 2016. Foreign currency exchange fluctuation in the Canadian dollar resulted in a decrease in income before income taxes of \$1.2 million and an increase of \$3.2 million in 2018 and 2017, respectively.

Net premiums increased by \$122.0 million, or 13.5%, and decreased by \$26.7 million, or 2.9%, in 2018 and 2017, respectively. The increase in 2018 was primarily due to new in force block transactions completed during 2018. The decrease in 2017 was primarily due to a decrease in creditor premiums of \$80.4 million partially offset by an increase in traditional individual life business premiums from annually increasing premium rates on yearly renewable term treaties and favorable foreign currency exchange fluctuation. Foreign currency exchange fluctuation in the Canadian dollar had a negligible effect on net premiums in 2018 and resulted in an increase of \$18.5 million in 2017. The segment added new business production, measured by face amount of insurance in force, of \$43.1 billion, \$35.6 billion and \$34.9 billion during 2018, 2017 and 2016, respectively.

Net investment income increased \$10.4 million, or 5.5%, and \$10.1 million, or 5.6%, in 2018 and 2017, respectively. The effect of changes in the Canadian dollar exchange rates had a negligible effect on net investment income in 2018 and resulted in an increase of \$4.0 million in 2017. Increases in the invested asset base increased net investment income in 2018 and 2017.

Loss ratios for the segment were 82.8%, 84.0% and 76.2% in 2018, 2017 and 2016, respectively. The decrease in the 2018 loss ratio was due to the aforementioned new inforce block transactions completed during of 2018 partially offset by unfavorable traditional life mortality experience compared to the prior year. The increase in the 2017 loss ratio was due to unfavorable traditional life mortality experience compared to favorable experience in 2016 and a decrease in creditor business premiums. Loss ratios for the individual life mortality business were 91.6%, 97.2% and 93.5% in 2018, 2017 and 2016, respectively. The aforementioned new inforce block transactions reduced the traditional individual life mortality business loss ratio in 2018 by 8.3%. Historically, the loss ratio increased annually primarily as the result of several large permanent level premium in force blocks assumed in 1997 and 1998. These blocks are mature blocks of long-term permanent level premium business in which mortality as a percentage of net premiums is expected to be higher than historical ratios. The nature of permanent level premium policies requires the Company to set up actuarial liabilities and invest the amounts received in excess of early-year claims costs to fund claims in later years when premiums, by design, continue to be level as compared to expected increasing mortality or claim costs. As such, investment income becomes a more significant component of profitability of these in force blocks. Excluding creditor business, claims and other policy benefits, as a percentage of net premiums and investment income were 74.2%, 76.5% and 73.7% in 2018, 2017 and 2016, respectively.

Policy acquisition costs and other insurance expenses as a percentage of net premiums for traditional individual life business were 22.6%, 21.3% and 25.7% in 2018, 2017 and 2016, respectively. Overall, while these ratios are expected to remain in a predictable range, and may fluctuate from period to period due to varying allowance levels and product mix. The decrease in 2017 reflects a lower level of creditor business, which typically has a higher level of acquisition costs. In addition, the amortization

pattern of previously capitalized amounts, which are subject to the form of the reinsurance agreement and the underlying insurance policies, may vary.

Other operating expenses decreased by \$0.2 million, or 0.6%, and \$4.4 million, or 11.7%, in 2018 and 2017, respectively. Foreign currency exchange fluctuation in the Canadian dollar had a negligible effect on other operating expenses for 2018 and resulted in an increase in other operating expenses of \$0.7 million in 2017, respectively. The decrease in other operating expenses in 2017 is primarily due to decrease in allocated expense from corporate operations. Other operating expenses as a percentage of net premiums were 3.2%, 3.7% and 4.1% in 2018, 2017 and 2016, respectively.

Financial Solutions

Income before income taxes decreased by \$7.1 million, or 42.5%, and increased by \$8.7 million, or 109.5%, in 2018 and 2017, respectively. The decrease in income before income taxes in 2018 was primarily a result of favorable experience on the longevity block of business in 2017 and a decrease in investment income. The increase in income before income taxes in 2017 was primarily due to favorable experience on longevity business. Foreign currency exchange fluctuation in the Canadian dollar resulted in an increase in income before income taxes of \$0.2 million and a decrease of \$0.4 million in 2018 and 2017, respectively.

Net premiums increased \$5.1 million, or 13.5%, and decreased by \$0.5 million, or 1.2%, in 2018 and 2017, respectively. The increase in net premiums in 2018 was primarily due to longevity business, where the premium structure generally increases over time. Foreign currency exchange fluctuation in the Canadian dollar resulted in an increase in net premiums of \$0.1 million and \$0.9 million in 2018 and 2017, respectively.

Net investment income decreased by \$3.8 million, or 73.9%, and increased by \$2.4 million, or 90.0%, in 2018 and 2017, respectively. The decrease in net investment income in 2018 was primarily due to a decrease in the invested asset base. The increase in net investment income for 2017 was primarily due to a growth in the invested asset base.

Claims and other policy benefits increased by \$7.2 million, or 24.2%, and decreased by \$6.6 million, or 18.3%, in 2018 and 2017, respectively. The increase in 2018 and the decrease in 2017 reflect favorable experience on the longevity block of business in 2017. The effect of changes in the Canadian dollar exchange rates resulted in a decrease in claims and other policy benefits of \$0.2 million and an increase of \$0.6 million in 2018 and 2017, respectively.

Europe, Middle East and Africa Operations

The Europe, Middle East and Africa (“EMEA”) operations includes business generated by its offices principally in France, Germany, Ireland, Italy, the Middle East, the Netherlands, Poland, South Africa, Spain and the United Kingdom (“UK”). EMEA consists of two major segments: Traditional and Financial Solutions. The Traditional segment primarily provides reinsurance through yearly renewable term and coinsurance agreements on a variety of life, health and critical illness products. Reinsurance agreements may be facultative or automatic agreements covering primarily individual risks and, in some markets, group risks. The Financial Solutions segment consists of reinsurance and other transactions associated with longevity closed blocks, payout annuities, capital management solutions and financial reinsurance.

For the year ended December 31, 2018

(dollars in thousands)

Revenues:

	Traditional	Financial Solutions	Total EMEA
Net premiums	\$ 1,423,199	\$ 195,333	\$ 1,618,532
Investment income, net of related expenses	66,242	133,855	200,097
Investment related gains (losses), net	(161)	555	394
Other revenues	5,325	20,143	25,468
Total revenues	1,494,605	349,886	1,844,491

Benefits and expenses:

Claims and other policy benefits	1,233,458	123,151	1,356,609
Interest credited	—	(6,659)	(6,659)
Policy acquisition costs and other insurance expenses	98,981	3,981	102,962
Other operating expenses	107,047	33,026	140,073
Total benefits and expenses	1,439,486	153,499	1,592,985
Income before income taxes	\$ 55,119	\$ 196,387	\$ 251,506

For the year ended December 31, 2017

(dollars in thousands)

Revenues:

	Traditional	Financial Solutions	Total EMEA
Net premiums	\$ 1,301,640	\$ 163,720	\$ 1,465,360
Investment income, net of related expenses	55,511	123,258	178,769
Investment related gains (losses), net	52	5,487	5,539
Other revenues	4,872	18,606	23,478
Total revenues	1,362,075	311,071	1,673,146

Benefits and expenses:

Claims and other policy benefits	1,096,211	142,796	1,239,007
Interest credited	—	11,078	11,078
Policy acquisition costs and other insurance expenses	92,143	1,833	93,976
Other operating expenses	103,235	31,850	135,085
Total benefits and expenses	1,291,589	187,557	1,479,146
Income before income taxes	\$ 70,486	\$ 123,514	\$ 194,000

For the year ended December 31, 2016

(dollars in thousands)

Revenues:

	Traditional	Financial Solutions	Total EMEA
Net premiums	\$ 1,140,062	\$ 180,271	\$ 1,320,333
Investment income, net of related expenses	50,301	125,282	175,583
Investment related gains (losses), net	5	13,537	13,542
Other revenues	4,781	21,428	26,209
Total revenues	1,195,149	340,518	1,535,667

Benefits and expenses:

Claims and other policy benefits	999,005	164,883	1,163,888
Interest credited	—	13,131	13,131
Policy acquisition costs and other insurance expenses	63,848	6	63,854
Other operating expenses	102,237	24,491	126,728
Total benefits and expenses	1,165,090	202,511	1,367,601
Income before income taxes	\$ 30,059	\$ 138,007	\$ 168,066

Income before income taxes increased by \$57.5 million, or 29.6%, and \$25.9 million, or 15.4%, in 2018 and 2017, respectively. The increase in income before income taxes for 2018 was primarily due to favorable performance in the closed block longevity and payout annuity business partially offset by unfavorable individual mortality and morbidity experience. The increase in income before income taxes for 2017 was primarily due to favorable individual mortality, morbidity and longevity experience, partly offset by lower payout annuity performance. Foreign currency exchange fluctuations resulted in an increase in income before income taxes of \$7.4 million and a decrease of \$4.3 million in 2018 and 2017, respectively.

Traditional Reinsurance

Income before income taxes decreased by \$15.4 million, or 21.8%, and increased by \$40.4 million, or 134.5%, in 2018 and 2017, respectively. The decrease in income before income taxes in 2018 was primarily due to unfavorable individual mortality and morbidity experience. The increase in income before income taxes in 2017 was primarily due to business growth and favorable individual morbidity and mortality experience. Foreign currency exchange fluctuations resulted in an increase in income before income taxes of \$1.5 million in both 2018 and 2017.

Net premiums increased by \$121.6 million, or 9.3%, and \$161.6 million, or 14.2%, in 2018 and 2017, respectively. The increase in 2018 was primarily due to increased volumes of mostly individual life business as well as increased health business. The increase in 2017 was primarily due to increased business volumes, most notably in Italy, South Africa, the Middle East and the Netherlands related to new treaties in 2017 and favorable growth from existing treaties. The segment added new business production, measured by face amount of insurance in force, of \$190.2 billion, \$181.5 billion and \$169.8 billion during 2018, 2017 and 2016, respectively. The face amount of reinsurance in force totaled \$716.3 billion, \$739.0 billion, and \$603.0 billion at December 31, 2018, 2017 and 2016, respectively. Foreign currency fluctuations unfavorably affected the face amount of reinsurance in force by \$41.4 billion and favorably by \$64.7 billion in 2018 and 2017, respectively. Foreign currency exchange fluctuations resulted in an increase in net premiums of \$40.6 million and a decrease of \$8.3 million in 2018 and 2017, respectively. The segment's primary currencies are the British pound, the Euro and the South African rand.

A portion of the net premiums for the segment, in each period presented, relates to reinsurance of critical illness coverage, primarily in the UK. This coverage provides a benefit in the event of the diagnosis of a pre-defined critical illness. Net premiums earned from this coverage totaled \$187.6 million, \$191.5 million and \$203.4 million in 2018, 2017 and 2016, respectively.

Net investment income increased by \$10.7 million, or 19.3%, and \$5.2 million, or 10.4%, in 2018 and 2017, respectively. The increase in 2018 was primarily due to an increase in the invested asset base and increased invested asset yield. The increase in 2017 was primarily due to an increase in the invested asset base related to increased business volumes. Foreign currency exchange fluctuations resulted in an increase in net investment income of \$1.8 million and \$0.1 million in 2018 and 2017, respectively.

Other revenues increased by \$0.5 million, or 9.3% and \$0.1 million, or 1.9%, in 2018 and 2017, respectively. These variances are primarily due to foreign currency transactions.

Loss ratios for this segment were 86.7%, 84.2% and 87.6% in 2018, 2017 and 2016, respectively. The decrease in loss ratio in 2017 was primarily due to favorable claims experience and changes in the mix of business reflecting increased volumes of new business with lower loss ratios, but with higher commissions. These higher commissions are reflected in the increase of the 2017 policy acquisition cost ratio below.

Policy acquisition costs and other insurance expenses as a percentage of net premiums were 7.0%, 7.1% and 5.6% for 2018, 2017 and 2016, respectively. The increase in policy acquisition cost ratio in 2017 was due primarily to changes in the mix of business reflecting increased volumes of new business with higher commissions.

Other operating expenses increased by \$3.8 million, or 3.7%, and \$1.0 million, or 1.0%, in 2018 and 2017, respectively. The increases in 2018 and 2017 were primarily due to the effects of foreign currency exchange fluctuations. Foreign currency exchange fluctuations resulted in an increase in operating expenses of \$2.6 million and \$1.6 million 2018 and 2017, respectively. Other operating expenses as a percentage of net premiums totaled 7.5%, 7.9% and 9.0% in 2018, 2017 and 2016, respectively.

Financial Solutions

Income before income taxes increased by \$72.9 million, or 59.0%, and decreased by \$14.5 million, or 10.5%, in 2018 and 2017, respectively. The increase in 2018 was primarily due to favorable performance in the closed block longevity and payout annuity businesses. The decrease in 2017 in income before income taxes was primarily due to payout annuity experience normalizing after a particularly positive 2016, partly offset by favorable longevity business results. Foreign currency exchange fluctuations resulted in an increase in income before income taxes of \$5.8 million and a decrease of \$5.8 million in 2018 and 2017, respectively.

Net premiums increased by \$31.6 million, or 19.3%, and decreased by \$16.6 million, or 9.2%, in 2018 and 2017, respectively. The increase in 2018 in net premiums was due to increased volumes of closed block longevity business. The decrease in 2017 in net premiums was due to a new retrocession treaty, executed for risk management purposes that cedes longevity risk to third parties, partially offset by an increase in premiums from new transactions. Foreign currency exchange fluctuations resulted in an increase in net premiums of \$6.5 million and a decrease of \$7.6 million in 2018 and 2017, respectively.

Net investment income increased \$10.6 million, or 8.6%, and decreased by \$2.0 million, or 1.6%, in 2018 and 2017, respectively. The increase in investment income in 2018 was due to an increased invested asset base resulting from business growth. The decrease in investment income in 2017 was primarily due to adverse foreign currency exchange fluctuations. Foreign currency exchange fluctuations resulted in an increase in investment income of \$4.8 million and a decrease of \$4.8 million in 2018 and 2017, respectively.

Other revenues increased by \$1.5 million, or 8.3% and decreased by \$2.8 million, or 13.2%, in 2018 and 2017, respectively. The increase in 2018 in other revenues was due to increased volumes of fee income business. The decrease in 2017 in other revenues was due to experience from a longevity swap normalizing after a particularly positive 2016. Fees earned from this business can vary significantly depending on the size of the transactions and the timing of their completion and, therefore, can fluctuate from period to period.

Claims and other policy benefits decreased \$19.6 million, or 13.8%, and \$22.1 million, or 13.4%, in 2018 and 2017, respectively. The decrease in 2018 was primarily due to higher terminations in closed block longevity business. The decrease in 2017 was primarily due to the aforementioned new longevity retrocession treaty that cedes longevity risk to third parties, net of an increase in claims and other policy benefits from new transactions.

Interest credited expense decreased by \$17.7 million, or 160.1%, and \$2.1 million, or 15.6%, in 2018 and 2017, respectively. Interest credited in this segment relates to amounts credited to the contractholders of unit-linked products. This amount will fluctuate according to contractholder investment selections, equity returns and interest rates. The effect on interest credited related to unit-linked products is substantially offset by a corresponding change in investment income.

Other operating expenses increased by \$1.2 million, or 3.7%, and \$7.4 million, or 30.0%, in 2018 and 2017, respectively. The increase in other operating expenses of 2018 was primarily due to an increase in foreign currency exchange fluctuations. The increase in 2017 was primarily due to increased administration costs related to longevity transactions, costs related to a potential

acquisition and by the effect of foreign currency exchange fluctuations. Foreign currency exchange fluctuations resulted in an increase in operating expenses of \$1.2 million and a decrease of \$0.4 million 2018 and 2017, respectively.

Asia Pacific Operations

The Asia Pacific operations include business generated by its offices principally in Australia, China, Hong Kong, India, Japan, Malaysia, New Zealand, Singapore, South Korea and Taiwan. The Traditional segment's principal types of reinsurance include individual and group life and health, critical illness, disability and superannuation. Superannuation is the Australian government mandated compulsory retirement savings program. Superannuation funds accumulate retirement funds for employees, and, in addition, typically offer life and disability insurance coverage. The Financial Solutions segment includes financial reinsurance, asset-intensive and certain disability and life blocks. Reinsurance agreements may be facultative or automatic agreements covering primarily individual risks and in some markets, group risks.

For the year ended December 31, 2018

(dollars in thousands)

Revenues:

	Traditional	Financial Solutions	Total Asia Pacific
Net premiums	\$ 2,296,435	\$ 866	\$ 2,297,301
Investment income, net of related expenses	95,521	40,729	136,250
Investment related gains (losses), net	7	(10,278)	(10,271)
Other revenues	24,885	23,162	48,047
Total revenues	2,416,848	54,479	2,471,327

Benefits and expenses:

Claims and other policy benefits	1,885,355	13,343	1,898,698
Interest credited	—	26,383	26,383
Policy acquisition costs and other insurance expenses	194,685	3,467	198,152
Other operating expenses	159,307	17,252	176,559
Total benefits and expenses	2,239,347	60,445	2,299,792
Income before income taxes	\$ 177,501	\$ (5,966)	\$ 171,535

For the year ended December 31, 2017

(dollars in thousands)

Revenues:

Net premiums	\$ 2,053,029	\$ 2,419	\$ 2,055,448
Investment income, net of related expenses	91,675	34,529	126,204
Investment related gains (losses), net	(10)	13,938	13,928
Other revenues	65,992	22,889	88,881
Total revenues	2,210,686	73,775	2,284,461

Benefits and expenses:

Claims and other policy benefits	1,635,728	18,020	1,653,748
Interest credited	—	22,447	22,447
Policy acquisition costs and other insurance expenses	277,582	5,111	282,693
Other operating expenses	148,590	15,067	163,657
Total benefits and expenses	2,061,900	60,645	2,122,545
Income before income taxes	\$ 148,786	\$ 13,130	\$ 161,916

For the year ended December 31, 2016

(dollars in thousands)

Revenues:

	Traditional	Financial Solutions	Total Asia Pacific
Net premiums	\$ 1,681,505	\$ 5,428	\$ 1,686,933
Investment income, net of related expenses	83,049	23,648	106,697
Investment related gains (losses), net	14	9,436	9,450
Other revenues	6,582	24,870	31,452
Total revenues	1,771,150	63,382	1,834,532

Benefits and expenses:

Claims and other policy benefits	1,345,951	25,180	1,371,131
Interest credited	—	12,796	12,796
Policy acquisition costs and other insurance expenses	163,036	6,071	169,107
Other operating expenses	148,235	15,272	163,507
Total benefits and expenses	1,657,222	59,319	1,716,541
Income before income taxes	\$ 113,928	\$ 4,063	\$ 117,991

Income before income taxes increased by \$9.6 million, or 5.9%, and \$43.9 million, or 37.2%, in 2018 and 2017, respectively. The increase in income before income taxes in 2018 was primarily due to business growth across the region and net favorable claims experience in Asia, partially offset by adverse claims experience in Australia. Also offsetting the increase in income before income taxes were losses on sales of investment securities and unfavorable changes in the fair value of derivatives in 2018 compared with gains on security sales and favorable changes in the fair value of derivatives in 2017. The increase in income before income taxes in 2017 was primarily due to higher income from offices in Asia driven by business growth, most notably in Hong Kong and Southeast Asia. Foreign currency exchange fluctuations resulted in an increase in income before income taxes of \$3.1 million and a decrease of \$1.1 million in 2018 and 2017, respectively.

Traditional Reinsurance

Income before income taxes increased by \$28.7 million, or 19.3%, and \$34.9 million, or 30.6%, in 2018 and 2017, respectively. The increase in income before income taxes in 2018 was primarily due to business growth across the region and favorable claims experience in Asia partially offset by adverse claims experience in Australia. The increase in income before income taxes in 2017 was primarily due to higher income from offices in Asia driven by business growth. Foreign currency exchange fluctuations resulted in an increase in income before income taxes of \$2.8 million and a decrease of \$1.4 million in 2018 and 2017, respectively.

Net premiums increased by \$243.4 million, or 11.9%, and \$371.5 million, or 22.1%, in 2018 and 2017, respectively. The increase in premiums for 2018 was primarily driven by new business written in Asian markets partially offset by the effect of three treaties recaptured in Australia in the fourth quarter of 2017. The increase in premiums for 2017 was driven by both new and existing business written throughout the segment. The segment added new business production, measured by face amount of insurance in force, of \$66.9 billion, \$78.9 billion and \$73.7 billion during 2018, 2017 and 2016, respectively. The face amount of reinsurance in force totaled \$616.9 billion, \$552.3 billion, and \$492.2 billion at December 31, 2018, 2017 and 2016, respectively. Foreign currency fluctuations unfavorably affected the face amount of reinsurance in force by \$28.0 billion and favorably by \$30.6 billion in 2018 and 2017, respectively. Foreign currency exchange fluctuations resulted in a decrease in net premiums of \$2.8 million and an increase of \$22.7 million in 2018 and 2017, respectively.

A portion of the net premiums for the segment, in each period presented, relates to reinsurance of critical illness coverage. This coverage provides a benefit in the event of the diagnosis of a pre-defined critical illness. Reinsurance of critical illness in the Asia Pacific operations is offered primarily in South Korea, Australia, China and Hong Kong. Net premiums from this coverage totaled \$806.1 million, \$611.0 million, and \$398.3 million in 2018, 2017 and 2016, respectively.

Net investment income increased \$3.8 million, or 4.2%, and \$8.6 million, or 10.4%, in 2018 and 2017, respectively. The increase in 2018 was primarily due to higher investment yields, largely offset by a lower invested asset base. The increase in 2017 was primarily due to a higher invested asset base. Foreign currency exchange fluctuations resulted in a decrease in net investment income of \$1.2 million and an increase of \$1.7 million in 2018 and 2017, respectively.

Other revenues decreased by \$41.1 million, or 62.3%, and increased by \$59.4 million, or 902.6%, in 2018 and 2017, respectively. The decrease in other revenues in 2018 was primarily due to \$57.9 million in recapture fees recognized in 2017 associated with the recapture of three treaties in Australia, compared to \$9.7 million of recapture fees in 2018 associated with the recapture of one treaty in Australia. The increase in other revenues in 2017 was primarily due to the aforementioned recapture fees associated with three treaties recaptured in Australia.

Loss ratios for this segment were 82.1%, 79.7% and 80.0% for 2018, 2017 and 2016, respectively. The increase in the loss ratio in 2018 was primarily due to new business mix in Asia and adverse claims experience in Australia. The decrease in the loss ratio in 2017 was primarily due to improved claims experience in Australia compared to the prior year.

Policy acquisition costs and other insurance expenses as a percentage of net premiums were 8.5%, 13.5% and 9.7% for 2018, 2017 and 2016, respectively. The ratio of policy acquisition costs and other insurance expenses as a percentage of net premiums increased in 2017, primarily due to the acceleration of policy acquisition costs related to the aforementioned recaptured treaties in Australia. The ratio of policy acquisition costs and other insurance expenses as a percentage of net premiums should generally decline as the business matures; however, the percentage does fluctuate periodically due to variations in the mixture of business and client-related actions.

Other operating expenses increased \$10.7 million, or 7.2%, and \$0.4 million, or 0.2%, in 2018 and 2017, respectively. The 2018 increase in other operating expenses is mainly due to increased compensation costs, primarily in the growing Asian operations. Foreign currency exchange fluctuations resulted in a decrease in operating expenses of \$0.3 million and an increase of \$1.2 million in 2018 and 2017, respectively. Other operating expenses as a percentage of net premiums totaled 6.9%, 7.2% and 8.8% in 2018, 2017 and 2016, respectively. The timing of premium flows and the level of costs associated with the entrance into and development of new markets in the Asia Pacific segment may cause other operating expenses as a percentage of net premiums to fluctuate over periods of time.

Financial Solutions

Income before income taxes decreased by \$19.1 million, or 145.4%, and increased by \$9.1 million, or 223.2%, in 2018 and 2017, respectively. The decrease in income before income taxes in 2018 was primarily due to investment related losses and a decrease in the fair value of derivatives in 2018 compared to investment related gains and an increase in the fair value of derivatives in 2017. The increase in income before income taxes in 2017 was primarily due to favorable lapse experience on a closed treaty in Japan as compared to 2016. Foreign currency exchange fluctuations resulted in an increase in income before income taxes of \$0.4 million and \$0.3 million in 2018 and 2017, respectively.

Net premiums decreased by \$1.6 million, or 64.2%, and \$3.0 million, or 55.4%, in 2018 and 2017, respectively. The decreases were primarily due to policy lapses on a closed treaty in Japan.

Net investment income increased \$6.2 million, or 18.0%, and \$10.9 million, or 46.0%, in 2018 and 2017, respectively. The increase in investment income in 2018 was primarily due to higher investment yields, partially offset by a lower invested asset base. The increase in investment income in 2017 was primarily due to a higher invested asset base.

Other revenues increased by \$0.3 million, or 1.2%, and decreased by \$2.0 million, or 8.0%, in 2018 and 2017, respectively. The decrease in other revenues in 2017 was primarily due to run-off of the previously mentioned treaty in Japan. The amount of reinsurance assumed from client companies, as measured by pre-tax statutory surplus, risk based capital and other financial reinsurance structures was \$2.9 billion and \$2.6 billion at December 31, 2018 and 2017, respectively. Fees earned from this business can vary significantly depending on the size of the transactions and the timing of their completion and therefore can fluctuate from period to period.

Claims and other policy benefits decreased by \$4.7 million, or 26.0%, and \$7.2 million, or 28.4%, in 2018 and 2017, respectively. The decrease in 2018 was attributable to lower lapses on the aforementioned closed treaty in Japan, partially offset by higher claims and policy benefits from new business. The decrease in 2017 was attributable to lower lapses from policies from a closed block of business in Japan. Management views recent experience as normal short-term volatility that is inherent in the business.

Other operating expenses increased by \$2.2 million, or 14.5%, and decreased by \$0.2 million, or 1.3%, in 2018 and 2017, respectively. The timing of premium flows and the level of costs associated with the entrance into and development of new markets in the Asia Pacific segment causes other operating expenses to fluctuate over periods of time.

Corporate and Other

Corporate and Other revenues primarily include investment income from unallocated invested assets, investment related gains and losses and service fees. Corporate and Other expenses consist of the offset to capital charges allocated to the operating segments within the policy acquisition costs and other insurance income line item, unallocated overhead and executive costs, interest expense related to debt, and the investment income and expense associated with the Company's collateral finance and securitization transactions and service business expenses. Additionally, Corporate and Other includes results from certain wholly-owned subsidiaries, such as RGAX, and joint ventures that, among other activities, develop and market technology, and provide consulting and outsourcing solutions for the insurance and reinsurance industries. In the past two years, the Company has increased its investment and expenditures in this area in an effort to both support its clients and generate new future revenue streams.

For the year ended December 31,

(dollars in thousands)

Revenues:

	2018	2017	2016
Net premiums	\$ 91	\$ 113	\$ 342
Investment income, net of related expenses	165,051	148,999	117,057
Investment related gains (losses), net	(110,427)	(4,943)	51,256
Other revenues	29,161	10,986	12,301
Total revenues	83,876	155,155	180,956

Benefits and expenses:

Claims and other policy benefits	86	(10)	(9)
Interest credited	11,514	6,356	2,469
Policy acquisition costs and other insurance income	(124,138)	(108,641)	(100,266)
Other operating expenses	255,353	207,769	154,554
Interest expense	147,355	146,025	137,623
Collateral finance and securitization expense	29,699	28,636	25,827
Total benefits and expenses	319,869	280,135	220,198
Loss before income taxes	\$ (235,993)	\$ (124,980)	\$ (39,242)

Loss before income taxes increased by \$111.0 million and \$85.7 million in 2018 and 2017, respectively. The increase in loss before income taxes for 2018 was primarily due to investment related losses and higher other operating expenses partially offset by increased other revenue. The increase in loss before income taxes for 2017 was primarily due to decreased net investment related gains, decreased other revenues and higher other operating expenses partially offset by increased investment income.

Net investment income increased by \$16.1 million, or 10.8%, and \$31.9 million, or 27.3%, in 2018 and 2017, respectively. The increase in 2018 was related to an increase in unallocated invested assets and higher variable investment income. The increase in 2017 was related to an increase in unallocated invested assets and higher investment yields.

Net investment related losses increased by \$105.5 million and \$56.2 million in 2018 and 2017, respectively. The increase in net investment related losses in 2018 was due to net losses on the sale of fixed maturity securities of \$55.2 million compared to gains in the prior year of \$36.7 million and a decline in the fair value of equity securities of \$23.6 million, which were offset by a \$18.3 million decrease in other-than-temporary impairments on fixed maturity securities. Net investment related losses in 2017 reflect higher impairments on fixed maturity and other securities of \$21.3 million and a reduction in net gains on the sale of fixed maturity securities of \$29.7 million, compared to 2016.

Other revenues increased by \$18.2 million, or 165.4%, and decreased by \$1.3 million, or 10.7%, in 2018 and 2017, respectively. The increase in 2018 was mainly due to the Company's January 2018 acquisition of LOGiQ3 Inc., a group of companies providing technology, consulting and outsourcing solutions primarily to the North American life insurance and reinsurance industry, which contributed \$20.5 million to other revenues in 2018.

Policy acquisition costs and other insurance income decreased by \$15.5 million, or 14.3%, and \$8.4 million, or 8.4%, in 2018 and 2017, respectively. Fluctuations period over period were attributable to the offset to capital charges allocated to the operating segments.

Other operating expenses increased by \$47.6 million, or 22.9%, and \$53.2 million, or 34.4%, in 2018 and 2017, respectively. The increase in other operating expenses during 2018 was due to increased compliance costs, strategic initiatives, acquisitions and increased incentive-based compensation. In addition, the aforementioned acquisition of LOGiQ3 Inc. contributed \$29.3 million of other operating expenses in 2018. The \$53.2 million increase in other operating expenses in 2017 was primarily related to a \$22.5 million capital project write-off, in addition to a \$13.7 million increase in compensation expense, mainly due to increased incentive-based compensation and pension benefits, and a \$10.0 million increase in consulting expenses due to various corporate initiatives.

Interest expense increased by \$1.3 million, or 0.9%, and \$8.4 million, or 6.1%, in 2018 and 2017, respectively. The increase in interest expense was primarily due to variability in tax-related interest expense. The \$8.4 million increase in interest expense during 2017 was primarily due to the issuance of \$800.0 million in long-term debt in June 2016, which was partially offset by the repayment of \$300.0 million of long-term debt in 2017.

Liquidity and Capital Resources

Overview

The Company believes that cash flows from the source of funds available to it will provide sufficient cash flows for the next twelve months to satisfy the current liquidity requirements of the Company under various scenarios that include the potential risk of early recapture of reinsurance treaties, market events and higher than expected claims. The Company performs periodic liquidity stress testing to ensure its asset portfolio includes sufficient high quality liquid assets that could be utilized to bolster its liquidity position under stress scenarios. These assets could be utilized as collateral for secured borrowing transactions with various third parties or by selling the securities in the open market if needed. The Company's liquidity requirements have been and will continue to be funded through net cash flows from operations. However, in the event of significant unanticipated cash requirements beyond normal liquidity needs, the Company has multiple liquidity alternatives available based on market conditions and the amount and timing of the liquidity need. These alternatives include borrowings under committed credit facilities, secured borrowings, the ability to issue long-term debt, preferred securities or common equity and, if necessary, the sale of invested assets subject to market conditions.

Current Market Environment

The current interest rate environment in select markets, primarily the U.S. and Canada, continues to put downward pressure on the Company's investment yield. The Company's average investment yield, excluding spread related business, for 2018 was at 4.45%, 10 basis points below the comparable 2017 rate. The Company's insurance liabilities, in particular its annuity products, are sensitive to changing market factors. Due to increases in risk free interest rates, gross unrealized gains on fixed maturity securities available-for-sale decreased from \$2,982.8 million at December 31, 2017 to \$1,858.7 million at December 31, 2018. Gross unrealized losses increased from \$113.3 million at December 31, 2017 to \$748.5 million at December 31, 2018.

The Company continues to be in a position to hold any investment security showing an unrealized loss until recovery, provided it remains comfortable with the credit of the issuer. As indicated above, gross unrealized gains on investment securities of \$1,858.7 million remain well in excess of gross unrealized losses of \$748.5 million as of December 31, 2018. Historically low interest rates continued to put pressure on the Company's investment yield. The Company does not rely on short-term funding or commercial paper and to date it has experienced no liquidity pressure, nor does it anticipate such pressure in the foreseeable future.

The Company projects its reserves to be sufficient and it would not expect to write down deferred acquisition costs or be required to take any actions to augment capital, even if interest rates remain at current levels for the next five years, assuming all other factors remain constant. While the Company has felt the pressures of sustained low interest rates and volatile equity markets and may continue to do so, its business operations are not overly sensitive to these risks. Although management believes the Company's current capital base is adequate to support its business at current operating levels, it continues to monitor new business opportunities and any associated new capital needs that could arise from the changing financial landscape.

The Holding Company

RGA is an insurance holding company whose primary uses of liquidity include, but are not limited to, the immediate capital needs of its operating companies, dividends paid to its shareholders, repurchase of common stock and interest payments on its indebtedness. The primary sources of RGA's liquidity include proceeds from its capital-raising efforts, interest income on undeployed corporate investments, interest income received on surplus notes with RGA Reinsurance, RCM and Rockwood Re and dividends from operating subsidiaries. As the Company continues its expansion efforts, RGA will continue to be dependent upon these sources of liquidity. See "Part IV – Item 15(a)(2) Financial Statement Schedules – Schedule II – Condensed Financial Information of Registrant" for more information regarding RGA's financial information.

RGA, through wholly-owned subsidiaries, has committed to provide statutory reserve support to third parties, in exchange for a fee, by funding loans if certain defined events occur. Such statutory reserves are required under the U.S. Valuation of Life Policies Model Regulation (commonly referred to as Regulation XXX for term life insurance policies and Regulation A-XXX for universal life secondary guarantees). The third-parties have recourse to RGA should the subsidiary fail to provide the required funding, however, as of December 31, 2018, the Company does not believe that it will be required to provide any funding under these commitments as the occurrence of the defined events is considered remote. See Note 12 - "Commitments, Contingencies and Guarantees" in the Notes to Consolidated Financial Statements for a table that presents these commitments by period and maximum obligation.

RGA established an intercompany revolving credit facility where certain subsidiaries can lend to or borrow from each other and from RGA in order to manage capital and liquidity more efficiently. The intercompany revolving credit facility, which is a series of demand loans among RGA and its affiliates, is permitted under applicable insurance laws. This facility reduces overall borrowing costs by allowing RGA and its operating companies to access internal cash resources instead of incurring third-party transaction costs. The statutory borrowing and lending limit for RGA's Missouri-domiciled insurance subsidiaries is currently 3% of the insurance company's admitted assets as of its most recent year-end. There were \$20.9 million and no borrowings outstanding under the intercompany revolving credit facility as of December 31, 2018 and 2017, respectively. In addition to loans associated

with the intercompany revolving credit facility, RGA and its subsidiary, RGA Capital LLC, provided loans to RGA Australian Holdings Pty Limited with a total outstanding balance of \$42.3 million and \$46.9 million as of December 31, 2018 and 2017, respectively.

The Company believes that it has sufficient liquidity for the next 12 months to fund its cash needs under various scenarios that include the potential risk of early recapture of reinsurance treaties and higher than expected death claims. Historically, the Company has generated positive net cash flows from operations. However, in the event of significant unanticipated cash requirements beyond normal liquidity, the Company has multiple liquidity alternatives available based on market conditions and the amount and timing of the liquidity need. These options include borrowings under committed credit facilities, secured borrowings, the ability to issue long-term debt, preferred securities or common equity and, if necessary, the sale of invested assets, subject to market conditions.

Undistributed earnings of the Company's foreign subsidiaries are targeted for reinvestment outside of the U.S. As of December 31, 2018, the amount of cash and cash equivalents and short-term investments held by the Company's subsidiaries that are taxed in a foreign jurisdiction was \$913.8 million. The GILTI provision generally eliminates U.S. federal income tax deferral on earnings of foreign subsidiaries, therefore the Company does not expect to incur any material incremental U.S. federal income tax on repatriation of these earnings. Incremental foreign withholding taxes are not expected to be material.

RGA endeavors to maintain a capital structure that provides financial and operational flexibility to its subsidiaries, credit ratings that support its competitive position in the financial services marketplace, and shareholder returns. As part of the Company's capital deployment strategy, it has in recent years repurchased shares of RGA common stock and paid dividends to RGA shareholders, as authorized by the board of directors. In January 2017, RGA's board of directors authorized a share repurchase program, with no expiration date, to repurchase up to \$400.0 million of RGA's outstanding common stock. The pace of repurchase activity depends on various factors such as the level of available cash, an evaluation of the costs and benefits associated with alternative uses of excess capital, such as acquisitions and in force reinsurance transactions, and RGA's stock price. Details underlying dividend and share repurchase program activity were as follows (in thousands, except share data):

	2018	2017	2016
Dividends to shareholders	\$ 140,110	\$ 117,291	\$ 100,371
Repurchases of treasury stock ⁽¹⁾	283,524	26,897	116,522
Total amount paid to shareholders	<u>\$ 423,634</u>	<u>\$ 144,188</u>	<u>\$ 216,893</u>
Number of shares repurchased ⁽¹⁾	1,932,055	208,680	1,356,892
Average price per share	\$ 146.75	\$ 128.89	\$ 85.87

(1) Excludes shares utilized to execute and settle certain stock incentive awards.

On January 24, 2019, RGA's board of directors authorized a share repurchase program for up to \$400.0 million of RGA's outstanding common stock. The authorization was effective immediately and does not have an expiration date. In connection with this new authorization, the board of directors terminated the stock repurchase authority granted in 2017.

RGA declared dividends totaling \$2.20 per share in 2018. All future payments of dividends are at the discretion of RGA's board of directors and will depend on the Company's earnings, capital requirements, insurance regulatory conditions, operating conditions, and other such factors as the board of directors may deem relevant. The amount of dividends that RGA can pay will depend in part on the operations of its reinsurance subsidiaries.

See Note 13 - "Debt" and Note 17 - "Equity" in the Notes to Consolidated Financial Statements for additional information regarding the Company's securities transactions.

Statutory Dividend Limitations

RCM, RGA Reinsurance and Chesterfield Re are subject to Missouri statutory provisions that restrict the payment of dividends. They may not pay dividends in any 12-month period in excess of the greater of the prior year's statutory net gain from operations or 10% of statutory capital and surplus at the preceding year-end, without regulatory approval. Aurora National is subject to California statutory provisions that are identical to those imposed by Missouri regarding the ability of Aurora National to pay dividends to RGA Reinsurance. The applicable statutory provisions only permit an insurer to pay a shareholder dividend from unassigned surplus. Any dividends paid by RGA Reinsurance would be paid to RCM, its parent company, which in turn has restrictions related to its ability to pay dividends to RGA. Chesterfield Re would pay dividends to its immediate parent Chesterfield Financial, which would in turn pay dividends to RCM, subject to the terms of the indenture for the embedded value securitization transaction, in which Chesterfield Financial cannot declare or pay any dividends so long as any private placement notes are outstanding. The MDOI allows RCM to pay a dividend to RGA to the extent RCM received the dividend from its subsidiaries, without limitation related to the level of unassigned surplus. Dividend payments from other subsidiaries are subject to regulations in the jurisdiction of domicile, which are generally based on their earnings and/or capital level.

The dividend limitations for RCM, RGA Reinsurance and Chesterfield Re are based on statutory financial results. Statutory accounting practices differ in certain respects from accounting principles used in financial statements prepared in conformity with GAAP. Significant differences include the treatment of deferred acquisition costs, deferred income taxes, required investment reserves, reserve calculation assumptions and surplus notes.

Dividend payments from non-U.S. operations are subject to similar restrictions established by local regulators. The non-U.S. regulatory regimes also commonly limit the dividend payments to the parent to a portion of the prior year's statutory income, as determined by the local accounting principles. The regulators of the Company's non-U.S. operations may also limit or prohibit profit repatriations or other transfers of funds to the U.S. if such transfers are deemed to be detrimental to the solvency or financial strength of the non-U.S. operations, or for other reasons. Most of the non-U.S. operating subsidiaries are second tier subsidiaries that are owned by various non-U.S. holding companies. The capital and rating considerations applicable to the first tier subsidiaries may also impact the dividend flow to RGA.

Debt

Certain of the Company's debt agreements contain financial covenant restrictions related to, among others, liens, the issuance and disposition of stock of restricted subsidiaries, minimum requirements of consolidated net worth, maximum ratios of debt to capitalization and change of control provisions. The Company is required to maintain a minimum consolidated net worth, as defined in the debt agreements, of \$5.3 billion, calculated as of the last day of each fiscal quarter. Also, consolidated indebtedness, calculated as of the last day of each fiscal quarter, cannot exceed 35% of the sum of the Company's consolidated indebtedness plus adjusted consolidated stockholders' equity. A material ongoing covenant default could require immediate payment of the amount due, including principal, under the various agreements. Additionally, the Company's debt agreements contain cross-default covenants, which would make outstanding borrowings immediately payable in the event of a material uncured covenant default under any of the agreements, including, but not limited to, non-payment of indebtedness when due for an amount in excess of the amounts set forth in those agreements, bankruptcy proceedings, or any other event that results in the acceleration of the maturity of indebtedness.

As of December 31, 2018 and 2017, the Company had \$2.8 billion in outstanding borrowings under its debt agreements and was in compliance with all covenants under those agreements. As of December 31, 2018 and 2017, the average interest rate on long-term debt outstanding was 5.24%. The ability of the Company to make debt principal and interest payments depends on the earnings and surplus of subsidiaries, investment earnings on undeployed capital proceeds, available liquidity at the holding company, and the Company's ability to raise additional funds.

The Company enters into derivative agreements with counterparties that reference either the Company's debt rating or its financial strength rating. If either rating is downgraded in the future, it could trigger certain terms in the Company's derivative agreements, which could negatively affect overall liquidity. For the majority of the Company's derivative agreements, there is a termination event, at the Company's option, should the long-term senior debt ratings drop below either BBB+ (S&P) or Baa1 (Moody's) or the financial strength ratings drop below either A- (S&P) or A3 (Moody's).

The Company may borrow up to \$850.0 million in cash and obtain letters of credit in multiple currencies on its revolving credit facility that matures in August 2023. As of December 31, 2018, the Company had no cash borrowings outstanding and \$18.2 million in issued, but undrawn, letters of credit under this facility.

Based on the historic cash flows and the current financial results of the Company, management believes RGA's cash flows will be sufficient to enable RGA to meet its obligations for at least the next 12 months.

Letters of Credit

The Company has obtained bank letters of credit in favor of various affiliated and unaffiliated insurance companies from which the Company assumes business. These letters of credit represent guarantees of performance under the reinsurance agreements and allow ceding companies to take statutory reserve credits. Certain of these letters of credit contain financial covenant restrictions similar to those described in the "Debt" discussion above. At December 31, 2018, there were approximately \$105.6 million of outstanding bank letters of credit in favor of third parties. Additionally, in accordance with applicable regulations, the Company utilizes letters of credit to secure statutory reserve credits when it retrocedes business to its affiliated subsidiaries. The Company cedes business to its affiliates to help reduce the amount of regulatory capital required in certain jurisdictions, such as the U.S. and the UK. The Company believes the capital required to support the business in the affiliates reflects more realistic expectations than the original jurisdiction of the business, where capital requirements are often considered to be quite conservative. As of December 31, 2018, \$1.4 billion in letters of credit from various banks were outstanding, but undrawn, backing reinsurance between the various subsidiaries of the Company. See Note 13—"Debt" in the Notes to Consolidated Financial Statements for information regarding the Company's letter of credit facilities.

Collateral Finance and Securitization Notes and Statutory Reserve Funding

The Company uses various internal and third-party reinsurance arrangements and funding sources to manage statutory reserve strain, including reserves associated with the U.S. Valuation of Life Policies Model Regulation (commonly referred to as Regulation XXX), and collateral requirements. Assets in trust and letters of credit are often used as collateral in these arrangements.

Regulation XXX, implemented in the U.S. for various types of life insurance business beginning January 1, 2000, significantly increased the level of reserves that U.S. life insurance and life reinsurance companies must hold on their statutory financial statements for various types of life insurance business, primarily certain level premium term life products. The reserve levels required under Regulation XXX increase over time and are normally in excess of reserves required under GAAP. In situations where primary insurers have reinsured business to reinsurers that are unlicensed and unaccredited in the U.S., the reinsurer must provide collateral equal to its reinsurance reserves in order for the ceding company to receive statutory financial statement credit. In order to manage the effect of Regulation XXX on its statutory financial statements, RGA Reinsurance has retroceded a majority of Regulation XXX reserves to unaffiliated and affiliated reinsurers, both licensed and unlicensed.

RGA Reinsurance's statutory capital may be significantly reduced if the unlicensed unaffiliated or affiliated reinsurer is unable to provide the required collateral to support RGA Reinsurance's statutory reserve credits and RGA Reinsurance cannot find an alternative source for collateral.

The Company has issued both collateral finance and securitization notes. The consolidated balance sheets include outstanding notes of \$682.0 million and \$783.9 million as of December 31, 2018 and 2017, respectively. See Note 14 - "Collateral Finance and Securitization Notes" in the Notes to Consolidated Financial Statements for additional information regarding the Company's collateral finance and securitization notes.

The demand for financing of the ceded reserve credits associated with the Company's assumed term life business has grown at a slower rate in recent years. The Company has been able to utilize its certified reinsurer, RGA Americas, as a means of reducing the burden of financing Regulation XXX and other types of reserves. The Company's Regulation XXX statutory reserve requirements associated with term life business and other statutory reserve requirements continues to require the Company to obtain additional letters of credit, put additional assets in trust, or utilize other funding mechanisms to support reserve credits. If the Company is unable to support the reserve credits, the regulatory capital levels of several of its subsidiaries may be significantly reduced, while the regulatory capital requirements for these subsidiaries would not change. The reduction in regulatory capital would not directly affect the Company's consolidated shareholders' equity under GAAP; however, it could affect the Company's ability to write new business and retain existing business.

Affiliated captives are commonly used in the insurance industry to help manage statutory reserve and collateral requirements. The NAIC has analyzed the insurance industry's use of affiliated captive reinsurers to satisfy certain reserve requirements and has adopted measures to promote uniformity in both the approval and supervision of such reinsurers. New standards to address the use of captive reinsurers were implemented, allowing current captives to continue in accordance with their currently approved plans. State insurance regulators that regulate the Company's domestic insurance companies have placed additional restrictions on the use of newly established captive reinsurers, which may increase costs and add complexity. As a result, the Company may need to alter the type and volume of business it reinsures, increase prices on those products, raise additional capital to support higher regulatory reserves or implement higher cost strategies, all of which could adversely affect the Company's competitive position and its results of operations. It is also possible that the NAIC could place limits on the recognition of capital held in related party captives when adopting its group capital calculation. Doing so would adversely impact the amount of capital that the group would otherwise be able to recognize and report as capital resident in the group.

In the U.S., the introduction of the certified reinsurer has provided an alternative way to manage collateral requirements. In 2014, RGA Americas was designated as a certified reinsurer by the MDOI. This designation allows the Company to retrocede business to RGA Americas in lieu of using captives for collateral requirements. Effective in 2017, principles-based reserves are permitted in the U.S. During 2016, the NAIC amended the standard valuation law to adopt life principles-based reserving that was effective January 1, 2017, allowing a three-year adoption period. The Company has chosen not to establish new captives while it evaluates the impact of principles-based reserving upon its overall risk management and financing programs, but continues to evaluate the effectiveness of the certified reinsurer option for financing its reserve growth compared to the option of establishing captives under the U.S. post-2014 regulations.

Assets in Trust

Some treaties give ceding companies the right to request that the Company place assets in trust for the benefit of the cedant to support statutory reserve credits in the event of a downgrade of the Company's ratings to specified levels, generally non-investment grade levels, or if minimum levels of financial condition are not maintained. As of December 31, 2018, these treaties had approximately \$3.4 billion in statutory reserves. Assets placed in trust continue to be owned by the Company, but their use is restricted based on the terms of the trust agreement. Securities with an amortized cost of \$2.3 billion were held in trust for the benefit of certain RGA subsidiaries to satisfy collateral requirements for reinsurance business at December 31, 2018. Additionally,

securities with an amortized cost of \$20.1 billion as of December 31, 2018, were held in trust to satisfy collateral requirements under certain third-party reinsurance treaties. Under certain conditions, the Company may be obligated to move reinsurance from one subsidiary of RGA to another subsidiary or make payments under a given treaty. These conditions include change in control or ratings of the subsidiary, insolvency, nonperformance under a treaty, or loss of reinsurance license of such subsidiary. If the Company was ever required to perform under these obligations, the risk to the Company on a consolidated basis under the reinsurance treaties would not change; however, additional capital may be required due to the change in jurisdiction of the subsidiary reinsuring the business, which could lead to a strain on liquidity.

Proceeds from the notes issued by Timberlake Financial and RGA's direct investment in Timberlake Financial were deposited into a series of trust accounts as collateral and are not available to satisfy the general obligations of the Company. As of December 31, 2018 the Company held deposits in trust and in custody of \$767.9 million for this purpose, which is not included in the figures above. A reserve account has been established to cover interest payments on notes issued by Chesterfield Financial that are not available to satisfy the general obligations of the Company. As of December 31, 2018 the Company held deposits in trust of \$13.5 million for this purpose, which is not included in the figures above. See "Collateral Finance and Securitization Notes and Statutory Reserve Funding" above for additional information on the Timberlake Financial and Chesterfield Financial notes.

Reinsurance Operations

Reinsurance agreements, whether facultative or automatic, generally provide recapture provisions. Most U.S.-based reinsurance treaties include a recapture right for ceding companies, generally after 10 years. Outside of the U.S., treaties primarily include a mutually agreed-upon recapture provision. Recapture rights permit the ceding company to reassume all or a portion of the risk formerly ceded to the reinsurer. In some situations, the Company has the right to place assets in trust for the benefit of the ceding party in lieu of recapture. Additionally, certain treaties may grant recapture rights to ceding companies in the event of a significant decrease in RGA Reinsurance's NAIC risk based capital ratio or financial strength rating. The RBC ratio trigger varies by treaty, with the majority between 125% and 225% of the NAIC's company action level. Financial strength rating triggers vary by treaty with the majority of the triggers reached if RGA Reinsurance's financial strength rating falls five notches from its current rating of "AA-" to the "BBB" level on the S&P scale. Recapture of business previously ceded does not affect premiums ceded prior to the recapture of such business, but would reduce premiums in subsequent periods. Upon recapture, the Company would reflect a net gain or loss on the settlement of the assets and liabilities associated with the treaty. In some cases, the ceding company is required to pay the Company a recapture fee. The Company estimates approximately \$544.9 billion of its gross assumed in force business, as of December 31, 2018, was subject to treaties where the ceding company could recapture in the event minimum levels of financial condition or ratings were not maintained.

Guarantees

RGA has issued guarantees to third parties on behalf of its subsidiaries for the payment of amounts due under certain reinsurance treaties, securities borrowing arrangements, financing arrangements and office lease obligations, whereby if a subsidiary fails to meet an obligation, RGA or one of its other subsidiaries will make a payment to fulfill the obligation. In limited circumstances, treaty guarantees are granted to ceding companies in order to provide additional security, particularly in cases where RGA's subsidiary is relatively new, unrated, or not of significant size, relative to the ceding company. Potential guaranteed amounts of future payments will vary depending on production levels and underwriting results. Guarantees related to borrowed securities provide additional security to third parties should a subsidiary fail to return the borrowed securities when due. RGA has issued payment guarantees on behalf of two of its subsidiaries in the event the subsidiaries fail to make payment under their office lease obligations. See Note 12 - "Commitments, Contingencies and Guarantees" in the Notes to Consolidated Financial Statements for a table that presents the amounts for guarantees, by type, issued by the Company.

In addition, the Company indemnifies its directors and officers pursuant to its charters and by-laws. Since this indemnity generally is not subject to limitation with respect to duration or amount, the Company does not believe that it is possible to determine the maximum potential amount due under this indemnity in the future.

Off-Balance Sheet Arrangements

The Company has commitments to fund investments in limited partnerships, joint ventures, commercial mortgage loans, private placement investments and bank loans, including revolving credit agreements. See Note 12 - "Commitments, Contingencies and Guarantees" in the Notes to Consolidated Financial Statements for additional information on the Company's commitments to fund investments and other off-balance sheet arrangements.

The Company has not engaged in trading activities involving non-exchange-traded contracts reported at fair value, nor has it engaged in relationships or transactions with persons or entities that derive benefits from their non-independent relationship with the Company.

Cash Flows

The Company's principal cash inflows from its reinsurance operations include premiums and deposit funds received from ceding companies. The primary liquidity concerns with respect to these cash flows are early recapture of the reinsurance contract by the ceding company and lapses of annuity products reinsured by the Company. The Company's principal cash inflows from its invested assets result from investment income and the maturity and sales of invested assets. The primary liquidity concerns with respect to these cash inflows relates to the risk of default by debtors and interest rate volatility. The Company manages these risks very closely. See "Investments" and "Interest Rate Risk" below.

Additional sources of liquidity to meet unexpected cash outflows in excess of operating cash inflows and current cash and equivalents on hand include selling short-term investments or fixed maturity securities and drawing funds under a revolving credit facility, under which the Company had availability of \$831.8 million as of December 31, 2018. The Company also has \$684.0 million of funds available through collateralized borrowings from the Federal Home Loan Bank of Des Moines ("FHLB") as of December 31, 2018. As of December 31, 2018, the Company could have borrowed these additional amounts without violating any of its existing debt covenants.

The Company's principal cash outflows relate to the payment of claims liabilities, interest credited, operating expenses, income taxes, dividends to shareholders, purchases of treasury stock, and principal and interest under debt and other financing obligations. The Company seeks to limit its exposure to loss on any single insured and to recover a portion of benefits paid by ceding reinsurance to other insurance enterprises or reinsurers under excess coverage and coinsurance contracts (See Note 2, "Significant Accounting Policies and Pronouncements" of the Notes to Consolidated Financial Statements). The Company performs annual financial reviews of its retrocessionaires to evaluate financial stability and performance. The Company has never experienced a material default in connection with retrocession arrangements, nor has it experienced any difficulty in collecting claims recoverable from retrocessionaires; however, no assurance can be given as to the future performance of such retrocessionaires nor to the recoverability of future claims. The Company's management believes its current sources of liquidity are adequate to meet its cash requirements for the next 12 months.

Summary of Primary Sources and Uses of Liquidity and Capital

The Company's primary sources and uses of liquidity and capital are summarized as follows (dollars in thousands):

	For the years ended December 31,		
	2018	2017	2016
Sources:			
Net cash provided by operating activities	\$ 1,581,121	\$ 1,982,308	\$ 1,421,076
Proceeds from long-term debt issuance	—	—	799,984
Excess tax benefits from share-based payment arrangement	—	—	162
Exercise of stock options, net	3,459	7,292	15,321
Change in cash collateral for derivatives and other arrangements	43,607	—	26,413
Cash provided by changes in universal life and other investment type policies and contracts	169,794	265,318	512,612
Effect of exchange rate changes on cash	—	52,693	—
Total sources	<u>1,797,981</u>	<u>2,307,611</u>	<u>2,775,568</u>
Uses:			
Net cash used in investing activities	636,552	1,607,573	2,781,084
Dividends to stockholders	140,110	117,291	100,371
Repayment of collateral finance and securitization notes	96,354	68,429	64,571
Debt issuance costs	—	—	8,766
Principal payments of long-term debt	2,690	302,582	2,479
Purchases of treasury stock	299,679	43,508	122,916
Change in cash collateral for derivatives and other arrangements	—	65,422	—
Effect of exchange rate changes on cash	36,387	—	19,938
Total uses	<u>1,211,772</u>	<u>2,204,805</u>	<u>3,100,125</u>
Net change in cash and cash equivalents	<u>\$ 586,209</u>	<u>\$ 102,806</u>	<u>\$ (324,557)</u>

Cash Flows from Operations - The principal cash inflows from the Company's reinsurance activities come from premiums, investment and fee income, annuity considerations and deposit funds. The principal cash outflows relate to the liabilities associated with various life and health insurance, annuity and disability products, operating expenses, income tax and interest on outstanding debt obligations. The primary liquidity concern with respect to these cash flows is the risk of shortfalls in premiums and investment income, particularly in periods with abnormally high claims levels.

Cash Flows from Investments - The principal cash inflows from the Company's investment activities come from repayments of principal on invested assets, proceeds from sales and maturities of invested assets, and settlements of freestanding derivatives. The principal cash outflows relate to purchases of investments, issuances of policy loans and settlements of freestanding derivatives. The Company typically has a net cash outflow from investing activities because cash inflows from insurance operations

are reinvested in accordance with its asset/liability management discipline to fund insurance liabilities. The Company closely monitors and manages these risks through its credit risk management process. The primary liquidity concerns with respect to these cash flows are the risk of default by debtors and market disruption, which could make it difficult for the Company to sell investments.

Financing Cash Flows - The principal cash inflows from the Company's financing activities come from issuances of RGA debt and equity securities, and deposit funds associated with universal life and other investment type policies and contracts. The principal cash outflows come from repayments of debt, payments of dividends to stockholders, purchases of treasury stock, and withdrawals associated with universal life and other investment type policies and contracts. A primary liquidity concern with respect to these cash flows is the risk of early contractholder and policyholder withdrawal.

Contractual Obligations

The following table displays the Company's contractual obligations, including obligations arising from its reinsurance business (in millions):

	Payment Due by Period				
	Total	Less than 1 Year	1-3 Years	4-5 Years	After 5 Years
Future policy benefits ⁽¹⁾	\$ 7,550.0	\$ (472.1)	\$ (1,014.5)	\$ (860.1)	\$ 9,896.7
Interest-sensitive contract liabilities ⁽²⁾	31,175.4	2,483.5	4,928.7	4,815.1	18,948.1
Long-term debt, including interest	5,624.7	556.2	660.7	620.7	3,787.1
Collateral finance and securitization notes, including interest ⁽³⁾	755.6	130.6	352.5	175.5	97.0
Other policy claims and benefits	5,642.8	5,642.8	—	—	—
Operating leases	65.5	13.6	21.0	16.8	14.1
Limited partnership interests and joint ventures	523.9	523.9	—	—	—
Payables for collateral received under derivative transactions	235.6	235.6	—	—	—
Other investment related commitments	453.7	453.7	—	—	—
Total	<u>\$ 52,027.2</u>	<u>\$ 9,567.8</u>	<u>\$ 4,948.4</u>	<u>\$ 4,768.0</u>	<u>\$ 32,743.0</u>

- (1) Future policyholder benefits include liabilities related primarily to the Company's reinsurance of life and health insurance products. Amounts presented in the table above represent the estimated obligations as they become due to ceding companies for benefits under such contracts, and also include future premiums, allowances and other amounts due to or from the ceding companies as the result of the Company's assumptions of mortality, morbidity, policy lapse and surrender risk as appropriate to the respective product. Total payments may vary materially from prior years due to the assumption of new treaties or as a result of changes in projections of future experience. All estimated cash payments presented in the table above are undiscounted as to interest, net of estimated future premiums on policies currently in force and gross of any reinsurance recoverable. The sum of the undiscounted estimated cash flows shown for all years in the table is an obligation of \$7,550.0 million compared to the discounted liability amount of \$25,285.4 million included on the consolidated balance sheets, substantially all due to the effects of discounting the estimated cash flows in the balance sheet liability. The time value of money is not factored into the calculations in the table above. In addition, differences will arise due to changes in the projection of future benefit payments compared with those developed when the reserve was established. Expected premiums can exceed expected policy benefit payments and allowances due to the nature of the reinsurance treaties, which generally have increasing premium rates that exceed the increasing benefit payments.
- (2) Interest-sensitive contract liabilities include amounts related to the Company's reinsurance of asset-intensive products, primarily deferred annuities and corporate-owned life insurance. Amounts presented in the table above represent the estimated obligations as they become due both to and from ceding companies relating to activity of the underlying policyholders. Amounts presented in the table above represent the estimated obligations under such contracts undiscounted as to interest, including assumptions related to surrenders, withdrawals, premium persistency, partial withdrawals, surrender charges, annuitizations, mortality, future interest credited rates and policy loan utilization. The sum of the obligations shown for all years in the table of \$31,175.4 million exceeds the liability amount of \$18,004.5 million included on the consolidated balance sheets principally due to the lack of discounting and accounting for separate account contracts.
- (3) Includes the Manor Re collateral financing arrangement that does not appear on the consolidated balance sheets due to a master netting agreement where the Company holds a term deposit note of equal value from the counterparty.

Excluded from the table above are net deferred income tax liabilities, unrecognized tax benefits, and accrued interest related to unrecognized tax benefits of \$2,079.9 million, for which the Company cannot reliably determine the timing of payment. Current income tax payable is also excluded from the table.

The net funded status of the Company's qualified and nonqualified pension and other postretirement liabilities included within other liabilities has been excluded from the amounts presented in the table above. As of December 31, 2018, the Company had a net unfunded balance of \$143.4 million related to qualified and nonqualified pension and other postretirement liabilities. See Note 10 – "Employee Benefit Plans" in the Notes to Consolidated Financial Statements for information related to the Company's obligations and funding requirements for pension and other post-employment benefits.

Asset / Liability Management

The Company actively manages its cash and invested assets using an approach that is intended to balance quality, diversification, asset/liability matching, liquidity and investment return. The goals of the investment process are to optimize after-

tax, risk-adjusted investment income and after-tax, risk-adjusted total return while managing the assets and liabilities on a cash flow and duration basis.

The Company has established target asset portfolios for its operating segments, which represent the investment strategies intended to profitably fund its liabilities within acceptable risk parameters. These strategies include objectives and limits for effective duration, yield curve sensitivity and convexity, liquidity, asset sector concentration and credit quality.

The Company's asset-intensive products are primarily supported by investments in fixed maturity securities reflected on the Company's consolidated balance sheets and under funds withheld arrangements with the ceding company. Investment guidelines are established to structure the investment portfolio based upon the type, duration and behavior of products in the liability portfolio so as to achieve targeted levels of profitability. The Company manages the asset-intensive business to provide a targeted spread between the interest rate earned on investments and the interest rate credited to the underlying interest-sensitive contract liabilities. The Company periodically reviews models projecting different interest rate scenarios and their effect on profitability. Certain of these asset-intensive agreements, primarily in the U.S. and Latin America Financial Solutions operating segment, are generally funded by fixed maturity securities that are withheld by the ceding company.

The Company's liquidity position (cash and cash equivalents and short-term investments) was \$2,032.3 million and \$1,396.8 million at December 31, 2018 and 2017, respectively. Liquidity needs are determined from valuation analyses conducted by operational units and are driven by product portfolios. Periodic evaluations of demand liabilities and short-term liquid assets are designed to adjust specific portfolios, as well as their durations and maturities, in response to anticipated liquidity needs.

See "Securities Borrowing, Lending and Other" in Note 4 - "Investments" in the Notes to Consolidated Financial Statements for information related to the Company's securities borrowing, lending and repurchase/reverse repurchase programs. In addition to its security agreements with third parties, certain RGA's subsidiaries have entered into intercompany securities lending agreements to more efficiently source securities for lending to third parties and to provide for more efficient regulatory capital management.

The Company is a member of the FHLB and holds \$83.2 million of FHLB common stock, which is included in other invested assets on the Company's consolidated balance sheets. The Company has entered into funding agreements with the FHLB under guaranteed investment contracts whereby the Company has issued the funding agreements in exchange for cash and for which the FHLB has been granted a blanket lien on the Company's commercial and residential mortgage-backed securities and commercial mortgage loans used to collateralize the Company's obligations under the funding agreements. The Company maintains control over these pledged assets, and may use, commingle, encumber or dispose of any portion of the collateral as long as there is no event of default and the remaining qualified collateral is sufficient to satisfy the collateral maintenance level. The funding agreements and the related security agreements represented by this blanket lien provide that upon any event of default by the Company, the FHLB's recovery is limited to the amount of the Company's liability under the outstanding funding agreements. The amount of the Company's liability for the funding agreements with the FHLB under guaranteed investment contracts was \$1.7 billion and \$1.4 billion at December 31, 2018 and 2017, respectively, which is included in interest sensitive contract liabilities on the Company's consolidated balance sheets. The advances on these agreements are collateralized primarily by commercial and residential mortgage-backed securities, commercial mortgage loans, and U.S. Treasury and government agency securities. The amount of collateral exceeds the liability and is dependent on the type of assets collateralizing the guaranteed investment contracts.

Investments

Management of Investments

The Company's investment and derivative strategies involve matching the characteristics of its reinsurance products and other obligations and to seek to closely approximate the interest rate sensitivity of the assets with estimated interest rate sensitivity of the reinsurance liabilities. The Company achieves its income objectives through strategic and tactical asset allocations, security and derivative strategies within an asset/liability management and disciplined risk management framework. Derivative strategies are employed within the Company's risk management framework to help manage duration, currency, and other risks in assets and/or liabilities and to replicate the credit characteristics of certain assets. For a discussion of the Company's risk management process, see "Market and Credit Risk" in the "Enterprise Risk Management" section below.

The Company's portfolio management groups work with the Enterprise Risk Management function to develop the investment policies for the assets of the Company's domestic and international investment portfolios. All investments held by the Company, directly or in a funds withheld at interest reinsurance arrangement, are monitored for conformance with the Company's stated investment policy limits as well as any limits prescribed by the applicable jurisdiction's insurance laws and regulations. See Note 4 - "Investments" in the Notes to Consolidated Financial Statements for additional information regarding the Company's investments.

Portfolio Composition

The Company had total cash and invested assets of \$56.1 billion and \$53.0 billion as of December 31, 2018 and 2017, respectively, as illustrated below (dollars in thousands):

	2018	% of Total	2017	% of Total
Fixed maturity securities, available-for-sale	\$ 39,992,346	71.3%	\$ 38,150,820	71.9%
Equity securities	82,197	0.1	100,152	0.2
Mortgage loans on real estate	4,966,298	8.8	4,400,533	8.3
Policy loans	1,344,980	2.4	1,357,624	2.6
Funds withheld at interest	5,761,471	10.3	6,083,388	11.5
Short-term investments	142,598	0.3	93,304	0.2
Other invested assets	1,915,297	3.4	1,505,332	2.8
Cash and cash equivalents	1,889,733	3.4	1,303,524	2.5
Total cash and invested assets	\$ 56,094,920	100.0%	\$ 52,994,677	100.0%

Investment Yield

The following table presents consolidated average invested assets at amortized cost, net investment income and investment yield, excluding spread related business. Spread related business is primarily associated with contracts on which the Company earns an interest rate spread between assets and liabilities. To varying degrees, fluctuations in the yield on other spread related business is generally subject to corresponding adjustments to the interest credited on the liabilities (dollars in thousands).

	2018	2017	2016	Increase /(Decrease)	
				2018	2017
Average invested assets at amortized cost	\$ 26,640,947	\$ 25,225,400	\$ 23,188,717	5.6%	8.8%
Net investment income	1,185,067	1,147,713	1,060,641	3.3%	8.2%
Investment yield (ratio of net investment income to average invested assets)	4.45%	4.55%	4.57%	(10) bps	(2) bps

Investment yield was progressively lower each year primarily due to the effect of a lower interest rate environment notably in the U.S. and Canada.

Fixed Maturity and Equity Securities Available-for-Sale

See “Fixed Maturity and Equity Securities Available-for-Sale” in Note 4 – “Investments” in the Notes to Consolidated Financial Statements for tables that provide the amortized cost, unrealized gains and losses, estimated fair value of these securities, and the other-than-temporary impairments in AOCI by sector as of December 31, 2018 and 2017.

The Company holds various types of fixed maturity securities available-for-sale and classifies them as corporate securities (“Corporate”), Canadian and Canadian provincial government securities (“Canadian government”), residential mortgage-backed securities (“RMBS”), asset-backed securities (“ABS”), commercial mortgage-backed securities (“CMBS”), U.S. government and agencies (“U.S. government”), state and political subdivisions, and other foreign government, supranational and foreign government-sponsored enterprises (“Other foreign government”). As of both December 31, 2018 and 2017, approximately 95.6% of the Company’s consolidated investment portfolio of fixed maturity securities were investment grade.

Important factors in the selection of investments include diversification, quality, yield, call protection and total rate of return potential. The relative importance of these factors is determined by market conditions and the underlying reinsurance liability and existing portfolio characteristics. The largest asset class in which fixed maturity securities were invested was corporate securities, which represented approximately 59.9% of total fixed maturity securities as of December 31, 2018, compared to 60.9% as of December 31, 2017. See “Corporate Fixed Maturity Securities” in Note 4 – “Investments” in the Notes to Consolidated Financial Statements for tables showing the major industry types, which comprise the corporate fixed maturity holdings as of December 31, 2018 and 2017.

As of December 31, 2018, the Company’s investments in Canadian and Canadian provincial government securities represented 9.7% of the fair value of total fixed maturity securities compared to 11.1% of the fair value of total fixed maturity securities as of December 31, 2017. These assets are primarily high quality, long duration provincial strips, the valuation of which is closely linked to the interest rate curve. These assets are longer in duration and held primarily for asset/liability management to meet Canadian regulatory requirements. See “Fixed Maturity and Equity Securities Available-for-Sale” in Note 4 – “Investments” in the Notes to Consolidated Financial Statements for tables showing the various sectors as of December 31, 2018 and 2017.

The Company references rating agency designations in some of its investments disclosures. These designations are based on the ratings from nationally recognized statistical rating organizations, primarily Moody’s, S&P and Fitch. Structured

securities (mortgage-backed and asset-backed securities) held by the Company's insurance subsidiaries that maintain the NAIC statutory basis of accounting utilize the NAIC rating methodology. The NAIC assigns designations to publicly traded as well as privately placed securities. The designations assigned by the NAIC range from class 1 to class 6, with designations in classes 1 and 2 generally considered investment grade (BBB or higher rating agency designation). NAIC designations in classes 3 through 6 are generally considered below investment grade (BB or lower rating agency designation).

The quality of the Company's available-for-sale fixed maturity securities portfolio, as measured at fair value and by the percentage of fixed maturity securities invested in various ratings categories, relative to the entire available-for-sale fixed maturity security portfolio, as of December 31, 2018 and 2017 was as follows (dollars in thousands):

NAIC Designation	Rating Agency Designation	2018			2017		
		Amortized Cost	Estimated Fair Value	% of Total	Amortized Cost	Estimated Fair Value	% of Total
1	AAA/AA/A	\$ 24,904,526	\$ 26,180,440	65.5%	\$ 23,534,574	\$ 25,762,103	67.5%
2	BBB	12,141,601	12,023,426	30.1	10,115,008	10,709,170	28.1
3	BB	1,409,235	1,371,328	3.4	1,139,200	1,173,639	3.1
4	B	395,694	385,670	1.0	408,990	420,284	1.1
5	CCC	13,183	12,860	—	78,143	79,747	0.2
6	In or near default	17,929	18,622	—	5,497	5,877	—
	Total	<u>\$ 38,882,168</u>	<u>\$ 39,992,346</u>	<u>100.0%</u>	<u>\$ 35,281,412</u>	<u>\$ 38,150,820</u>	<u>100.0%</u>

The Company's fixed maturity portfolio includes structured securities. The following table shows the types of structured securities the Company held as of December 31, 2018 and 2017 (dollars in thousands):

	2018		2017	
	Amortized Cost	Estimated Fair Value	Amortized Cost	Estimated Fair Value
RMBS:				
Agency	\$ 811,044	\$ 814,568	\$ 878,559	\$ 896,977
Non-agency	1,061,192	1,054,653	816,567	822,903
Total RMBS	<u>1,872,236</u>	<u>1,869,221</u>	<u>1,695,126</u>	<u>1,719,880</u>
CMBS	1,428,115	1,419,034	1,285,594	1,303,387
ABS	2,171,254	2,149,204	1,634,758	1,648,362
Total	<u>\$ 5,471,605</u>	<u>\$ 5,437,459</u>	<u>\$ 4,615,478</u>	<u>\$ 4,671,629</u>

The Company's RMBS include agency-issued pass-through securities and collateralized mortgage obligations. A majority of the agency-issued pass-through securities are guaranteed or otherwise supported by the Federal Home Loan Mortgage Corporation, Federal National Mortgage Association, or the Government National Mortgage Association. The principal risks inherent in holding mortgage-backed securities are prepayment and extension risks, which will affect the timing of when cash will be received and are dependent on the level of mortgage interest rates. Prepayment risk is the unexpected increase in principal payments from the expected, primarily as a result of owner refinancing. Extension risk relates to the unexpected slowdown in principal payments from the expected. In addition, non-agency mortgage-backed securities face credit risk should the borrower be unable to pay the contractual interest or principal on their obligation. The Company monitors its mortgage-backed securities to mitigate exposure to the cash flow uncertainties associated with these risks.

The Company's ABS include credit card receivables, railcar leasing, student loans, single-family rentals, home equity loans and collateralized debt obligations (primarily collateralized loan obligations). The Company owns floating rate securities that represent approximately 16.0% and 13.8% of the total fixed maturity securities as of December 31, 2018 and 2017, respectively. These investments have a higher degree of income variability than the other fixed income holdings in the portfolio due to the floating rate nature of the interest payments. The Company holds these investments to match specific floating rate liabilities primarily reflected in the consolidated balance sheets as collateral finance notes, as well as to enhance asset management strategies. In addition to the risks associated with floating rate securities, principal risks in holding asset-backed securities are structural, credit and capital market risks. Structural risks include the securities' cash flow priority in the capital structure and the inherent prepayment sensitivity of the underlying collateral. Credit risks include the adequacy and ability to realize proceeds from the collateral. Credit risks are mitigated by credit enhancements that include excess spread, over-collateralization and subordination. Capital market risks include general level of interest rates and the liquidity for these securities in the marketplace.

The Company monitors its fixed maturity securities to determine impairments in value and evaluates factors such as financial condition of the issuer, payment performance, the length of time and the extent to which the market value has been below amortized cost, compliance with covenants, general market and industry sector conditions, current intent and ability to hold securities, and various other subjective factors. Based on management's judgment, securities determined to have an other-than-

temporary impairment in value are written down to fair value. See “Investments – Other-than-Temporary Impairment” in Note 2 – “Significant Accounting Policies and Pronouncements” in the Notes to Consolidated Financial Statements for additional information. The table below summarizes other-than-temporary impairments and changes in the mortgage loan provision for 2018, 2017 and 2016 (dollars in thousands):

	2018	2017	2016
Impairment losses on available-for-sale securities:			
Fixed maturity securities	\$ 28,494	\$ 42,639	\$ 38,731
Equity securities	—	1,202	—
Other impairment losses	10,001	7,806	10,134
Change in mortgage loan provision	1,918	1,691	872
Total	<u>\$ 40,413</u>	<u>\$ 53,338</u>	<u>\$ 49,737</u>

The fixed maturity impairments in 2018, 2017 and 2016 were largely related to high-yield and emerging market corporate securities. The equity impairments in 2017 were related to an equity position received as part of a debt restructuring. In addition, other impairment losses in 2018, 2017 and 2016 were primarily due to impairments on real estate joint ventures and limited partnerships.

As of December 31, 2018 and 2017, the Company had \$748.5 million and \$113.3 million, respectively, of gross unrealized losses related to its fixed maturity securities. The distribution of the gross unrealized losses related to these securities is shown below:

	2018	2017
Sector:		
Corporate	74.2%	48.8%
Canadian government	0.3	1.5
RMBS	3.4	10.5
ABS	4.4	4.6
CMBS	2.4	4.3
U.S. government	7.7	19.4
State and political subdivisions	1.2	3.8
Other foreign government	6.4	7.1
Total	<u>100.0%</u>	<u>100.0%</u>
Industry:		
Finance	27.5%	15.8%
Asset-backed	4.4	4.6
Industrial	38.2	30.0
Mortgage-backed	5.8	14.8
Government	15.6	31.8
Utility	8.5	3.0
Total	<u>100.0%</u>	<u>100.0%</u>

See “Unrealized Losses for Fixed Maturity and Equity Securities Available-for-Sale” in Note 4 – “Investments” in the Notes to Consolidated Financial Statements for a table that presents the total gross unrealized losses for these securities as of December 31, 2018 and 2017, respectively, where the estimated fair value had declined and remained below amortized cost by 20% or more or less than 20%.

The Company’s determination of whether a decline in value is other-than-temporary includes analysis of the underlying credit and the extent and duration of a decline in value. The Company’s credit analysis of an investment includes determining whether the issuer is current on its contractual payments, evaluating whether it is probable that the Company will be able to collect all amounts due according to the contractual terms of the security and analyzing the overall ability of the Company to recover the amortized cost of the investment. In the Company’s impairment review process, the duration and severity of an unrealized loss position for equity securities are given greater weight and consideration given the lack of contractual cash flows and the deferability features of these securities.

See “Unrealized Losses for Fixed Maturity and Equity Securities Available-for-Sale” in Note 4 – “Investments” in the Notes to Consolidated Financial Statements for tables that present the estimated fair values and gross unrealized losses, including other-than-temporary impairment losses reported in AOCI, for these securities that have estimated fair values below amortized cost, by class and grade security, as well as the length of time the related market value has remained below amortized cost as of December 31, 2018 and 2017.

As of December 31, 2018 and 2017, respectively, the Company classified approximately 5.0% and 5.9% of its fixed maturity securities in the Level 3 category (refer to Note 6 – “Fair Value of Assets and Liabilities” in the Notes to Consolidated

Financial Statements for additional information). These securities primarily consist of private placement corporate securities, bank loans and Canadian provincial strips with inactive trading markets.

See “Securities Borrowing, Lending and Other” in Note 4 – “Investments” in the Notes to Consolidated Financial Statements for information related to the Company’s securities borrowing, lending, repurchase and repurchase/reverse repurchase programs.

Mortgage Loans on Real Estate

Mortgage loans represented approximately 8.8% and 8.3% of the Company’s cash and invested assets as of December 31, 2018 and 2017, respectively. The Company’s mortgage loan portfolio consists of U.S., Canada and United Kingdom based investments primarily in commercial offices, light industrial properties and retail locations. The mortgage loan portfolio is diversified by geographic region and property type. Most of the mortgage loans in the Company’s portfolio range in size up to \$30.0 million, with the average mortgage loan investment as of December 31, 2018 totaling approximately \$9.6 million. The mortgage loan portfolio was diversified by geographic region and property type as discussed further under “Mortgage Loans on Real Estate” in Note 4 - “Investments” in the Notes to Consolidated Financial Statements.

As of December 31, 2018 and 2017, the Company’s mortgage loans, gross of unamortized deferred loan origination fees and expenses and valuation allowances, were distributed geographically as follows (dollars in thousands):

	2018		2017	
	Recorded Investment	% of Total	Recorded Investment	% of Total
U.S. Region:				
Pacific	\$ 1,396,346	28.0%	\$ 1,258,753	28.6%
South Atlantic	964,174	19.3	896,117	20.3
Mountain	693,281	13.9	694,324	15.7
East North Central	605,608	12.2	527,316	11.9
West North Central	288,949	5.8	309,326	7.0
West South Central	567,541	11.4	387,151	8.8
Middle Atlantic	202,235	4.1	137,600	3.1
East South Central	117,588	2.4	96,887	2.2
New England	5,609	0.1	5,700	0.1
Subtotal - U.S.	4,841,331	97.2	4,313,174	97.7
Canada	135,394	2.7	99,997	2.3
UK	6,629	0.1	—	—
Total	\$ 4,983,354	100.0%	\$ 4,413,171	100.0%

Valuation allowances on mortgage loans are established based upon inherent losses expected by management to be realized in connection with future dispositions or settlement of mortgage loans, including foreclosures. The valuation allowances are established after management considers, among other things, the value of underlying collateral and payment capabilities of debtors. Any subsequent adjustments to the valuation allowances will be treated as investment gains or losses.

See “Mortgage Loans on Real Estate” in Note 4 - “Investments” in the Notes to Consolidated Financial Statements for information regarding valuation allowances and impairments.

Policy Loans

Policy loans comprised approximately 2.4% and 2.6% of the Company’s cash and invested assets as of December 31, 2018 and 2017, respectively, the majority of which are associated with one client. These policy loans present no credit risk because the amount of the loan cannot exceed the obligation due the ceding company upon the death of the insured or surrender of the underlying policy. The provisions of the treaties in force and the underlying policies determine the policy loan interest rates. The Company earns a spread between the interest rate earned on policy loans and the interest rate credited to corresponding liabilities.

Funds Withheld at Interest

Funds withheld at interest comprised approximately 10.3% and 11.5% of the Company’s cash and invested assets as of December 31, 2018 and 2017, respectively. For reinsurance agreements written on a modified coinsurance basis and certain agreements written on a coinsurance basis, assets equal to the net statutory reserves are withheld and legally owned and managed by the ceding company, and are reflected as funds withheld at interest on the Company’s consolidated balance sheets. In the event of a ceding company’s insolvency, the Company would need to assert a claim on the assets supporting its reserve liabilities. However, the risk of loss to the Company is mitigated by its ability to offset amounts it owes the ceding company for claims or

allowances against amounts owed by the ceding company. Interest accrues to the total funds withheld at interest assets at rates defined by the treaty terms. The Company is subject to the investment performance on the withheld assets, although it does not directly control them. These assets are primarily fixed maturity investment securities and pose risks similar to the fixed maturity securities the Company owns. To mitigate this risk, the Company helps set the investment guidelines followed by the ceding company and monitors compliance. Ceding companies with funds withheld at interest had an average financial strength rating of “A” as of December 31, 2018 and 2017. Certain ceding companies maintain segregated portfolios for the benefit of the Company.

The majority of the Company’s funds withheld at interest balances are associated with its reinsurance of annuity contracts. The funds withheld receivable balance for segregated portfolios is subject to the general accounting principles for *Derivatives and Hedging* related to embedded derivatives.

Under these principles, the Company’s funds withheld receivable under certain reinsurance arrangements incorporate credit risk exposures that are unrelated or only partially related to the creditworthiness of the obligor and include an embedded derivative feature that is not clearly and closely related to the host contract. Therefore, the embedded derivative feature must be measured at fair value on the consolidated balance sheets and changes in fair value reported in income. See “Embedded Derivatives” in Note 2 - “Significant Accounting Policies and Pronouncements” in the Notes to Consolidated Financial Statements for further discussion.

Based on data provided by ceding companies as of December 31, 2018 and 2017, funds withheld at interest totaled (dollars in thousands):

<u>Underlying Security Type:</u>	2018		2017	
	Book Value	Estimated Fair Value	Book Value	Estimated Fair Value
Segregated portfolios	\$ 3,681,874	\$ 3,829,337	\$ 3,958,583	\$ 4,279,114
Non-segregated portfolios	1,973,181	1,973,181	1,996,509	1,996,509
Embedded derivatives ⁽¹⁾	106,416	—	128,296	—
Total funds withheld at interest	<u>\$ 5,761,471</u>	<u>\$ 5,802,518</u>	<u>\$ 6,083,388</u>	<u>\$ 6,275,623</u>

(1) Represents the fair value of embedded derivatives related to reinsurance written on a modco or funds withheld basis and subject to the general accounting principles for *Derivatives and Hedging* related to embedded derivatives for the segregated portfolios. When the segregated portfolios are presented on a fair value basis in the “Estimated Fair Value” column, the calculation of a separate embedded derivative is not applicable.

Based on data provided by the ceding company as of December 31, 2018 and 2017, segregated portfolios contained primarily corporate, municipal, government and asset-backed securities as well as derivative securities and reverse repurchase obligations. These assets pose risks similar to the fixed maturity securities the Company directly owns. Derivatives consist primarily of S&P 500 options that are used to hedge liabilities and interest credited for EIAs reinsured by the Company. The securities held within the segregated portfolios are primarily investment-grade, with an average rating of “A.” The average maturity for investments held within the segregated portfolios of funds withheld at interest is ten years or more. Interest accrues to the total funds withheld at interest assets at rates defined by the treaty terms and the Company estimated the yields were approximately 5.43%, 7.78% and 5.89% for the years ended December 31, 2018, 2017 and 2016, respectively. Changes in these estimated yields are affected by changes in the fair value of equity options held in the funds withheld portfolio associated with EIAs. Additionally, under certain treaties the Company is subject to the investment performance on the withheld assets, although it does not directly control them. To mitigate this risk, the Company helps set the investment guidelines followed by the ceding company and monitors compliance.

Other Invested Assets

Other invested assets include limited partnership interests, joint ventures (other than operating joint ventures), equity release mortgages, derivative contracts, fair value option (“FVO”) contractholder-directed unit-linked investments and FHLB common stock. Other invested assets represented approximately 3.4% and 2.8% of the Company’s cash and invested assets as of December 31, 2018 and 2017, respectively. See “Other Invested Assets” in Note 4 – “Investments” in the Notes to Consolidated Financial Statements for a table that presents the carrying value of the Company’s other invested assets by type as of December 31, 2018 and 2017.

The Company utilizes derivative financial instruments to protect the Company against possible changes in the fair value of its investment portfolio as a result of interest rate changes, to hedge against risk of changes in the purchase price of securities, to hedge liabilities associated with the reinsurance of variable annuities with guaranteed living benefits and to manage the portfolio’s effective yield, maturity and duration. In addition, the Company utilizes derivative financial instruments to reduce the risk associated with fluctuations in foreign currency exchange rates. The Company uses both exchange-traded, centrally cleared, and customized over-the-counter derivative financial instruments.

See Note 5 – “Derivative Instruments” in the Notes to Consolidated Financial Statements for a table that presents the notional amounts and fair value of investment related derivative instruments held as of December 31, 2018 and 2017.

The Company may be exposed to credit-related losses in the event of non-performance by counterparties to derivative financial instruments. Generally, the credit exposure of the Company's derivative contracts is limited to the fair value at the reporting date plus or minus any collateral posted or held by the Company. The Company had no credit exposure related to its derivative contracts, excluding futures and mortality swaps, as of December 31, 2018 and 2017, as the net amount of collateral pledged to the Company from counterparties exceeded the fair value of the derivative contracts.

The Company manages its credit risk related to over-the-counter derivatives by entering into transactions with creditworthy counterparties, maintaining collateral arrangements and through the use of master agreements that provide for a single net payment to be made by one counterparty to another at each due date and upon termination. As exchange-traded futures are affected through regulated exchanges, and positions are marked to market on a daily basis, the Company has minimal exposure to credit-related losses in the event of nonperformance by counterparties. See Note 5 – "Derivative Instruments" in the Notes to Consolidated Financial Statements for more information regarding the Company's derivative instruments.

The Company holds beneficial interests in equity release mortgages in the UK. Equity release mortgages represent loans provided to individuals 55 years of age and older secured by the borrower's residence. Equity release mortgages are comparable to a home equity loan by allowing the borrower to utilize the equity in their home as collateral. The amount of the loan is dependent on the appraised value of the home at the time of origination, the borrower's age and interest rate. Unlike a home equity loan, no payment of principal or interest is required until the death of the borrower or sale of the home. Equity release mortgages may also be either fully funded at origination, or the borrower can request periodic funding similar to a line of credit. Equity release mortgages are subject to risks, including market, credit, interest rate, liquidity, operational, reputational and legal risks.

Other invested assets includes \$475.9 million and \$219.9 million of equity release mortgages as of December 31, 2018 and 2017, respectively. Investment income includes \$17.9 million, \$8.3 million and \$2.6 million in interest income earned on equity release mortgages for the years ended December 31, 2018, 2017 and 2016, respectively.

Enterprise Risk Management

RGA maintains a dedicated Enterprise Risk Management ("ERM") function that is responsible for analyzing and reporting the Company's risks on an aggregated basis; facilitating monitoring to ensure the Company's risks remain within its appetites and limits; and ensuring, on an ongoing basis, that RGA's ERM objectives are met. This includes ensuring proper risk controls are in place; risks are effectively identified, assessed, and managed; and key risks to which the Company is exposed are disclosed to appropriate stakeholders. The ERM function plays an important role in fostering the Company's risk management culture and practices.

Enterprise Risk Management Structure and Governance

The Board of Directors ("the Board") oversees enterprise risk through its standing committees. The Finance, Investments, and Risk Management ("FIRM") Committee of the Board oversees the management of the Company's ERM program and policies. The FIRM receives regular reports and assessments that describe the Company's key risk exposures and include quantitative and qualitative assessments and information about breaches, exceptions, and waivers.

The Company's Global Chief Risk Officer ("CRO") leads the dedicated ERM function. The CRO reports to the Chief Executive Officer ("CEO") and has direct access to the Board through the FIRM Committee with formal reporting occurring quarterly. The CRO is supported by a network of Business Unit Chief Risk Officers and Risk Management Officers throughout the business who are responsible for the analysis and management of risks within their scope. A Lead Risk Management Officer is assigned to each risk to take overall responsibility to monitor and assess the risk consistently across all markets.

In addition to leading the ERM function, the CRO also chairs the Company's Risk Management Steering Committee ("RMSC"), which is made up of senior management executives, including the CEO, the Chief Financial Officer ("CFO"), and the Chief Operating Officer, among others. The RMSC provides oversight for the Insurance, Market and Credit, Capital, and Operational risk committees and retains direct risk oversight responsibilities for the following:

- Company's global ERM framework, activities, and issues.
- Identification, assessments, and management of all known, new and emerging strategic risk exposures.
- Risk appetite statement, including the ongoing alignment of the risk appetite statement with the Company's strategy and capital plans.
- Review, revise and approve RGA group-level strategic risk limits consistent with the risk appetite statement

The Insurance, Market and Credit, Capital, and Operational risk committees have direct oversight accountability for their respective risks areas including the identification, assessments, and management of known, new and emerging risk exposures and the review and approval of RGA group-level risk limits

To ensure appropriate oversight of enterprise-wide risk management issues without unnecessary duplication, as well as to foster cross-committee communication and coordination regarding risk issues, risk committee chairs attend RMSC meetings.

In addition to the risk committees, their sub-committees and working groups, some RGA operating entities have risk management committees that oversee relevant risks related to segment-level risk limits.

Enterprise Risk Management Framework

RGA's ERM framework provides a platform to assess the risk / return profiles of risks throughout the organization to enable enhanced decision making by business leaders. The ERM framework also guides the development and implementation of mitigation strategies to reduce exposures to these risks to acceptable levels.

RGA's ERM framework includes the following elements:

1. **Risk Culture:** Risk management is an integral part of the Company's culture and is embedded in RGA's business processes in accordance with RGA's risk philosophy. As the cornerstone of the ERM framework, a culture of prudent risk management reinforced by senior management plays a preeminent role in the effective management of risks assumed by RGA.
2. **Risk Appetite Statement:** A general and high level overview of the risk profile RGA aims to achieve to meet its strategic objectives. This statement is then supported by more granular risk limits guiding the businesses to achieve this Risk Appetite Statement.
3. **Risk Limits:** Risk Limits establish the maximum amount of defined risk that the Company is willing to assume to remain within the Company's overall risk appetite. These risks have been identified by the management of the Company as relevant to manage the overall risk profile of the Company while allowing achievement of strategic objectives.
4. **Risk Assessment Process:** RGA uses qualitative and quantitative methods to assess key risks through a portfolio approach, which analyzes established and emerging risks in conjunction with other risks.
5. **Business Specific Limits/Controls:** These limits/controls provide additional safeguards against undesired risk exposures and are embedded in business processes. Examples include maximum retention limits, pricing and underwriting reviews, per issuer limits, concentration limits, and standard treaty language.

Proactive risk monitoring and reporting enable early detection and mitigation of emerging risks. The RMSC and its subcommittees monitor adherence to risk limits through the ERM function, which reports regularly to the RMSC and FIRM Committee. The frequency of monitoring is tailored to the volatility assessment and relative priority of each risk. Risk escalation channels coupled with open communication lines enhance the mitigations explained above. The Company has devoted significant resources to developing its ERM program and expects to continue to do so in the future. Nonetheless, the Company's policies and procedures to identify, manage, and monitor risks may not be fully effective. Many of the Company's methods for managing risk are based on historical information, which may not be a good predictor of future risk exposures, such as the risk of a pandemic causing a large number of deaths. Management of operational, legal, and regulatory risk relies on policies and procedures that may not be fully effective under all scenarios.

Risk Categories

The Company groups its risks into the following categories: Insurance risk, Market and Credit risk, Capital risk, Operational risk and Strategic risk. Specific risk assessments and descriptions can be found below and in Item 1A - "Risk Factors."

Insurance Risk

Insurance risk is the risk of lower or negative earnings and potentially a reduction in enterprise value due to a greater amount of benefits and related expenses paid than expected, or from non-market related adverse policyholder or client behavior. The Company uses multiple approaches to managing insurance risk: active insurance risk assessment and pricing appropriately for the risks assumed, transferring undesired risks, and managing the retained exposure prudently. These strategies are explained below.

Insurance Risk Assessment and Pricing

The Company has developed extensive expertise in assessing insurance risks that ultimately forms an integral part of ensuring that it is compensated commensurately for the risks it assumes and that it does not overpay for the risks it transfers to third parties. This expertise includes a vast array of market and product knowledge supported by a large information database of historical experience that is closely monitored. Analysis and experience studies derived from this database help form the basis for the Company's pricing assumptions that are used in developing rates for new risks. If actual mortality or morbidity experience is materially adverse, some reinsurance treaties allow for increases to future premium rates.

Mis-estimation of any key risk can threaten the long term viability of the enterprise. Further, the pricing process is a key operational risk and significant effort is applied to ensuring the appropriateness of pricing assumptions. Some of the safeguards the Company uses to ensure proper pricing are: experience studies, strict underwriting, sensitivity and scenario testing, pricing guidelines and controls, authority limits and internal and external pricing reviews. In addition, the ERM function provides pricing oversight that includes periodic pricing audits.

Risk Transfer

To minimize volatility in financial results and reduce the impact of large losses, the Company transfers some of its insurance risk to third parties using vehicles such as retrocession and catastrophe coverage.

Individual Exposure Retrocession

In the normal course of business, the Company seeks to limit its exposure to loss on any single insured and to recover a portion of claims paid by ceding reinsurance to other insurance enterprises (or retrocessionaires) under excess coverage and coinsurance contracts. In individual life markets, the Company retains a maximum of \$8.0 million of coverage per individual life. In certain limited situations the Company has retained more than \$8.0 million per individual life. The Company enters into agreements with other reinsurers to mitigate the residual risk related to the over-retained policies. Additionally, due to some lower face amount reinsurance coverages provided by the Company in addition to individual life, such as group life, disability and health, under certain circumstances, the Company could potentially incur claims totaling more than \$8.0 million per individual life.

Catastrophic Excess Loss Retrocession

The Company seeks to limit its exposure to loss on its assumed catastrophic excess of loss reinsurance agreements by ceding a portion of its exposure to multiple retrocessionaires through retrocession line slips or directly to retrocession markets. The Company's policy is to retain a maximum of \$20.0 million of catastrophic loss exposure per agreement and to retrocede up to \$40.0 million additional loss exposures to the retrocession markets. The Company limits its exposure on a country-by-country (and state-by-state in the U.S.) basis by managing its total exposure to all catastrophic excess of loss agreements bound within a given country to established maximum aggregate exposures. The maximum exposures are established and managed both on gross amounts issued prior to including retrocession and for amounts net of exposures retroceded.

Catastrophe Coverage

The Company accesses the markets each year for annual catastrophic coverages and reviews current coverage and pricing of current and alternate designs. The coverage may vary from year to year based on the Company's perceived value of such protection. The current policy covers events involving 5 or more insured deaths from a single occurrence and covers \$100.0 million of claims in excess of the Company's \$25.0 million deductible.

Managing Retained Exposure

The Company retains most of the inbound insurance risk. The Company manages the retained exposure proactively using various mitigating factors such as diversification and limits. Diversification is the primary mitigating factor of short term volatility risk, but it also mitigates adverse impacts of changes in long term trends and catastrophic events. The Company's insured populations are dispersed globally, diversifying the insurance exposure because factors that cause actual experience to deviate materially from expectations do not affect all areas uniformly and synchronously or in close sequence. A variety of limits mitigate retained insurance risk. Examples of these limits include geographic exposure limits, which set the maximum amount of business that can be written in a given country, and jumbo limits, which prevent excessive coverage on a given individual.

In the event that mortality or morbidity experience develops in excess of expectations, some reinsurance treaties allow for increases to future premium rates. Other treaties include experience refund provisions, which may also help reduce RGA's mortality risk.

RGA has various methods to manage its insurance risks, including access to the capital and reinsurance markets.

Market and Credit Risk

Market and Credit risk is the risk of lower or negative earnings and potentially a reduction in enterprise value due to changes in the market prices of asset and liabilities.

Interest Rate Risk

Interest Rate risk is risk that changes in the level and volatility of nominal interest rates affect the profitability, value or solvency position of the Company. This includes credit spread changes and inflation but excludes credit quality deterioration. This risk arises from many of the Company's primary activities, as the Company invests substantial funds in interest-sensitive assets, primarily fixed maturity securities, and also has certain interest-sensitive contract liabilities. A prolonged period where market

yields are significantly below the book yields of the Company's asset portfolio puts downward pressure on portfolio book yields. The Company has been proactive in its investment strategies, reinsurance structures and overall asset-liability management practices to reduce the risk of unfavorable consequences in this type of environment.

The Company manages interest rate risk to optimize the return on the Company's capital and to preserve the value created by its business operations within certain constraints. For example, certain management and monitoring processes are designed to minimize the effect of sudden and/or sustained changes in interest rates on fair value, cash flows, and net interest income. The Company manages its exposure to interest rates principally by managing the relative matching of the cash flows of its liabilities and assets.

The following table presents the account values, the weighted average interest-crediting rates and minimum guaranteed rate ranges for the contracts containing guaranteed rates by major class of interest-sensitive product as of December 31, 2018 and 2017 (dollars in thousands):

Interest Sensitive Contract Liability	Account Value		Current Weighted-Average Interest Crediting Rate		Minimum Guaranteed Rate Ranges	
	2018	2017	2018	2017	2018	2017
Traditional individual fixed annuities	\$ 8,497,997	\$ 6,671,880	2.96%	2.86%	0.50 – 5.50%	0.50 – 4.50%
Equity-indexed annuities	3,727,953	4,071,702	1.11	3.88	0.10 – 3.00	1.00 – 3.00
Individual variable annuity contracts	130,826	144,615	2.97	3.04	1.50 – 3.04	1.50 – 3.04
Guaranteed investment contracts	1,744,418	1,358,612	2.45	1.63	1.47 – 3.61	1.47 – 2.63
Universal life – type policies	2,603,802	2,659,445	4.00	3.97	3.00 – 6.00	3.00 – 6.00

The following table presents the account values by each minimum guaranteed rate, rounded to the nearest percentage, by class of interest-sensitive product as of December 31, 2018 and 2017 (dollars in thousands):

Interest Sensitive Contract Liability	Account Value as of December 31, 2018						
	1%	2%	3%	4%	5%	6%	Total
Traditional individual fixed annuities	\$ 937,992	\$ 759,700	\$ 4,697,125	\$ 2,071,431	\$ 10,718	\$ 21,031	\$ 8,497,997
Equity-indexed annuities	685,249	2,252,767	789,937	—	—	—	3,727,953
Individual variable annuity contracts	—	2,123	128,703	—	—	—	130,826
Guaranteed investment contracts	125,000	635,555	973,151	10,712	—	—	1,744,418
Universal life – type policies	—	—	6	2,526,631	55,862	21,303	2,603,802

Interest Sensitive Contract Liability	Account Value as of December 31, 2017						
	1%	2%	3%	4%	5%	6%	Total
Traditional individual fixed annuities	\$ 833,788	\$ 742,760	\$ 3,761,978	\$ 1,322,063	\$ 11,291	\$ —	\$ 6,671,880
Equity-indexed annuities	692,601	2,508,847	870,254	—	—	—	4,071,702
Individual variable annuity contracts	—	2,528	142,087	—	—	—	144,615
Guaranteed investment contracts	239,809	1,093,776	25,027	—	—	—	1,358,612
Universal life – type policies	—	—	51,010	2,529,314	56,634	22,487	2,659,445

The spread profits on the Company's fixed annuity and interest-sensitive whole life, universal life ("UL") and fixed portion of variable universal life ("VUL") insurance policies are at risk if interest rates decline and remain relatively low for a period of time, which has generally been the case in recent years. Should interest rates remain at current levels, which are significantly lower than those existing prior to the declines of recent years, the average earned rate of return on the Company's annuity and UL investment portfolios will continue to decline. Declining portfolio yields may cause the spreads between investment portfolio yields and the interest rate credited to contract holders to deteriorate as the Company's ability to manage spreads can become limited by minimum guaranteed rates on annuity and UL policies. In 2018, minimum guaranteed rates on non-variable annuity and UL policies generally ranged from 0.10% to 6.00%, with an average guaranteed rate of approximately 2.86%. In 2017, minimum guaranteed rates on non-variable annuity and UL policies generally ranged from 0.50% to 6.00%, with an average guaranteed rate of approximately 2.74%.

Interest rate spreads are managed for near term income through a combination of crediting rate actions and portfolio management. Certain annuity products contain crediting rates that reset annually, of which \$7,003.9 million and \$5,343.9 million of account balances are not subject to surrender charges as of December 31, 2018 and 2017, respectively, with substantially all of these already at their minimum guaranteed rates. As such, certain management and monitoring processes are designed to minimize the effect of sudden and/or sustained changes in interest rates on fair value, cash flows, and net interest income.

The Company's exposure to interest rate price risk and interest rate cash flow risk is reviewed on a quarterly basis. Interest rate price risk exposure is measured using interest rate sensitivity analysis to determine the change in fair value of the Company's

financial instruments in the event of a hypothetical change in interest rates. Interest rate cash flow risk exposure is measured using interest rate sensitivity analysis to determine the Company's variability in cash flows in the event of a hypothetical change in interest rates.

Interest rate sensitivity analysis is used to measure the Company's interest rate price risk by computing estimated changes in fair value of fixed rate assets and liabilities in the event of a hypothetical 100 basis point change (increase or decrease) in market interest rates. The Company does not have fixed rate instruments classified as trading securities. The Company's projected net decrease in fair value of financial instruments in the event of a 100 basis point increase in market interest rates at its fiscal years ended December 31, 2018 and 2017 was \$1,493.1 million and \$966.7 million, respectively.

The calculation of fair value is based on the net present value of estimated discounted cash flows expected over the life of the market risk sensitive instruments, using market prepayment assumptions and market rates of interest provided by independent broker quotations and other public sources, with adjustments made to reflect the shift in the treasury yield curve as appropriate.

The interest rate sensitivity relating to the Company's fixed maturity securities is assessed using hypothetical scenarios that assume positive and negative 50 and 100 basis point parallel shifts in the yield curves. This analysis assumes that the U.S., Canadian and other pertinent countries' yield curve shifts are of equal direction and magnitude. Change in value of individual securities is estimated consistently under each scenario using a commercial valuation tool. The Company's actual experience may differ from the results noted below particularly due to assumptions utilized or if events differ from those included in the methodology. The following tables summarize the results of this analysis for fixed maturity securities in the Company's investment portfolio as of the dates indicated (dollars in millions):

Interest Rate Analysis of Estimated Fair Value of Fixed Maturity Securities

December 31, 2018:	-100 bps	-50 bps	-	50 bps	100 bps
Total estimated fair value	\$ 43,073	\$ 41,494	\$ 39,992	\$ 38,570	\$ 37,248
% Change in estimated fair value from base	7.7%	3.8%	—%	(3.6)%	(6.9)%
\$ Change in estimated fair value from base	\$ 3,081	\$ 1,502	\$ —	\$ (1,422)	\$ (2,744)
 December 31, 2017:	 -100 bps	 -50 bps	 -	 50 bps	 100 bps
Total estimated fair value	\$ 41,312	\$ 39,695	\$ 38,151	\$ 36,699	\$ 35,354
% Change in estimated fair value from base	8.3%	4.0%	—%	(3.8)%	(7.3)%
\$ Change in estimated fair value from base	\$ 3,161	\$ 1,544	\$ —	\$ (1,452)	\$ (2,797)

Interest rate sensitivity analysis is also used to measure the Company's interest rate cash flow risk by computing estimated changes in the expected cash flows for floating rate assets and liabilities over a one year period following an instantaneous, parallel, hypothetical 100 basis point change (increase or decrease) in market interest rates. The Company does not have variable rate instruments classified as trading securities. The Company's projected decrease in cash flows associated with floating rate instruments in the event of an instantaneous 100 basis point decrease in market interest rates for its fiscal years ended December 31, 2018 and 2017 was \$71.3 million and \$44.4 million, respectively.

Computations of prospective effects of hypothetical interest rate changes are based on numerous assumptions, and should not be relied on as indicative of future results. Further, the computations do not contemplate any actions management could undertake in response to changes in interest rates. Certain shortcomings are inherent in the method of analysis presented in the computation of the estimated fair value of fixed maturity securities and the estimated cash flows of floating rate instruments, which constitute forward-looking statements. Actual values may differ materially from those projections presented due to a number of factors, including, without limitation, market conditions varying from assumptions used in the calculation of the fair value.

In order to reduce the exposure to changes in fair values from interest rate fluctuations, the Company has developed strategies to manage the net interest rate sensitivity of its assets and liabilities. In addition, from time to time, the Company has utilized the swap market to manage the sensitivity of fair values to interest rate fluctuations.

Inflation can also have direct effects on the Company's assets and liabilities. The primary direct effect of inflation is the increase in operating expenses. A large portion of the Company's operating expenses consists of salaries, which are subject to wage increases at least partly affected by the rate of inflation.

The Company reinsures annuities with benefits indexed to the cost of living. Some of these benefits are hedged with a combination of CPI swaps and indexed bonds when material.

Long Term Care products have an inflation component linked to the future cost of such services. If health care costs increase at a much larger rate than what is prevalent in the nominal interest rates available in the markets, the Company may not earn enough investment yield to pay future claims on such products.

Real Estate Risk

Real Estate risk is the risk that changes in the level and volatility of real estate market valuations may impact the profitability, value or solvency position of the Company. The Company has investments in direct real estate equity and debt instruments collateralized by real estate (“real estate loans”). Real estate equity risks include significant reduction in valuations, which could be caused by downturns in the broad economy or in specific geographic regions or sectors. In addition, real estate loan risks include defaults, borrower or tenant bankruptcy and reduced liquidity. Real estate loan risks are partially mitigated by the excess of the value of the property over the loan principle, which provides a buffer should the value of the real estate decrease. The Company manages its real estate loan risk by diversifying by property type and geography and through exposure limits.

Equity Risk

Equity risk is the risk that changes in the level and volatility of equity market valuations affect the profitability, value or solvency position of the Company. This risk includes Variable Annuity and other equity linked exposures and asset related equity exposure. The Company assumes equity risk from alternative investments, fixed indexed annuities and variable annuities. The Company uses derivatives to hedge its exposure to movements in equity markets that have a direct correlation with certain of its reinsurance products.

Alternative Investments

Alternative investments are investments in non-traditional asset classes that primarily back the Company’s capital and surplus as well as certain long-term illiquid liability portfolios. Alternative investments generally encompass: hedge funds, emerging markets debt, distressed debt, commodities, infrastructure, tax credits, and equities, both public and private. The Company mitigates its exposure to alternative investments by limiting the size of the alternative investments holding and using per-issuer investment limits.

Fixed Indexed Annuities

The Company reinsures fixed indexed annuities (“FIAs”). Credits for FIAs are affected by changes in equity markets. Thus the fair value of the benefit is primarily a function of index returns and volatility. The Company hedges most of the underlying FIA equity exposure with derivatives.

Variable Annuities

The Company reinsures variable annuities including those with guaranteed minimum death benefits (“GMDB”), guaranteed minimum income benefits (“GMIB”), guaranteed minimum accumulation benefits (“GMAB”) and guaranteed minimum withdrawal benefits (“GMWB”). Strong equity markets, increases in interest rates and decreases in equity market volatility will generally decrease the fair value of the liabilities underlying the benefits. Conversely, a decrease in the equity markets along with a decrease in interest rates and an increase in equity market volatility will generally result in an increase in the fair value of the liabilities underlying the benefits, which has the effect of increasing reserves and lowering earnings. The Company maintains a customized dynamic hedging program that is designed to substantially mitigate the risks associated with income volatility around the change in reserves on guaranteed benefits, ignoring the Company’s own credit risk assessment. However, the hedge positions may not fully offset the changes in the carrying value of the guarantees due to, among other things, time lags, high levels of volatility in the equity and derivative markets, extreme changes in interest rates, unexpected contract holder behavior, and divergence between the performance of the underlying funds and hedging indices. These factors, individually or collectively, may have a material adverse effect on the Company’s net income, financial condition or liquidity. The table below provides a summary of variable annuity account values and the fair value of the guaranteed benefits as of December 31, 2018 and 2017.

(dollars in millions)	December 31,	
	2018	2017
No guaranteed minimum benefits	\$ 797	\$ 950
GMDB only	159	182
GMIB only	21	24
GMAB only	7	22
GMWB only	1,090	1,366
GMDB / WB	272	343
Other	19	31
Total variable annuity account values	\$ 2,365	\$ 2,918
Fair value of liabilities associated with living benefit riders	\$ 168	\$ 152

Credit Risk

Credit risk, which includes default risk, is risk of loss due to credit quality deterioration of an individual financial asset, derivative or non-derivative contract or instrument. Credit quality deterioration may or may not be accompanied by a ratings downgrade. Generally, the credit exposure for an asset is limited to the fair value, net of any collateral received, at the reporting date.

Investment Credit Risk

Investment credit risk is credit risk related to invested assets. The Company manages investment credit risk using per-issuer investment limits. In addition to per-issuer limits, the Company also limits the total amounts of investments per rating category. An automated compliance system checks for compliance for all investment positions and sends warning messages when there is a breach. The Company manages its credit risk related to over-the-counter derivatives by entering into transactions with creditworthy counterparties, maintaining collateral arrangements and through the use of master agreements that provide for a single net payment to be made by one counterparty to another at each due date and upon termination. Because futures are transacted through regulated exchanges, and positions are marked to market on a daily basis, the Company has minimal exposure to credit-related losses in the event of nonperformance by counterparties to such derivative instruments.

The Company enters into various collateral arrangements, which require both the posting and accepting of collateral in connection with its derivative instruments. Collateral agreements contain attachment thresholds that vary depending on the posting party's financial strength ratings. Additionally, a decrease in the Company's financial strength rating to a specified level results in potential settlement of the derivative positions under the Company's agreements with its counterparties. A committee is responsible for setting rules and approving and overseeing all transactions requiring collateral. See "Credit Risk" in Note 5 - "Derivative Instruments" in the Notes to Consolidated Financial Statements for additional information on credit risk related to derivatives.

Counterparty Risk

Counterparty risk is the potential for the Company to incur losses due to a client, retrocessionaire, or partner becoming distressed or insolvent. This includes run-on-the-bank risk and collection risk.

Run-on-the-Bank

The risk that a client's in force block incurs substantial surrenders and/or lapses due to credit impairment, reputation damage or other market changes affecting the counterparty. Substantially higher than expected surrenders and/or lapses could result in inadequate in force business to recover cash paid out for acquisition costs.

Collection Risk

For clients and retrocessionaires, this includes their inability to satisfy a reinsurance agreement because the right of offset is disallowed by the receivership court; the reinsurance contract is rejected by the receiver, resulting in a premature termination of the contract; and/or the security supporting the transaction becomes unavailable to RGA.

The Company manages counterparty risk by limiting the total exposure to a single counterparty and by only initiating contracts with creditworthy counterparties. In addition, some of the counterparties have set up trusts and letters of credit, reducing the Company's exposure to these counterparties.

Generally, RGA's insurance subsidiaries retrocede amounts in excess of their retention to certain other RGA insurance subsidiaries. External retrocessions are arranged through the Company's retrocession pools for amounts in excess of its retention. As of December 31, 2018, all retrocession pool members in this excess retention pool rated by the A.M. Best Company were rated "A-" or better except one pool member that was rated "B+." A rating of "A-" is the fourth highest rating out of sixteen possible ratings. For a majority of the retrocessionaires that were not rated, letters of credit or trust assets have been given as additional security. In addition, the Company performs annual financial and in force reviews of its retrocessionaires to evaluate financial stability and performance.

The Company has never experienced a material default in connection with retrocession arrangements, nor has it experienced any material difficulty in collecting claims recoverable from retrocessionaires; however, no assurance can be given as to the future performance of such retrocessionaires or as to the recoverability of any such claims.

Aggregate Counterparty Limits

In addition to investment credit limits and counterparty limits, there are aggregate counterparty risk limits that include counterparty exposures from reinsurance, financing and investment activities at an aggregated level to control total exposure to a single counterparty. Counterparty risk aggregation is important because it enables the Company to capture risk exposures at a comprehensive level and under more extreme circumstances compared to analyzing the components individually.

All counterparty exposures are calculated on a quarterly basis, reviewed by management and monitored by the ERM function.

Capital Risk

Capital risk is the risk of lower/negative earnings, potential reduction in enterprise value, and/or the loss of ability to conduct business due to insufficient financial capacity, including not having the appropriate amount of group or entity-level capital to conduct business today or in the future. The Company monitors capital risk exposure using relevant bases of measurement including but not limited to economic, rating agency, and local regulatory methodologies. Additionally, the Company regularly assesses risk related to collateral, financing, liquidity and tax.

Collateral Risk

Collateral risk is the risk that collateral will not be available at expected costs or in the capacity required to meet current and future needs. The Company monitors risks related to interest rate movement, collateral requirements and position and capital markets environment. Collateral demands and resources continue to be actively managed with available collateral sources being more than sufficient to cover stress level collateral demands.

Foreign Currency Risk

Foreign currency risk is the risk of changes in level and volatility of currency exchange rates affect the profitability, value or solvency position of the Company. The Company manages its exposure to currency principally by currency matching invested assets with the underlying liabilities to the extent practical. The Company has in place net investment hedges for a portion of its investments in its Canadian operations to reduce excess exposure to these currencies. Translation differences resulting from translating foreign subsidiary balances to U.S. dollars are reflected in stockholders' equity on the consolidated balance sheets.

The Company generally does not hedge the foreign currency exposure of its subsidiaries transacting business in currencies other than their functional currency (transaction exposure). However, the Company has entered into cross currency swaps to manage exposure to specific currencies. The majority of the Company's foreign currency transactions are denominated in Australian dollars, British pounds, Canadian dollars, Euros, Japanese yen, Korean won, and the South African rand. The maximum amount of assets held in a specific currency (with the exception of the U.S. dollar) is measured relative to risk targets and is monitored regularly.

The Company does not hedge the income statement risk associated with translating foreign currencies. The foreign exchange risk sensitivity of the Company's consolidated pre-tax income is assessed using hypothetical test scenarios. Actual results may differ from the results noted below particularly due to assumptions utilized or if events occur that were not included in the methodology. For more information on this risk, see "Item 1A - Risk Factors - Risks Related to Our Business." In general, a weaker U.S. dollar relative to foreign currencies has a favorable impact on the Company's income before income taxes. The following tables summarize the impact on the Company's reported income before income taxes of an immediate favorable or unfavorable change in each of the foreign exchange rates to which the Company has exposure (dollars in thousands):

	Unfavorable			Favorable	
	-10%	-5%	-	5%	10%
Year Ended December 31, 2018					
Income before income taxes	\$ 795,645	\$ 820,732	\$ 845,820	\$ 870,908	\$ 895,995
% change of income before income taxes from base	(5.9)%	(3.0)%	—%	3.0%	5.9%
\$ change of income before income taxes from base	\$ (50,175)	\$ (25,088)	\$ —	\$ 25,088	\$ 50,175
	Unfavorable			Favorable	
	-10%	-5%	-	5%	10%
Year Ended December 31, 2017					
Income before income taxes	\$ 1,096,520	\$ 1,119,667	\$ 1,142,815	\$ 1,165,963	\$ 1,189,110
% change of income before income taxes from base	(4.1)%	(2.0)%	—%	2.0%	4.1%
\$ change of income before income taxes from base	\$ (46,295)	\$ (23,148)	\$ —	\$ 23,148	\$ 46,295

Financing Risk

Financing risk is the risk that capital will not be available at expected costs or in the capacity required. The Company continues to monitor financing risks related to regulatory financing, contingency financing, and debt capital and sees no immediate issues with its current structures, capacity and plans.

Liquidity Risk

Liquidity risk is the risk that the Company is unable to meet payment obligations at expected costs or in the capacity required. The Company's traditional liquidity demands include items such as claims, expenses, debt financing and investment

purchases, which are largely known or can be reasonably forecasted. The Company regularly performs liquidity risk modeling, including both market and Company specific stresses, to assess the sufficiency of available resources.

Tax Risk

Tax risk is the risk that current and future tax positions are different than expected. The Company monitors tax risks related to the evolving tax and regulatory environment, business transactions, legal entity reorganizations, tax compliance obligations, and financial reporting.

Operational Risk

Operational risk is the risk of lower/negative earnings and a potential reduction in enterprise value caused by unexpected losses associated with inadequacy or failure on the part of internal processes, people and systems, or from external events. The Company regularly monitors and assesses the risks related to business conduct and governance, fraud, privacy and security, business disruption, and business operations. Various insurance, market and credit, capital, and strategy risk obligations and concerns often intersect with the Company's core operational process risk areas. Given the scope of the Company's business and the number of countries in which it operates, this set of risks has the potential to affect the business locally, regionally, or globally. Operational risks are core to managing the Company's brand and market confidence as well as maintaining its ability to acquire and retain the appropriate expertise to execute and operate the business.

Business Conduct and Governance

Business conduct and governance is the risk related to management oversight, compliance, market conduct, and legal matters. The Company's Compliance Risk Management Program facilitates a proactive evaluation of present and potential compliance risks associated with both local and enterprise-wide regulatory requirements as well as compliance with Company policies and procedures.

Fraud Risk

Fraud risk is the risk related to the deliberate abuse of and/or taking of Company assets in order to secure gain for the perpetrator or inflict harm on the Company or other victim. Ongoing monitoring and an annual fraud risk assessment enables the Company to continually evaluate potential fraud risks within the organization.

Privacy and Security Risk

Privacy and security risk is the risk of theft, loss, or unauthorized disclosure of physical or electronic assets resulting in a loss of asset value, confidentiality, or intellectual property. The Company's privacy and security programs, processes, and procedures are designed to prevent unauthorized physical and electronic theft and the disclosure of confidential and personal data related to its customers, insured individuals or its employees. The Company employs technology, administrative related processes and procedural controls, security measures and other preventative actions to reduce the risk of such incidents.

Business Disruption Risk

Business disruption risk is the risk of impairment to operational capabilities due to the unavailability of people, systems, and/or facilities. The Company's global business continuity process enables associates to identify potential impacts that threaten operations by providing the framework, policies and procedures and required recurring training for how the Company will recover and restore interrupted critical functions, within a predetermined time, after a disaster or extended disruption, until its normal facilities are restored.

Business Operations Risk

Business operations risk is the risk related to business processes and procedures. Business operations risk includes risk associated with the processing of transactions, data use and management, monitoring and reporting, the integrity and accuracy of models, the use of third parties, and the delivery of advisory services.

Human Capital Risk

Human capital risk is related to workforce management, including talent acquisition, development, retention, and employment relations/regulations. The Company actively monitors human capital risks using multiple practices that include but are not limited to human resource and compliance policies and procedures, regularly reviewing key risk indicators, performance evaluations, compensation and benefits benchmarking, succession planning, employee engagement surveys and associate exit interviews.

Strategic Risk

Strategic risk relates to the planning, implementation, and management of the Company's business plans and strategies, including the risks associated with: the global environment in which it operates; future law and regulation changes; political risks; and relationships with key external parties.

Strategy Risk

Strategy risk is the risk related to the design and execution of the Company's strategic plan, including risks associated with merger and acquisition activity. Strategy risks are addressed by a robust multi-year planning process, regular business unit level assessments of strategy execution and active benchmarking of key performance and risk indicators across the Company's portfolios of businesses. The Company's risk appetites and limits are set to be consistent with strategic objectives.

External Environment Risk

External environment risk relates to external competition, macro trends, and client needs. Macro characteristics that drive market opportunities, risk and growth potential, the competitive landscape and client feedback are closely monitored.

Key Relationships Risk

Key relationships risk relates to areas of important interactions with parties external to the Company. The Company's reputation is a critical asset in successfully conducting business and therefore relationships with its primary stakeholders (including but not limited to business partners, shareholders, clients, rating agencies, and regulators) are all carefully monitored.

Political and Regulatory Risk

Political and regulatory risk relates to future law and regulation changes and the impact of political changes or instability on the Company's ability to achieve its objectives. Regulatory and political developments and related risks that may affect the Company are identified, assessed and monitored as part of regular oversight activities.

New Accounting Standards

See "New Accounting Pronouncements" in Note 2 — "Significant Accounting Policies and Pronouncements" in the Notes to Consolidated Financial Statements.

Item 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Information required by Item 7A is contained in Item 7 under the caption "Management's Discussion and Analysis of Financial Condition and Results of Operations—Market and Credit Risk"

Item 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

REINSURANCE GROUP OF AMERICA, INCORPORATED AND SUBSIDIARIES

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REINSURANCE GROUP OF AMERICA, INCORPORATED AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS
(in thousands, except share data)

	December 31, 2018	December 31, 2017
Assets		
Fixed maturity securities:		
Available-for-sale at fair value (amortized cost of \$38,882,168 and \$35,281,412)	\$ 39,992,346	\$ 38,150,820
Equity securities (amortized cost of \$107,721 and \$102,841)	82,197	100,152
Mortgage loans on real estate (net of allowances of \$11,286 and \$9,384)	4,966,298	4,400,533
Policy loans	1,344,980	1,357,624
Funds withheld at interest	5,761,471	6,083,388
Short-term investments	142,598	93,304
Other invested assets	1,915,297	1,505,332
Total investments	54,205,187	51,691,153
Cash and cash equivalents	1,889,733	1,303,524
Accrued investment income	427,893	392,721
Premiums receivable and other reinsurance balances	3,017,868	2,338,481
Reinsurance ceded receivables	757,572	782,027
Deferred policy acquisition costs	3,397,770	3,239,824
Other assets	839,222	767,088
Total assets	\$ 64,535,245	\$ 60,514,818
Liabilities and Stockholders' Equity		
Future policy benefits	\$ 25,285,400	\$ 22,363,241
Interest-sensitive contract liabilities	18,004,526	16,227,642
Other policy claims and benefits	5,642,755	4,992,074
Other reinsurance balances	487,177	488,739
Deferred income taxes	1,798,800	2,198,309
Other liabilities	1,396,200	1,102,975
Long-term debt	2,787,873	2,788,365
Collateral finance and securitization notes	681,961	783,938
Total liabilities	56,084,692	50,945,283
Commitments and contingent liabilities (See Note 12)		
Stockholders' Equity:		
Preferred stock (par value \$.01 per share; 10,000,000 shares authorized; no shares issued or outstanding)	—	—
Common stock (par value \$.01 per share; 140,000,000 shares authorized; shares issued: 79,137,758 at December 31, 2018 and 2017)	791	791
Additional paid-in-capital	1,898,652	1,870,906
Retained earnings	7,284,949	6,736,265
Treasury stock, at cost - 16,323,390 and 14,685,663 shares	(1,370,602)	(1,102,058)
Accumulated other comprehensive income	636,763	2,063,631
Total stockholders' equity	8,450,553	9,569,535
Total liabilities and stockholders' equity	\$ 64,535,245	\$ 60,514,818

See accompanying notes to consolidated financial statements.

REINSURANCE GROUP OF AMERICA, INCORPORATED AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF INCOME
(in thousands, except per share amounts)

	For the years ended December 31,		
	2018	2017	2016
Revenues			
Net premiums	\$ 10,543,776	\$ 9,841,130	\$ 9,248,871
Investment income, net of related expenses	2,138,525	2,154,651	1,911,886
Investment related gains (losses), net:			
Other-than-temporary impairments on fixed maturity securities	(28,494)	(42,639)	(38,805)
Other-than-temporary impairments on fixed maturity securities transferred to other comprehensive income	—	—	74
Other investment related gains (losses), net	(141,594)	210,519	132,926
Total investment related gains (losses), net	(170,088)	167,880	94,195
Other revenues	363,451	352,108	266,559
Total revenues	12,875,664	12,515,769	11,521,511
Benefits and expenses			
Claims and other policy benefits	9,318,929	8,518,917	7,993,375
Interest credited	425,204	502,040	364,691
Policy acquisition costs and other insurance expenses	1,322,520	1,466,646	1,310,540
Other operating expenses	786,137	710,690	645,509
Interest expense	147,355	146,025	137,623
Collateral finance and securitization expense	29,699	28,636	25,827
Total benefits and expenses	12,029,844	11,372,954	10,477,565
Income before income taxes	845,820	1,142,815	1,043,946
Provision for income taxes	129,978	(679,366)	342,503
Net income	\$ 715,842	\$ 1,822,181	\$ 701,443
Earnings per share			
Basic earnings per share	\$ 11.25	\$ 28.28	\$ 10.91
Diluted earnings per share	11.00	27.71	10.79

See accompanying notes to consolidated financial statements.

REINSURANCE GROUP OF AMERICA, INCORPORATED AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(in thousands)

	For the years ended December 31,		
	2018	2017	2016
Comprehensive income (loss)			
Net Income	\$ 715,842	\$ 1,822,181	\$ 701,443
Other comprehensive income (loss), net of tax:			
Foreign currency translation adjustments	(79,775)	69,126	8,610
Net unrealized investment gains (losses)	(1,344,502)	698,078	419,336
Defined benefit pension and postretirement plan adjustments	(18)	726	3,099
Total other comprehensive income (loss), net of tax	(1,424,295)	767,930	431,045
Total comprehensive income (loss)	\$ (708,453)	\$ 2,590,111	\$ 1,132,488

See accompanying notes to consolidated financial statements.

REINSURANCE GROUP OF AMERICA, INCORPORATED AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(in thousands except per share amounts)

	Common Stock	Additional Paid In Capital	Retained Earnings	Treasury Stock	Accumulated Other Comprehensive Income	Total
Balance, December 31, 2015	\$ 791	\$ 1,816,142	\$ 4,620,303	\$ (1,010,139)	\$ 708,284	\$ 6,135,381
Net income			701,443			701,443
Total other comprehensive income (loss)					431,045	431,045
Dividends to stockholders, \$1.56 per share			(100,371)			(100,371)
Purchase of treasury stock				(122,916)		(122,916)
Reissuance of treasury stock		32,469	(22,245)	38,276		48,500
Balance, December 31, 2016	791	1,848,611	5,199,130	(1,094,779)	1,139,329	7,093,082
Adoption of new accounting standards			(138,649)		156,372	17,723
Net income			1,822,181			1,822,181
Total other comprehensive income (loss)					767,930	767,930
Dividends to stockholders, \$1.82 per share			(117,291)			(117,291)
Purchase of treasury stock				(43,508)		(43,508)
Reissuance of treasury stock		22,295	(29,106)	36,229		29,418
Balance, December 31, 2017	791	1,870,906	6,736,265	(1,102,058)	2,063,631	9,569,535
Adoption of new accounting standards			553		(2,573)	(2,020)
Net income			715,842			715,842
Total other comprehensive income (loss)					(1,424,295)	(1,424,295)
Dividends to stockholders, \$2.20 per share			(140,110)			(140,110)
Purchase of treasury stock				(299,679)		(299,679)
Reissuance of treasury stock		27,746	(27,601)	31,135		31,280
Balance, December 31, 2018	\$ 791	\$ 1,898,652	\$ 7,284,949	\$ (1,370,602)	\$ 636,763	\$ 8,450,553

See accompanying notes to consolidated financial statements.

REINSURANCE GROUP OF AMERICA, INCORPORATED AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOW
(in thousands)

	For the years ended December 31,		
	2018	2017	2016
Cash flows from operating activities			
Net income	\$ 715,842	\$ 1,822,181	\$ 701,443
Adjustments to reconcile net income to net cash provided by operating activities:			
Change in operating assets and liabilities:			
Accrued investment income	7,159	(43,142)	(18,761)
Premiums receivable and other reinsurance balances	(764,159)	(346,737)	(156,836)
Deferred policy acquisition costs	(107,325)	154,234	31,024
Reinsurance ceded receivable balances	66,298	(124,056)	(53,221)
Future policy benefits, other policy claims and benefits, and other reinsurance balances	1,593,065	1,320,810	810,474
Deferred income taxes	76,507	(847,304)	293,777
Other assets and other liabilities, net	(162,835)	242,466	(98,675)
Amortization of net investment premiums, discounts and other	(57,378)	(105,382)	(93,952)
Depreciation and amortization expense	45,127	52,902	26,853
Investment related (gains) losses, net	170,088	(167,880)	(94,195)
Excess tax benefits from share-based payment arrangement	—	—	(162)
Other, net	(1,268)	24,216	117,949
Net cash provided by operating activities	1,581,121	1,982,308	1,465,718
Cash flows from investing activities			
Sales of fixed maturity securities available-for-sale	9,339,632	7,308,608	4,584,828
Maturities of fixed maturity securities available-for-sale	626,650	589,214	472,435
Sales of equity securities	45,863	207,347	434,518
Principal payments on mortgage loans on real estate	445,360	339,919	442,755
Principal payments on policy loans	57,352	114,586	88,840
Purchases of fixed maturity securities available-for-sale	(9,724,190)	(8,941,293)	(7,414,647)
Purchases of equity securities	(13,428)	(81,254)	(584,532)
Cash invested in mortgage loans on real estate	(1,019,212)	(964,421)	(1,092,876)
Cash invested in policy loans	(44,708)	(44,607)	(47,646)
Cash invested in funds withheld at interest	(53,626)	(22,557)	(32,597)
Purchase of businesses, net of cash acquired of \$4,988	(31,441)	—	—
Purchases of property and equipment	(28,891)	(44,211)	(44,642)
Change in short-term investments	129,329	52,302	465,628
Change in other invested assets	(365,242)	(121,206)	(97,790)
Net cash used in investing activities	(636,552)	(1,607,573)	(2,825,726)
Cash flows from financing activities			
Dividends to stockholders	(140,110)	(117,291)	(100,371)
Repayment of collateral finance and securitization notes	(96,354)	(68,429)	(64,571)
Proceeds from long-term debt issuance	—	—	799,984
Debt issuance costs	—	—	(8,766)
Principal payments of long-term debt	(2,690)	(302,582)	(2,479)
Purchases of treasury stock	(299,679)	(43,508)	(122,916)
Excess tax benefits from share-based payment arrangement	—	—	162
Exercise of stock options, net	3,459	7,292	15,321
Change in cash collateral for derivative positions and other arrangements	43,607	(65,422)	26,413
Deposits on universal life and other investment type policies and contracts	864,193	1,017,699	1,041,623
Withdrawals on universal life and other investment type policies and contracts	(694,399)	(752,381)	(529,011)
Net cash used in financing activities	(321,973)	(324,622)	1,055,389
Effect of exchange rate changes on cash	(36,387)	52,693	(19,938)
Change in cash and cash equivalents	586,209	102,806	(324,557)
Cash and cash equivalents, beginning of period	1,303,524	1,200,718	1,525,275
Cash and cash equivalents, end of period	\$ 1,889,733	\$ 1,303,524	\$ 1,200,718
Supplemental disclosures of cash flow information:			
Interest paid	\$ 170,191	\$ 173,471	\$ 156,727
Income taxes paid, net of refunds	\$ 141,703	\$ 37,098	\$ 61,085
Non-cash transactions:			
Transfer of invested assets	\$ 4,636,099	\$ 3,285,837	\$ 120,500
Purchase of a business:			
Assets acquired, excluding cash acquired	\$ 69,791	\$ —	\$ —
Liabilities assumed	(38,350)	—	—
Net cash paid on purchase	\$ 31,441	\$ —	\$ —

See accompanying notes to consolidated financial statements.

Reinsurance Group of America, Incorporated
Notes to consolidated financial statements
For the years ended December 31, 2018, 2017 and 2016

Note 1 BUSINESS AND BASIS OF PRESENTATION

Business

Reinsurance Group of America, Incorporated (“RGA”) is an insurance holding company that was formed on December 31, 1992. The consolidated financial statements herein include the assets, liabilities, and results of operations of RGA and its subsidiaries, all of which are wholly owned (collectively, the “Company”).

The Company is engaged in providing traditional reinsurance, which includes individual and group life and health, disability, and critical illness reinsurance. The Company also provides financial solutions, which includes longevity reinsurance, asset-intensive products, primarily annuities, financial reinsurance and stable value products.

Reinsurance is an arrangement under which an insurance company, the reinsurer, agrees to indemnify another insurance company, the ceding company, for all or a portion of the insurance risks underwritten by the ceding company. Reinsurance is designed to (i) reduce the net amount at risk on individual risks, thereby enabling the ceding company to increase the volume of business it can underwrite, as well as increase the maximum risk it can underwrite on a single risk; (ii) enhance the ceding company’s financial strength and surplus position; (iii) stabilize operating results by leveling fluctuations in the ceding company’s loss experience; and (iv) assist the ceding company in meeting applicable regulatory requirements.

Basis of Presentation

The consolidated financial statements of the Company have been prepared in accordance with U.S. generally accepted accounting principles (“GAAP”). The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosures of contingent assets and liabilities as of the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. The most significant estimates include those used in determining deferred policy acquisition costs, premiums receivable, future policy benefits, incurred but not reported claims, income taxes, valuation of investments and investment impairments, and valuation of embedded derivatives. Actual results could differ materially from the estimates and assumptions used by management.

The accompanying consolidated financial statements include the accounts of RGA and its subsidiaries, all of which are wholly owned, and any variable interest entities where the Company is the primary beneficiary. Entities in which the Company has significant influence over the operating and financing decisions but are not required to be consolidated are reported under the equity method of accounting. The Company evaluates variable interest entities in accordance with the general accounting principles for *Consolidation*. Intercompany balances and transactions have been eliminated.

There were no subsequent events, other than as disclosed in Note 19 - “Subsequent Event,” that would require disclosure or adjustments to the accompanying consolidated financial statements through the date the consolidated financial statements were issued.

Note 2 SIGNIFICANT ACCOUNTING POLICIES AND PRONOUNCEMENTS

Investments

Fixed Maturity Securities

Fixed maturity securities classified as available-for-sale are reported at fair value and are so classified based upon the possibility that such securities could be sold prior to maturity if that action enables the Company to execute its investment philosophy and appropriately match investment results to operating and liquidity needs.

Unrealized gains and losses on fixed maturity securities classified as available-for-sale, less applicable deferred income taxes as well as related adjustments to deferred acquisition costs, if applicable, are reflected as a direct charge or credit to accumulated other comprehensive income (“AOCI”) in stockholders’ equity on the consolidated balance sheets.

Investment income is recognized as it accrues or is legally due. Realized gains and losses on sales of investments are included in investment related gains (losses), net, as are credit impairments that are other-than-temporary in nature. The cost of investments sold is primarily determined based upon the specific identification method.

Equity Securities

Equity securities are carried at fair value with the exception of the Company’s investment in the Federal Home Loan Bank of Des Moines (“FHLB”) common stock, which is carried at cost and included in other invested assets. Realized and unrealized gains and losses associated with equity securities carried at fair value are included in investment related gains (losses), net.

Mortgage Loans on Real Estate

Mortgage loans on real estate are carried at unpaid principal balances, net of any unamortized premium or discount and valuation allowances. Interest income is accrued on the principal amount of the mortgage loan based on its contractual interest rate. Amortization of premiums and discounts is recorded using the effective yield method. The Company accrues interest on loans until it is probable the Company will not receive interest or the loan is 90 days past due. Interest income, amortization of premiums, accretion of discounts and prepayment fees are reported in investment income, net of related expenses in the consolidated statements of income.

A mortgage loan is considered to be impaired when, based on the current information and events, it is probable that the Company will be unable to collect all amounts due according to the contractual terms of the mortgage agreement. Although all available and applicable factors are considered in the Company's analysis, loan-to-value and debt service coverage ratios are the most critical factors in determining impairment.

Valuation allowances on mortgage loans are established based upon inherent losses expected by management to be realized in connection with future dispositions or settlement of mortgage loans, including foreclosures. The Company establishes valuation allowances for estimated impairments on an individual loan basis as of the balance sheet date. Such valuation allowances are based on the excess carrying value of the loan over the present value of expected future cash flows discounted at the loan's original effective interest rate, the value of the loan's collateral if the loan is in the process of foreclosure or is otherwise collateral-dependent, or the loan's market value if the loan is being sold. Non-specific valuation allowances are established for mortgage loans based upon several loan factors, including the Company's historical experience for loan losses, defaults and loss severity, loss expectations for loans with similar risk characteristics and industry statistics. These evaluations are revised as conditions change and new information becomes available. In addition to historical experience, management considers qualitative factors that include the impact of changing macro-economic conditions, which may not be currently reflected in the loan portfolio performance, and the quality of the loan portfolio.

Any interest accrued or received on the net carrying amount of the impaired loan will be included in investment income or applied to the principal of the loan, depending on the assessment of the collectability of the loan. Mortgage loans deemed to be uncollectible or that have been foreclosed are charged off against the valuation allowances and subsequent recoveries, if any, are credited to the valuation allowances. Changes in valuation allowances are reported in investment related gains (losses), net on the consolidated statements of income.

The Company evaluates whether a mortgage loan modification represents a troubled debt restructuring. In a troubled debt restructuring, the Company grants concessions related to the borrower's financial difficulties. Generally, the types of concessions include: reduction of the contractual interest rate, extension of the maturity date at an interest rate lower than current market interest rates and/or a reduction of accrued interest. The Company considers the amount, timing and extent of the concession granted in determining any impairment or changes in the specific valuation allowance recorded in connection with the troubled debt restructuring. Through the continuous monitoring process, the Company may have recorded a specific valuation allowance prior to when the mortgage loan is modified in a troubled debt restructuring. Accordingly, the carrying value (after specific valuation allowance) before and after modification through a troubled debt restructuring may not change significantly, or may increase if the expected recovery is higher than the pre-modification recovery assessment.

Policy Loans

Policy loans are reported at the unpaid principal balance. Interest income on such loans is recorded as earned using the contractually agreed-upon interest rate. These policy loans present no credit risk because the amount of the loan cannot exceed the obligation due the ceding company upon the death of the insured or surrender of the underlying policy.

Funds Withheld at Interest

Funds withheld at interest represent amounts contractually withheld by ceding companies in accordance with reinsurance agreements. For agreements written on a modified coinsurance ("modco") basis and agreements written on a coinsurance funds withheld basis, assets that support the net statutory reserves or as defined in the treaty, are withheld and legally owned by the ceding company. Interest, recorded in investment income, net of related expenses in the consolidated statements of income, accrues to these assets at calculated rates as defined by the treaty terms. Changes in the value of the equity options held within the funds withheld portfolio associated with equity-indexed annuity treaties are reflected in investment income, net of related expenses.

Short-term Investments

Short-term investments represent investments with remaining maturities of one year or less, but greater than three months, at the time of acquisition and are stated at estimated fair value or amortized cost, which approximates estimated fair value. Interest on short-term investments is recorded in investment income, net of related expenses in the consolidated statements of income.

Other Invested Assets

In addition to FHLB common stock discussed in the *Equity Securities* section above and derivative contracts discussed below, other invested assets include limited partnership interests, joint ventures (other than operating joint ventures), equity release mortgages and contractholder-directed investments. Limited partnership interests are primarily carried at cost. Based on the nature and structure of these investments, they do not meet the characteristics of an equity security in accordance with applicable accounting standards. Joint ventures and certain limited partnerships are reported using the equity method of accounting.

Equity release mortgages are carried at unpaid principal balances, net of any unamortized premium or discount and valuation allowance. Interest income is accrued on the principal amount of the equity release mortgage based on its contractual interest rate.

The fair value option ("FVO") was elected for contractholder-directed investments supporting unit-linked variable annuity type liabilities that do not qualify for presentation and reporting as separate accounts. Changes in estimated fair value of these securities are included in investment income, net of related expenses.

Securities Borrowing, Lending and Repurchase Agreements

The Company participates in securities borrowing programs whereby securities, which are not reflected on the Company's consolidated balance sheets, are borrowed from third parties. The borrowed securities are used to provide collateral under affiliated reinsurance transactions. The Company is required to maintain a minimum of 100% of the fair value, or par value under certain programs, of the borrowed securities as collateral. The collateral consists of rights to reinsurance treaty cash flows. If cash flows from the reinsurance treaties are insufficient to maintain the minimum collateral requirement, the Company may substitute cash or securities to meet the requirement.

The Company participates in a securities lending program whereby securities, reflected as investments on the Company's consolidated balance sheets, are loaned to a third party. The Company receives securities as collateral, in an amount equal to a minimum of 105% of the fair value of the securities lent. The securities received as collateral are not reflected on the Company's consolidated balance sheets.

The Company participates in a repurchase program in which securities, reflected as investments on the Company's consolidated balance sheets, are pledged to a third party. In return, the Company receives cash from the third party, which is reflected as a payable to a third party, included in other liabilities on the consolidated balance sheets. The Company is required to maintain a minimum collateral balance with a fair value of 105% of the cash received.

The Company participates in repurchase/reverse repurchase programs in which securities, reflected as investments on the Company's consolidated balance sheets, are pledged to third parties. In return, the Company receives securities from the third parties with an estimated fair value equal to a minimum of 100% of the securities pledged. The securities received are not reflected on the Company's consolidated balance sheets.

Other-than-Temporary Impairment

The Company identifies fixed maturity securities that could potentially have credit impairments that are other-than-temporary by monitoring market events that could impact issuers' credit ratings, business climates, management changes, litigation, government actions and other similar factors. The Company also monitors late payments, pricing levels, rating agency actions, key financial ratios, financial statements, revenue forecasts and cash flow projections as indicators of credit issues.

The Company reviews all securities on a case-by-case basis to determine whether an other-than-temporary decline in value exists and whether losses should be recognized. The Company considers relevant facts and circumstances in evaluating whether a credit or interest rate-related impairment of a security is other-than-temporary. Relevant facts and circumstances considered include: (1) the extent and length of time the fair value has been below cost or amortized cost; (2) the reasons for the decline in fair value; (3) the issuer's financial position and access to capital; and (4) the Company's intent to sell a security or whether it is more likely than not it will be required to sell the security before the recovery of its amortized cost that, in some cases, may extend to maturity. To the extent the Company determines that a security is deemed to be other-than-temporarily impaired, an impairment loss is recognized.

Impairment losses on fixed maturity securities recognized in the financial statements are dependent on the facts and circumstances related to the specific security. If the Company intends to sell a security or it is more likely than not that it would be required to sell a security before the recovery of its amortized cost, less any recorded credit loss, it recognizes an other-than-temporary impairment in investment related gains (losses), net on the consolidated statements of income for the difference between amortized cost and fair value. If neither of these two conditions exists then the recognition of the other-than-temporary impairment is bifurcated and the Company recognizes the credit loss portion in investment related gains (losses), net and the non-credit loss portion in AOCI.

The Company estimates the amount of the credit loss component of a fixed maturity security impairment as the difference between amortized cost and the present value of the expected cash flows of the security. The present value is determined using the best

estimate cash flows discounted at the effective interest rate implicit to the security at the date of purchase or the current yield to accrete an asset-backed or floating rate security. The techniques and assumptions for establishing the best estimate cash flows vary depending on the type of security. The asset-backed securities' cash flow estimates are based on security-specific facts and circumstances that may include collateral characteristics, expectations of delinquency and default rates, loss severity and prepayment speeds and structural support, including subordination and guarantees. The corporate fixed maturity security cash flow estimates are derived from scenario-based outcomes of expected corporate restructurings or the disposition of assets using security specific facts and circumstances including timing, security interests and loss severity.

In periods after an other-than-temporary impairment loss is recognized on a fixed maturity security, the Company will report the impaired security as if it had been purchased on the date it was impaired and will continue to estimate the present value of the estimated cash flows of the security. Accordingly, the discount (or reduced premium) based on the new cost basis is accreted into net investment income over the remaining term of the fixed maturity security in a prospective manner based on the amount and timing of estimated future cash flows.

The Company considers its cost method investments for other-than-temporary impairment when the carrying value of these investments exceeds the net asset value. The Company takes into consideration the severity and duration of this excess when deciding if the cost method investment is other-than-temporarily impaired. For equity method investments (including real estate joint ventures), the Company considers financial and other information provided by the investee, other known information and inherent risks in the underlying investments, as well as future capital commitments, in determining whether an impairment has occurred.

Derivative Instruments

Overview

The Company utilizes a variety of derivative instruments including swaps, options, forwards and futures, primarily to manage or hedge interest rate risk, credit risk, inflation risk, foreign currency risk, market volatility and various other market risks associated with its business. The Company does not invest in derivatives for speculative purposes. It is the Company's policy to enter into derivative contracts primarily with highly rated parties. See Note 5 - "Derivative Instruments" for additional detail on the Company's derivative positions.

Accounting and Financial Statement Presentation of Derivatives

Derivatives are carried on the Company's consolidated balance sheets primarily in other invested assets or other liabilities, at fair value. Certain derivatives are subject to master netting provisions and reported as a net asset or liability. On the date a derivative contract is executed, the Company designates the derivative as (1) a fair value hedge, (2) a cash flow hedge, (3) a net investment hedge in a foreign operation or (4) free-standing derivatives held for other risk management purposes, which primarily involve managing asset or liability risks associated with the Company's reinsurance treaties that do not qualify for hedge accounting.

Changes in the fair value of free-standing derivative instruments, which do not receive accounting hedge treatment, are primarily reflected in investment related gains (losses), net.

Changes in the fair value of non-investment free-standing derivative instruments (e.g. mortality and longevity swaps), which do not receive accounting hedge treatment, are reflected in other revenues.

Hedge Documentation and Hedge Effectiveness

To qualify for hedge accounting, at the inception of the hedging relationship, the Company formally documents its risk management objective and strategy for undertaking the hedging transaction, as well as its designation of the hedge as either (i) a fair value hedge; (ii) a cash flow hedge; or (iii) a hedge of a net investment in a foreign operation. In this documentation, the Company sets forth how the hedging instrument is expected to hedge the designated risks related to the hedged item and sets forth the method that will be used to retrospectively and prospectively assess the hedging instrument's effectiveness and the method that will be used to measure ineffectiveness. A derivative designated as a hedging instrument must be assessed as being highly effective in offsetting the designated risk of the hedged item. Hedge effectiveness is formally assessed at inception and periodically throughout the life of the designated hedging relationship.

Under a fair value hedge, changes in the fair value of the hedging derivative, including amounts measured as ineffective, and changes in the fair value of the hedged item related to the designated risk being hedged, are reported within investment related gains (losses), net. The fair values of the hedging derivatives are exclusive of any accruals that are separately reported in the consolidated statements of income within interest income or interest expense to match the location of the hedged item.

Under a cash flow hedge, changes in the fair value of the hedging derivative measured as effective are reported within AOCI and the deferred gains or losses on the derivative are reclassified into the consolidated statements of income when the Company's earnings are affected by the variability in cash flows of the hedged item. Changes in the fair value of the hedging instrument measured as ineffective are reported within investment related gains (losses), net. The fair values of the hedging derivatives are

exclusive of any accruals that are separately reported in the consolidated statements of income within interest income or interest expense to match the location of the hedged item.

In a hedge of a net investment in a foreign operation, changes in the fair value of the hedging derivative that are measured as effective are reported within AOCI consistent with the translation adjustment for the hedged net investment in the foreign operation. Changes in the fair value of the hedging instrument measured as ineffective are reported within investment related gains (losses), net.

The Company discontinues hedge accounting prospectively when: (i) it is determined that the derivative is no longer highly effective in offsetting changes in the estimated fair value or cash flows of a hedged item; (ii) the derivative expires, is sold, terminated, or exercised; (iii) it is no longer probable that the hedged forecasted transaction will occur; or (iv) the derivative is de-designated as a hedging instrument.

When hedge accounting is discontinued because it is determined that the derivative is not highly effective, the derivative continues to be carried in the consolidated balance sheets at fair value, with changes in fair value recognized in investment related gains (losses), net. The carrying value of the hedged asset or liability under a fair value hedge is no longer adjusted for changes in its estimated fair value due to the hedged risk, and the cumulative adjustment to its carrying value is amortized into income over the remaining life of the hedged item. Provided the hedged forecasted transaction occurrence is still probable, the changes in estimated fair value of derivatives recorded in other comprehensive income (loss) ("OCI") related to discontinued cash flow hedges are released into the consolidated statements of income when the Company's earnings are affected by the variability in cash flows of the hedged item.

When hedge accounting is discontinued because it is no longer probable that the forecasted transactions will occur on the anticipated date or within two months of that date, the derivative continues to be carried in the consolidated balance sheets at its estimated fair value, with changes in estimated fair value recognized currently in investment related gains (losses), net. Deferred gains and losses of a derivative recorded in OCI pursuant to the discontinued cash flow hedge of a forecasted transaction that is no longer probable are recognized immediately in investment related gains (losses), net.

In all other situations in which hedge accounting is discontinued, the derivative is carried at its estimated fair value in the consolidated balance sheets, with changes in its estimated fair value recognized in the current period as investment related gains (losses), net.

Embedded Derivatives

The Company reinsures certain annuity products that contain terms that are deemed to be embedded derivatives, primarily equity-indexed annuities and variable annuities with guaranteed minimum benefits. The Company assesses reinsurance contract terms to identify embedded derivatives, which are required to be bifurcated under the general accounting principles for *Derivatives and Hedging*. If the contract is not reported for in its entirety at fair value and it is determined that the terms of the embedded derivative are not clearly and closely related to the economic characteristics of the host contract, and that a separate instrument with the same terms would qualify as a derivative instrument, the embedded derivative is bifurcated from the host contract and accounted for separately.

Such embedded derivatives are carried on the consolidated balance sheets at fair value in the same line item as the host contract. Changes in the fair value of embedded derivatives associated with equity-indexed annuities are reflected in interest credited on the consolidated statements of income and changes in the fair value of embedded derivatives associated with variable annuity guaranteed minimum benefits are reflected in investment related gains (losses), net on the consolidated statements of income. See "Interest-Sensitive Contract Liabilities" below for additional information on embedded derivatives related to equity-indexed and variable annuities. The Company has implemented an economic hedging strategy to mitigate the volatility associated with its reinsurance of variable annuity guaranteed minimum benefits. The hedging strategy is designed such that changes in the fair value of the hedge contracts, primarily futures, swap contracts and options, move in the opposite direction of changes in the fair value of the embedded derivatives. While the Company actively manages its hedging program, the hedges that are in place may not be totally effective in offsetting the embedded derivative changes due to the many variables that must be managed and the Company may see a corresponding increase or decrease in the net liability. The Company has elected not to assess this hedging strategy for hedge accounting treatment.

Additionally, reinsurance treaties written on a modco or funds withheld basis are subject to the general accounting principles for *Derivatives and Hedging* related to embedded derivatives. The Company's funds withheld at interest balances are primarily associated with its reinsurance treaties structured on a modco or funds withheld basis, the majority of which were subject to the general accounting principles for *Derivatives and Hedging* related to embedded derivatives. Management believes the embedded derivative feature in each of these reinsurance treaties is similar to a total return swap on the assets held by the ceding companies. The valuation of embedded derivatives is sensitive to the investment credit spread environment. Changes in investment credit spreads are also affected by the application of a credit valuation adjustment ("CVA"). The fair value calculation of an embedded derivative in an asset position utilizes a CVA based on the ceding company's credit risk. Conversely, the fair value calculation of an embedded derivative in a liability position utilizes a CVA based on the Company's credit risk. Generally, an increase in investment credit spreads, ignoring changes in the CVA, will have a negative impact on the fair value of the embedded derivative (decrease

in income). The fair value of the embedded derivatives is included in the funds withheld at interest line item on the consolidated balance sheets. The change in the fair value of the embedded derivatives is recorded in investment related gains (losses), net on the consolidated statements of income.

The Company has entered into various financial reinsurance treaties on a funds withheld and modco basis. These treaties do not transfer significant insurance risk and are recorded on a deposit method of accounting with the Company earning a net fee. As a result of the experience refund provisions contained in these treaties, the value of the embedded derivatives in these contracts is currently considered immaterial. The Company monitors the performance of these treaties on a quarterly basis. Significant adverse performance or losses on these treaties may result in a loss associated with the embedded derivative.

Fair Value Measurements

General accounting principles for *Fair Value Measurements and Disclosures* define fair value, establish a framework for measuring fair value, establish a fair value hierarchy based on the inputs used to measure fair value and enhance disclosure requirements for fair value measurements. In compliance with these principles, the Company has categorized its assets and liabilities, based on the priority of the inputs to the valuation technique, into a three level hierarchy or separately for assets measured using the net asset value ("NAV"). The fair value hierarchy gives the highest priority to quoted prices in active markets for identical assets or liabilities (Level 1), the second highest priority to quoted prices in markets that are not active or inputs that are observable either directly or indirectly (Level 2) and the lowest priority to unobservable inputs (Level 3).

If the inputs used to measure fair value fall within different levels of the hierarchy, the category level is based on the lowest priority level input that is significant to the fair value measurement of the asset or liability.

See Note 6 - "Fair Value of Assets and Liabilities" for further details on the Company's assets and liabilities recorded at fair value.

Cash and Cash Equivalents

Cash and cash equivalents include cash on deposit and highly liquid debt instruments purchased with an original maturity of three months or less.

Premiums Receivable

Premiums are accrued when due and in accordance with information received from the ceding company. When the Company enters into a new reinsurance agreement, it records accruals based on the terms of the reinsurance treaty. Similarly, when a ceding company fails to report information on a timely basis, the Company records accruals based on the terms of the reinsurance treaty as well as historical experience. Other management estimates include adjustments for increased in force on existing treaties, lapsed premiums given historical experience, the financial health of specific ceding companies, collateral value and the legal right of offset on related amounts (i.e. allowances and claims) owed to the ceding company. Under the legal right of offset provisions in its reinsurance treaties, the Company can withhold payments for allowances and claims from unpaid premiums. Based on its review of these factors and historical experience, the Company did not believe a provision for doubtful accounts was necessary as of December 31, 2018 or 2017.

Reinsurance Ceded Receivables

The Company generally reports retrocession activity on a gross basis. Amounts paid or deemed to have been paid for reinsurance are reflected in reinsurance ceded receivables. The cost of reinsurance related to long-duration contracts is recognized over the terms of the reinsured policies on a basis consistent with the reporting of those policies.

Deferred Policy Acquisition Costs

Costs of acquiring new business, which vary with and are directly related to the production of new business, have been deferred to the extent that such costs are deemed recoverable from future premiums or gross profits. Such costs include commissions and allowances as well as certain costs of policy issuance and underwriting. Non-commission costs related to the acquisition of new and renewal insurance contracts may be deferred only if they meet the following criteria:

- Incremental direct costs of a successful contract acquisition
- Portions of employees' salaries and benefits directly related to time spent performing specified acquisition activities for a contract that has been acquired or renewed
- Other costs directly related to the specified acquisition or renewal activities that would not have been incurred had that acquisition contract transaction not occurred

The Company tests the recoverability for each year of business at issue before establishing additional deferred acquisition costs ("DAC"). The Company also performs annual tests to establish that DAC are expected to remain recoverable, and if financial performance significantly deteriorates to the point where a deficiency exists, a cumulative charge to current operations will be recorded. No such adjustments related to DAC recoverability were made in 2018, 2017 and 2016.

DAC related to traditional life insurance contracts are amortized with interest over the premium-paying period of the related policies in proportion to the ratio of individual period premium revenues to total anticipated premium revenues over the life of the policy. Such anticipated premium revenues are estimated using the same assumptions used for computing liabilities for future policy benefits.

DAC related to interest-sensitive life and investment-type policies are amortized over the lives of the policies, in proportion to the gross profits realized from mortality, investment income less interest credited, and expense margins.

Other Reinsurance Balances

The Company assumes and retrocedes financial reinsurance contracts that do not expose it to a reasonable possibility of loss from insurance risk. These contracts are reported as deposits and are included in other reinsurance assets/liabilities. The amount of revenue reported in other revenues on these contracts represents fees and the cost of insurance under the terms of the reinsurance agreement. Assets and liabilities are reported on a net or gross basis, depending on the specific details within each treaty. Reinsurance agreements reported on a net basis, where a legal right of offset exists, are generally included in other reinsurance balances on the consolidated balance sheets. Balances resulting from the assumption and/or subsequent transfer of benefits and obligations resulting from cash flows related to variable annuities have also been classified as other reinsurance balance assets and/or liabilities. Other reinsurance assets are included in premiums receivable and other reinsurance balances while other reinsurance liabilities are included in other reinsurance balances on the consolidated balance sheets.

Acquired Intangibles

Goodwill and Value of Business Acquired

Goodwill, reported in other assets, is not amortized into results of operations, but instead is reviewed at least annually for impairment and written down only in the periods in which the recorded value of goodwill exceeds its fair value. Goodwill as of December 31, 2018 and 2017 totaled \$7.0 million. The value of business acquired (“VOBA”) is amortized in proportion to the ratio of annual premium revenues to total anticipated premium revenues or in relation to the present value of estimated profits. Anticipated premium revenues have been estimated using assumptions consistent with those used in estimating reserves for future policy benefits. The carrying value is reviewed at least annually for indicators of impairment in value. The VOBA was approximately \$5.1 million and \$3.3 million, including accumulated amortization of \$15.0 million and \$14.6 million, as of December 31, 2018 and 2017, respectively. The VOBA amortization expense for the years ended December 31, 2018, 2017 and 2016 was \$0.4 million, \$0.3 million, and \$0.5 million, respectively. These amortized balances are included in other assets on the consolidated balance sheets. Future amortization of the VOBA is not material.

Value of Distribution Agreements and Customer Relationships Acquired

Value of distribution agreements (“VODA”) is reported in other assets and represents the present value of future profits associated with the expected future business derived from the distribution agreements. Value of customer relationships acquired (“VOCRA”) is also reported in other assets and represents the present value of the expected future profits associated with the expected future business acquired through existing customers of the acquired company or business. The VODA is amortized over a useful life of 15 years and the VOCRA is also amortized over a 15 year period in proportion to expected revenues generated, with amortization included in policy acquisition costs and other insurance expenses. Each year the Company reviews VODA and VOCRA to determine the recoverability of these balances. VODA and VOCRA totaled approximately \$40.8 million and \$49.2 million, including accumulated amortization of \$79.8 million and \$71.5 million, as of December 31, 2018 and 2017, respectively. The VODA and VOCRA amortization expense for the years ended December 31, 2018, 2017 and 2016 was \$8.3 million, \$8.7 million and \$9.0 million, respectively. Amortization of the VODA and VOCRA is estimated to be \$8.1 million, \$7.6 million, \$6.6 million, \$6.4 million and \$6.2 million during 2019, 2020, 2021, 2022 and 2023, respectively.

Other acquired intangible assets

Other acquired intangibles are also reported in other assets and primarily represent intangibles and licenses acquired through the Company’s acquisition of service and technology oriented companies in an effort to both support its clients and generate new future revenue streams. Other acquired intangible assets are amortized using the straight-line method over the estimated useful life of 10 years, with amortization included in other operating expenses. Each year the Company reviews other acquired intangibles to determine the recoverability of these balances. Other acquired intangibles totaled approximately \$37.4 million and \$3.1 million, including accumulated amortization of \$4.4 million and \$0.6 million, as of December 31, 2018 and 2017, respectively. Other acquired intangibles amortization expense for the years ended December 31, 2018, 2017 and 2016 was \$3.8 million, \$0.3 million and \$0.2 million, respectively. Amortization of other acquired intangibles is estimated to be \$4.2 million, \$4.2 million, \$4.1 million, \$4.1 million and \$4.1 million during 2019, 2020, 2021, 2022 and 2023, respectively.

Property, Equipment, Leasehold Improvements and Computer Software

Property, equipment and leasehold improvements, which are included in other assets, are stated at cost, less accumulated depreciation. Depreciation is determined using the straight-line method over the estimated useful lives of the assets, as appropriate. The estimated life is generally 40 years for company occupied real estate property, from one to seven years for leasehold improvements, and from three to seven years for all other property and equipment. The cost basis of the property, equipment and leasehold improvements was \$248.7 million and \$236.1 million at December 31, 2018 and 2017, respectively. Accumulated depreciation of property, equipment and leasehold improvements was \$97.0 million and \$79.4 million at December 31, 2018 and 2017, respectively. Related depreciation expense was \$18.3 million, \$17.2 million and \$16.6 million for the years ended December 31, 2018, 2017 and 2016, respectively.

Computer software, which is included in other assets, is stated at cost, less accumulated amortization. Purchased software costs, as well as certain internal and external costs incurred to develop internal-use computer software during the application development stage, are capitalized. Amortization of software costs is recorded on a straight-line basis over periods ranging from three to ten years. Carrying values are reviewed at least annually for indicators of impairment in value. Unamortized computer software costs were \$150.4 million and \$145.5 million at December 31, 2018 and 2017, respectively. Amortization expense was \$26.9 million, \$35.7 million, and \$10.3 million for the years ended December 31, 2018, 2017 and 2016, respectively. The Company recognized capital project write-offs of \$4.7 million, \$24.5 million and \$0.6 million in 2018, 2017 and 2016, respectively.

Operating Joint Ventures

The Company has made investments in certain joint ventures that are strategic in nature and made other than for the sole purpose of generating investment income. These investments are reported under the equity method of accounting and are included in other assets on the consolidated balance sheets. The Company's share of earnings from these joint ventures is reported in other revenues on the consolidated statements of income. The Company's investments in operating joint ventures do not have a material effect on the Company's results of operations and financial condition, and as a result no additional disclosures have been presented.

Future Policy Benefits

Liabilities for future benefits on life policies are established in an amount adequate to meet the estimated future obligations on policies in force. Liabilities for future policy benefits under long-duration life insurance policies have been computed based upon expected investment yields, mortality and withdrawal (lapse) rates, and other assumptions. These assumptions include a margin for adverse deviation and vary with the characteristics of the plan of insurance, year of issue, age of insured, and other appropriate factors. Interest rates range from 3.0% to 6.0%. The mortality and withdrawal assumptions are based on the Company's experience as well as industry experience and standards. In establishing reserves for future policy benefits, the Company assigns policy liability assumptions to particular timeframes (eras) in such a manner as to be consistent with the underlying assumptions and economic conditions at the time the risks are assumed. The Company maintains a consistent approach to setting the provision for adverse deviation between eras.

Liabilities for future benefits on longevity business, including annuities in the payout phase, are established in an amount adequate to meet the estimated future obligations on policies in force. Liabilities for future benefits related to the longevity business, including annuities in the payout phase have been calculated using expected mortality, investment yields, and other assumptions. These assumptions include a margin for adverse deviation and vary with the characteristics of the plan of insurance, year of issue, age of insured, and other appropriate factors. The mortality assumptions are based on the Company's experience as well as industry experience and standards. A deferred profit liability is established when the gross premium exceeds the net premium.

The Company periodically reviews actual and anticipated experience compared to the assumptions used to establish policy benefits. The Company establishes premium deficiency reserves if actual and anticipated experience indicates that existing policy liabilities together with the present value of future gross premiums will not be sufficient to cover the present value of future benefits, settlement and maintenance costs and to recover unamortized acquisition costs. Anticipated investment income is considered in the calculation of premium deficiency losses for short-duration contracts. The premium deficiency reserve is established by a charge to income, as well as a reduction in unamortized acquisition costs and, to the extent there are no unamortized acquisition costs, an increase in future policy benefits.

The reserving process includes normal periodic reviews of assumptions used and adjustments of reserves to incorporate the refinement of the assumptions. Any such adjustments relate only to policies assumed in recent periods and the adjustments are reflected by a cumulative charge or credit to current operations.

The Company reinsures disability products in various markets. Liabilities for future benefits on disability policies' active lives are established in an amount adequate to meet the estimated future obligations on policies in force. These reserves are the amounts that, with the additional premiums to be received and interest thereon compounded annually at certain assumed rates, are calculated to be sufficient to meet the various policy and contract obligations as they mature.

The Company establishes future policy benefits for guaranteed minimum death benefits (“GMDB”) relating to the reinsurance of certain variable annuity contracts by estimating the expected value of death benefits in excess of the projected account balance and recognizing the excess proportionally over the accumulation period based on total expected assessments. The Company regularly evaluates estimates used and adjusts the additional liability balance, with a related charge or credit to claims and other policy benefits, if actual experience or other evidence suggests that earlier assumptions should be revised. The assumptions used in estimating the GMDB liabilities are consistent with those used for amortizing DAC, and are thus subject to the same variability and risk. The Company’s GMDB liabilities at December 31, 2018 and 2017 were not material.

Interest-Sensitive Contract Liabilities

Liabilities for future benefits on interest-sensitive life and investment-type contract liabilities are carried at the accumulated contract holder values without reduction for potential surrender or withdrawal charges. The Company reinsures asset-intensive products, including annuities and corporate-owned life insurance. The investment portfolios for these products are segregated for management purposes within the general account of the respective legal entity. The liabilities under asset-intensive insurance contracts or reinsurance contracts reinsured on a coinsurance basis are included in interest-sensitive contract liabilities on the consolidated balance sheets. Asset-intensive contracts principally include individual fixed annuities in the accumulation phase, single premium immediate annuities, equity-indexed annuities, individual variable annuities, corporate-owned life and interest-sensitive whole life insurance contracts. Interest-sensitive contract liabilities are equal to (i) policy account values, which consist of an accumulation of gross premium payments; (ii) credited interest less expenses, mortality charges, and withdrawals; and (iii) fair value adjustments relating to business combinations. Liabilities for immediate annuities are calculated as the present value of the expected cash flows, with the locked-in discount rate determined such that there is no gain or loss at inception. Additionally, certain annuity contracts the Company reinsures contain terms, such as guaranteed minimum benefits and equity participation options, which are deemed to be embedded derivatives and are accounted for based on the general accounting principles for *Derivatives and Hedging*.

The Company establishes liabilities for guaranteed minimum living benefits relating to certain variable annuity products as follows: Guaranteed minimum income benefits (“GMIB”) provide the contract holder, after a specified period of time determined at the time of issuance of the variable annuity contract, with a minimum level of income (annuity) payments. Under the reinsurance treaty, the Company makes a payment to the ceding company equal to the GMIB net amount-at-risk at the time of annuitization and thus these contracts meet the net settlement criteria of the general accounting principles for *Derivatives and Hedging* and the Company assumes no mortality risk. Accordingly, the GMIB is considered an embedded derivative, which is measured at fair value separately from the host variable annuity product.

Guaranteed minimum withdrawal benefits (“GMWB”) guarantee the contract holder a return of their purchase payment via partial withdrawals, even if the account value is reduced to zero, provided that the contract holder’s cumulative withdrawals in a contract year do not exceed a certain limit. The initial guaranteed withdrawal amount is equal to the initial benefit base as defined in the contract (typically, the initial purchase payments plus applicable bonus amounts). The GMWB is also an embedded derivative, which is measured at fair value separately from the host variable annuity product.

Guaranteed minimum accumulation benefits (“GMAB”) provide the contract holder, after a specified period of time determined at the time of issuance of the variable annuity contract, with a minimum accumulation of their purchase payments even if the account value is reduced to zero. The initial guaranteed accumulation amount is equal to the initial benefit base as defined in the contract (typically, the initial purchase payments plus applicable bonus amounts). The GMAB is also an embedded derivative, which is measured at fair value separately from the host variable annuity product.

For GMIB, GMWB and GMAB, the initial benefit base is increased by additional purchase payments made within a certain time period and decreased by benefits paid and/or withdrawal amounts. After a specified period of time, the benefit base may also increase as a result of an optional reset as defined in the contract.

The fair values of the GMIB, GMWB and GMAB embedded derivative liabilities are reflected in interest-sensitive contract liabilities on the consolidated balance sheets and are calculated based on actuarial and capital market assumptions related to the projected cash flows, including benefits and related contract charges over the lives of the contracts. These projected cash flows incorporate expectations concerning policyholder behavior, such as lapses, withdrawals and benefit selections, and capital market assumptions such as interest rates and equity market volatilities. In measuring the fair value of GMIBs, GMWBs and GMABs, the Company attributes a portion of the fees collected from the policyholder equal to the present value of expected future guaranteed minimum income, withdrawal and accumulation benefits (at inception). The changes in fair value are reported in investment related gains (losses), net. Any additional fees represent “excess” fees and are reported in other revenues on the consolidated statements of income. These variable annuity guaranteed living benefits may be more costly than expected in volatile or declining equity markets or falling interest rate markets, causing an increase in interest-sensitive contract liabilities, negatively affecting net income.

The Company reinsures equity-indexed annuity contracts. These contracts allow the contract holder to elect an interest rate return or an equity market component where interest credited is based on the performance of common stock market indices, such as the S&P 500 Index[®], the Dow Jones Industrial Average, or the NASDAQ. The equity market option is considered an embedded derivative, similar to a call option, which is reflected at fair value on the consolidated balance sheets in interest-sensitive contract

liabilities. The fair value of embedded derivatives is computed based on a projection of future equity option costs using a budget methodology, discounted back to the balance sheet date using current market indicators of volatility and interest rates. Changes in the fair value of the embedded derivatives are included as a component of interest credited on the consolidated statements of income.

The Company reviews its estimates of actuarial liabilities for interest-sensitive contract liabilities and compares them with its actual experience. Differences between actual experience and the assumptions used in pricing these guarantees and benefits and in the establishment of the related liabilities result in variances in profit and could result in losses. The effects of changes in such estimated liabilities are included in the results of operations in the period in which the changes occur.

Other Policy Claims and Benefits

Claims payable for incurred but not reported losses are determined using case-basis estimates and lag studies of past experience. The time lag from the date of the claim or death to when the ceding company reports the claim to the Company can vary significantly by ceding company, business segment and product type, but generally averages around 3.8 months. Incurred but not reported claims are estimates on an undiscounted basis, using actuarial estimates of historical claims expense, adjusted for current trends and conditions. These estimates are continually reviewed and the ultimate liability may vary significantly from the amount recognized, which are reflected in claims and other policy benefits in the consolidated statements of income in the period in which they are determined.

Other Liabilities

Other liabilities primarily include investments in transit, separate accounts, employee benefits, cash collateral received on derivative positions and current federal income taxes payable.

Income Taxes

The U.S. consolidated tax return includes the operations of RGA and all eligible subsidiaries. Certain RGA subsidiaries file separate U.S. income tax returns as these companies are currently ineligible for inclusion in the consolidated federal tax return. The Company's foreign subsidiaries are taxed under applicable local statutes.

The Company provides for federal, state and foreign income taxes currently payable, as well as those deferred due to temporary differences between the tax basis of assets and liabilities and the reported amounts, and are recognized in net income or in certain cases in OCI. The Company's accounting for income taxes represents management's best estimate of various events and transactions considering the laws enacted as of the reporting date. The Tax Cuts and Jobs Act of 2017 ("U.S. Tax Reform") creates additional complexity due to various provisions that require management judgment and assumptions, which are subject to change.

Deferred tax assets and liabilities are measured by applying the relevant jurisdictions' enacted tax rate to the temporary difference in the period in which the temporary differences are expected to reverse. The Company will establish a valuation allowance if management determines, based on available information, that it is more likely than not that deferred income tax assets will not be realized. The Company has deferred tax assets including those related to net operating and capital losses. The Company has projected its ability to utilize its U.S. and foreign deferred tax assets and has determined that all of the U.S. assets including losses are expected to be utilized and established a valuation allowance on the portion of the foreign deferred tax assets the Company believes more likely than not will not be realized.

Significant judgment is required in determining whether valuation allowances should be established as well as the amount of such allowances. When making such a determination, consideration is given to, among other things, the following:

- (i) future taxable income exclusive of reversing temporary differences and carryforwards;
- (ii) future reversals of existing taxable temporary differences;
- (iii) taxable income in prior carryback years; and
- (iv) tax planning strategies.

Any such changes could significantly affect the amounts reported in the consolidated financial statements in the year these changes occur.

The Company reports uncertain tax positions in accordance with generally accepted accounting principles. In order to recognize the benefit of an uncertain tax position, the position must meet the more likely than not criteria of being sustained. Unrecognized tax benefits due to tax uncertainties that do not meet the more likely than not criteria are included within other liabilities and are charged to earnings in the period that such determination is made. The Company classifies interest related to tax uncertainties as interest expense whereas penalties related to tax uncertainties are classified as a component of income tax.

See Note 9 - "Income Tax" for further discussion including the impact of the December 22, 2017 enactment of U.S. Tax Reform.

Collateral Finance and Securitization Notes

Collateral finance and securitization notes represent private placement asset-backed structured financing transactions. Collateral finance notes are issued on specified insurance policies reinsured by the Company's regulated subsidiaries. Transaction costs, primarily interest expense, are reflected in collateral finance and securitization expense. See Note 14 - "Collateral Finance and Securitization Notes" for additional information.

Foreign Currency Translation

Assets, liabilities and results of foreign operations are recorded based on the functional currency of each foreign operation. The determination of the functional currency is based on economic facts and circumstances pertaining to each foreign operation. The Company's material functional currencies are the U.S. dollar, Canadian dollar, British pound, Australian dollar, Japanese yen, Korean won, Euro and South African rand. The translation of the functional currency into U.S. dollars is performed for balance sheet accounts using current exchange rates in effect at the balance sheet date and for revenue and expense accounts using weighted-average exchange rates during each year. Gains or losses, net of applicable deferred income taxes, resulting from such translation are included in accumulated currency translation adjustments, in AOCI on the consolidated balance sheets until the underlying functional currency operation is sold or substantially liquidated.

Recognition of Revenues and Related Expenses

Life and health premiums are recognized as revenue when due from the insured, and are reported net of amounts retroceded. Benefits and expenses are reported net of amounts retroceded and are associated with earned premiums so that profits are recognized over the life of the related contract. This association is accomplished through the provision for future policy benefits and the amortization of deferred policy acquisition costs. Other revenue includes items such as treaty recapture fees, fees associated with financial reinsurance and policy changes on interest-sensitive and investment-type products that the Company reinsures. Any fees that are collected in advance of the period benefited are deferred and recognized over the period benefited.

For certain reinsurance transactions involving in force blocks of business, the ceding company pays a premium equal to the initial required reserve (future policy benefit). In such transactions, for income statement presentation, the Company nets the expense associated with the establishment of the reserve on the consolidated balance sheets against the premiums from the transaction.

Revenues for interest-sensitive and investment-type products consist of investment income, policy charges for the cost of insurance, policy administration, and surrenders that have been assessed against policy account balances during the period. Interest-sensitive contract liabilities for these products represent policy account balances before applicable surrender charges. Policy benefits and claims that are charged to expenses include claims incurred in the period in excess of related policy account balances and interest credited to policy account balances. Interest is credited to policyholder account balances according to terms of the policies or contracts.

For each of its reinsurance contracts, the Company must determine if the contract provides indemnification against loss or liability relating to insurance risk, in accordance with GAAP. The Company must review all contractual features, particularly those that may limit the amount of insurance risk to which the Company is subject or features that delay the timely reimbursement of claims. If the Company determines that a contract does not expose it to a reasonable possibility of a significant loss from insurance risk, the Company records the contract on a deposit method of accounting with any net amount receivable reflected as an asset within premiums receivable and other reinsurance balances, and any net amount payable reflected as a liability within other reinsurance balances on the consolidated balance sheets. Fees earned on the contracts are reflected as other revenues, rather than premiums, on the consolidated statements of income.

Equity Based Compensation

The Company expenses the fair value of stock awards included in its incentive compensation plans. As of the date stock awards are approved, the fair value of stock options is determined using a Black-Scholes options valuation methodology, and the fair value of other stock awards is based upon the market value of the stock on the grant date. The fair value of the awards is expensed over the performance or service period, which generally corresponds to the vesting period, and is recognized as an increase to additional paid-in-capital in stockholders' equity, and stock-based compensation expense is reflected in other operating expenses in the consolidated statements of income.

Earnings Per Share

Basic earnings per share exclude any dilutive effects of any outstanding options. Diluted earnings per share include the dilutive effects assuming outstanding stock options were exercised.

New Accounting Pronouncements

Changes to the general accounting principles are established by the Financial Accounting Standards Board (“FASB”) in the form of accounting standards updates to the FASB Accounting Standards CodificationTM. Accounting standards updates not listed below were assessed and determined to be either not applicable or are expected to have minimal impact on the Company’s consolidated financial statements.

Description	Date of Adoption	Effect on the financial statements or other significant matters
Standards adopted:		
<i>Reporting Comprehensive Income</i> This updated guidance requires reclassification from accumulated other comprehensive income to retained earnings for the stranded tax effects resulting from the newly enacted U.S. federal corporate income tax rate. The amount of the reclassification would be the difference between the historical U.S. federal corporate income tax rate and the newly enacted 21 percent tax rate.	December 31, 2017	The Company adopted the new guidance by reclassifying certain income tax effects of items within accumulated other comprehensive income to retained earnings as a result of the Tax Cuts and Jobs Act of 2017. The impact of adopting this standard was an increase in accumulated other comprehensive income and a reduction in retained earnings of approximately \$156.4 million. The adjustments to the Company’s deferred tax liabilities was a provisional amount as defined in the SEC’s SAB 118, issued in December 2017 to address complexities in completing the calculations resulting from the U.S. Tax Cuts and Jobs Act of 2017. SAB 118 provides guidance on accounting for the effects of the U.S. Tax and Jobs Act of 2017 when the Company’s process is incomplete, and permits a final determination to be made within a measurement period not to exceed one year from the enactment date. During 2018, the Company continued to evaluate and gather additional information to account for the effects of the Tax Cuts and Jobs Act of 2017, including the preparation of and filing of its U.S. tax returns to more precisely compute the pretax deferred tax items and the impact of adopting the new guidance. As part of this process the Company recorded an additional adjustment in 2018 decreasing accumulated other comprehensive income and increasing retained earnings of approximately \$2.6 million.
<i>Stock Compensation</i> This updated guidance requires excess tax benefits and deficiencies from share-based payment awards be recorded in income tax expense in the income statement. Previously, excess tax benefits and deficiencies were recognized in shareholders’ equity or deferred taxes on the balance sheet depending on the tax situation of the Company. In addition, the updated guidance also changes the accounting for forfeitures and statutory tax withholding requirements, as well as the classification in the statement of cash flows.	January 1, 2017	Upon adoption, the Company recognized excess tax benefits of approximately \$17.7 million in deferred tax assets that were previously not recognized in a cumulative-effect adjustment increasing retained earnings by \$17.7 million. The Company also recorded excess tax benefits of approximately \$10.5 million in the provision for income taxes for the year ended December 31, 2017. The number of weighted average diluted shares outstanding were also adjusted to exclude excess tax benefits from the assumed proceeds in the diluted shares calculation resulting in an immaterial increase in the number of dilutive shares outstanding. The Company also elected to continue estimating forfeitures for purposes of recognizing share-based compensation. Other aspects of the adoption of the updated guidance did not have a material impact to the Company’s consolidated financial statements.
<i>Financial Instruments - Recognition and Measurement</i> This guidance requires equity investments that are not accounted for under the equity method of accounting to be measured at fair value with changes recognized in net income and also updates certain presentation and disclosure requirements.	January 1, 2018	This guidance required a cumulative-effect adjustment for certain items upon adoption. The adoption of the new guidance was not material to the Company’s consolidated financial statements.
<i>Compensation - Retirement Benefits - Defined Benefit Plans - General</i> This guidance is part of the FASB’s disclosure framework project and eliminates certain disclosure requirements for defined benefit pension and other postretirement plans. Early adoption is permitted.	December 31, 2018	This new guidance was applied retrospectively to all periods presented in the year of adoption. The adoption of the new standard was not material to the Company’s consolidated financial statements.

Standards not yet adopted:

Leases

This new standard, based on the principle that entities should recognize assets and liabilities arising from leases, does not significantly change the lessees' recognition, measurement and presentation of expenses and cash flows from the previous accounting standard. Leases are classified as finance or operating. The new standard's primary change is the requirement for entities to recognize a lease liability for payments and a right of use asset representing the right to use the leased asset during the term of operating lease arrangements. Lessees are permitted to make an accounting policy election to not recognize the asset and liability for leases with a term of twelve months or less. Lessors' accounting is largely unchanged from the previous accounting standard. In addition, the new standard expands the disclosure requirements of lease arrangements. Early adoption is permitted.

January 1, 2019

This new standard will be adopted by applying the optional transition method and record a right-of-use asset and liability on the Company's balance sheet relating to existing operating leases. The Company does not expect the adoption of the new standard to have a material impact on its results of operations or balance sheet. The Company will recognize a lease liability and right-of-use asset of approximately \$55.2 million related to its operating leases upon adoption of the new standard.

Derivatives and Hedging

This updated guidance improves the financial reporting of hedging relationships to better portray the economic results of an entity's risk management activities in its financial statements and make certain targeted improvements to simplify the application of the hedge accounting in current GAAP related to the assessment of hedge effectiveness. Early adoption is permitted.

January 1, 2019

This new guidance will be adopted by applying a modified retrospective approach to existing hedging relationships as of the date of adoption. The Company does not expect the adoption of the new standard to have a material impact on its results of operations or balance sheet. Upon adoption of the new standard, the Company will record an immaterial adjustment to retained earnings as of the beginning of the first reporting period in which the guidance is effective and will modify some disclosures.

Financial Instruments - Credit Losses

This guidance adds to GAAP an impairment model, known as current expected credit loss ("CECL") model that is based on expected losses rather than incurred losses. For traditional and other receivables, held-to-maturity debt securities, loans and other instruments entities will be required to use the new forward-looking "expected loss" model that generally will result in earlier recognition of allowance for losses. For available-for-sale debt securities with unrealized losses, entities will measure credit losses similar to what they do today, except the losses will be recognized as allowances rather than reduction to the amortized cost of the securities. Early adoption is permitted.

January 1, 2020

This guidance will be adopted through a cumulative-effect adjustment to retained earnings as of the beginning of the first reporting period in which the guidance is effective (that is, a modified-retrospective approach). The Company is currently evaluating the impact of this amendment on its consolidated financial statements.

Fair Value Measurement

This guidance is part of the FASB's disclosure framework project and eliminates certain disclosure requirements for fair value measurement, requires entities to disclose new information and modifies existing disclosure requirements. Early adoption is permitted.

January 1, 2020

Certain disclosure changes in the new guidance will be applied prospectively in the year of adoption. The remaining changes in the new guidance will be applied retrospectively to all periods presented in the year of adoption. The Company is currently evaluating the impact of this amendment on its consolidated financial statements.

Financial Services - Insurance

This guidance significantly changes how insurers account for long-duration insurance contracts. The new guidance will require insurers to review and update, if necessary, the assumptions used to measure insurance liabilities periodically, rather than retain assumptions used at contract inception. The updated guidance also changes the recognition and measurement of deferred acquisition costs (DAC) and created a new category of benefit features called market risk benefits (MRB) that will be measured at fair value. The guidance also significantly expands the disclosure requirements for long-duration contracts.

January 1, 2021

The guidance on measuring the liabilities for future policy benefits and DAC will likely be adopted on a modified retrospective basis as of the earliest period presented in the year of adoption. The guidance on MRB will be adopted on a retrospective basis as of the earliest period presented in the year of adoption. The Company is currently evaluating the impact of this amendment on its consolidated financial statements but anticipates the updated guidance will likely have a material impact on the measurement and recognition of its long-duration insurance contracts.

Note 3 EARNINGS PER SHARE

The following table sets forth the computation of basic and diluted earnings per share on net income (in thousands, except per share information):

	2018	2017	2016
Earnings:			
Net income (numerator for basic and diluted calculations)	\$ 715,842	\$ 1,822,181	\$ 701,443
Shares:			
Weighted average outstanding shares (denominator for basic calculations)	63,658	64,427	64,274
Equivalent shares from outstanding stock options	1,436	1,326	715
Diluted shares (denominator for diluted calculations)	65,094	65,753	64,989
Earnings per share:			
Basic	\$ 11.25	\$ 28.28	\$ 10.91
Diluted	11.00	27.71	10.79

The calculation of common equivalent shares does not include the impact of options having a strike or conversion price that exceeds the average stock price for the earnings period, as the result would be antidilutive. The calculation of common equivalent shares also excludes the impact of outstanding performance contingent shares, as the conditions necessary for their issuance have

not been satisfied as of the end of the reporting period. Approximately 0.1 million and 0.2 million outstanding stock options were not included in the calculation of common equivalent shares during 2018 and 2017, respectively. During 2016, all outstanding options were included in the calculation of common equivalent shares. Approximately 0.4 million, 0.3 million and 0.4 million performance contingent shares were excluded from the calculation of common equivalent shares during 2018, 2017 and 2016, respectively.

Note 4 INVESTMENTS

Fixed Maturity and Equity Securities Available-for-Sale

The Company holds various types of fixed maturity securities available-for-sale and classifies them as corporate securities (“Corporate”), Canadian and Canadian provincial government securities (“Canadian government”), residential mortgage-backed securities (“RMBS”), asset-backed securities (“ABS”), commercial mortgage-backed securities (“CMBS”), U.S. government and agencies (“U.S. government”), state and political subdivisions, and other foreign government, supranational and foreign government-sponsored enterprises (“Other foreign government”).

The following table provides information relating to investments in fixed maturity securities by sector as of December 31, 2018 (dollars in thousands):

December 31, 2018:	Amortized Cost	Unrealized Gains	Unrealized Losses	Estimated Fair Value	% of Total	Other-than- temporary impairments in AOCI
Available-for-sale:						
Corporate	\$ 24,006,407	\$ 530,804	\$ 555,092	\$ 23,982,119	59.9%	\$ —
Canadian government	2,768,466	1,126,227	2,308	3,892,385	9.7	—
RMBS	1,872,236	22,267	25,282	1,869,221	4.7	—
ABS	2,171,254	10,779	32,829	2,149,204	5.4	275
CMBS	1,428,115	9,153	18,234	1,419,034	3.5	—
U.S. government	2,233,537	10,204	57,867	2,185,874	5.5	—
State and political subdivisions	721,290	39,914	9,010	752,194	1.9	—
Other foreign government	3,680,863	109,320	47,868	3,742,315	9.4	—
Total fixed maturity securities	<u>\$ 38,882,168</u>	<u>\$ 1,858,668</u>	<u>\$ 748,490</u>	<u>\$ 39,992,346</u>	<u>100.0%</u>	<u>\$ 275</u>

The following table provides information relating to investments in fixed maturity and equity securities by sector as of December 31, 2017 (dollars in thousands):

December 31, 2017:	Amortized Cost	Unrealized Gains	Unrealized Losses	Estimated Fair Value	% of Total	Other-than- temporary impairments in AOCI
Available-for-sale:						
Corporate	\$ 21,966,803	\$ 1,299,594	\$ 55,429	\$ 23,210,968	60.9%	\$ —
Canadian government	2,843,273	1,378,510	1,707	4,220,076	11.1	—
RMBS	1,695,126	36,632	11,878	1,719,880	4.5	—
ABS	1,634,758	18,798	5,194	1,648,362	4.3	275
CMBS	1,285,594	22,627	4,834	1,303,387	3.4	—
U.S. government	1,953,436	12,089	21,933	1,943,592	5.1	—
State and political subdivisions	647,727	59,997	4,296	703,428	1.8	—
Other foreign government	3,254,695	154,507	8,075	3,401,127	8.9	—
Total fixed maturity securities	<u>\$ 35,281,412</u>	<u>\$ 2,982,754</u>	<u>\$ 113,346</u>	<u>\$ 38,150,820</u>	<u>100.0%</u>	<u>\$ 275</u>
Non-redeemable preferred stock	\$ 41,553	\$ 479	\$ 2,226	\$ 39,806	39.7%	—
Other equity securities	61,288	479	1,421	60,346	60.3	—
Total equity securities	<u>\$ 102,841</u>	<u>\$ 958</u>	<u>\$ 3,647</u>	<u>\$ 100,152</u>	<u>100.0%</u>	<u>—</u>

The Company enters into various collateral arrangements with counterparties that require both the pledging and acceptance of fixed maturity securities as collateral. Pledged fixed maturity securities are included in fixed maturity securities, available-for-sale in the consolidated balance sheets. Fixed maturity securities received as collateral are held in separate custodial accounts and are not recorded on the Company’s consolidated balance sheets. Subject to certain constraints, the Company is permitted by contract to sell or repledge collateral it receives; however, as of December 31, 2018 and 2017, none of the collateral received had been sold or repledged. The Company also holds assets in trust to satisfy collateral requirements under derivative transactions and

certain third-party reinsurance treaties. The following table includes fixed maturity securities pledged and received as collateral and assets in trust held to satisfy collateral requirements under derivative transactions and certain third-party reinsurance treaties as of December 31, 2018 and 2017 (dollars in thousands):

	2018		2017	
	Amortized Cost	Estimated Fair Value	Amortized Cost	Estimated Fair Value
Fixed maturity securities pledged as collateral	\$ 80,891	\$ 83,950	\$ 72,542	\$ 75,622
Fixed maturity securities received as collateral	n/a	616,584	n/a	590,417
Assets in trust held to satisfy collateral requirements	20,072,735	20,366,170	15,584,296	16,715,281

The Company monitors its concentrations of financial instruments on an ongoing basis and mitigates credit risk by maintaining a diversified investment portfolio that limits exposure to any one issuer. The Company's exposure to concentrations of credit risk from single issuers greater than 10% of the Company's stockholders' equity included securities of the U.S. government and its agencies, as well as the securities disclosed below, as of December 31, 2018 and 2017 (dollars in thousands):

	2018		2017	
	Amortized Cost	Estimated Fair Value	Amortized Cost	Estimated Fair Value
Fixed maturity securities guaranteed or issued by:				
Canadian province of Quebec	\$ 1,091,018	\$ 1,757,087	\$ 1,119,337	\$ 1,917,996
Canadian province of Ontario	913,642	1,187,526	939,837	1,282,944

The amortized cost and estimated fair value of fixed maturity securities classified as available-for-sale as of December 31, 2018 are shown by contractual maturity in the table below (dollars in thousands). Actual maturities can differ from contractual maturities because borrowers may have the right to call or prepay obligations with or without call or prepayment penalties. Asset and mortgage-backed securities are shown separately in the table below, as they are not due at a single maturity date.

	Amortized Cost	Estimated Fair Value
Available-for-sale:		
Due in one year or less	\$ 1,185,868	\$ 1,190,931
Due after one year through five years	8,760,200	8,851,307
Due after five years through ten years	9,060,972	9,149,497
Due after ten years	14,403,523	15,363,152
Asset and mortgage-backed securities	5,471,605	5,437,459
Total	\$ 38,882,168	\$ 39,992,346

Corporate Fixed Maturity Securities

The tables below show the major industry types of the Company's corporate fixed maturity holdings as of December 31, 2018 and 2017 (dollars in thousands):

December 31, 2018:

	Amortized Cost	Estimated Fair Value	% of Total
Finance	\$ 8,793,742	\$ 8,730,568	36.3%
Industrial	12,336,857	12,342,111	51.6
Utility	2,875,808	2,909,440	12.1
Total	\$ 24,006,407	\$ 23,982,119	100.0%

December 31, 2017:

	Amortized Cost	Estimated Fair Value	% of Total
Finance	\$ 7,977,885	\$ 8,362,774	36.1%
Industrial	11,535,166	12,199,333	52.5
Utility	2,453,752	2,648,861	11.4
Total	\$ 21,966,803	\$ 23,210,968	100.0%

Other-Than-Temporary Impairments—Fixed Maturity Securities

As discussed in Note 2 – “Significant Accounting Policies and Pronouncements,” a portion of certain other-than-temporary impairment (“OTTI”) losses on fixed maturity securities is recognized in AOCI. For these securities, the net amount recognized in the consolidated statements of income (“credit loss impairments”) represents the difference between the amortized cost of the security and the net present value of its projected future cash flows discounted at the effective interest rate implicit in the debt

security prior to impairment. Any remaining difference between the fair value and amortized cost is recognized in AOCI. The following table sets forth the amount of pre-tax credit loss impairments on fixed maturity securities held by the Company as of the dates indicated, for which a portion of the OTTI loss was recognized in AOCI, and the corresponding changes in such amounts (dollars in thousands):

	2018	2017	2016
Balance, beginning of period	\$ 3,677	\$ 6,013	\$ 7,284
Additional impairments - credit loss OTTI recognized on securities previously impaired	—	—	231
Credit loss impairments previously recognized on securities impaired to fair value during the period	—	(2,336)	—
Credit loss previously recognized on securities that matured, paid down, prepaid or were sold during the period	—	—	(1,502)
Balance, end of period	<u>\$ 3,677</u>	<u>\$ 3,677</u>	<u>\$ 6,013</u>

Unrealized Losses for Fixed Maturity and Equity Securities Available-for-Sale

The following table presents the total gross unrealized losses for the 3,109 fixed maturity securities as of December 31, 2018, where the estimated fair value had declined and remained below amortized cost by the indicated amount (dollars in thousands):

	2018	
	Gross Unrealized Losses	% of Total
Less than 20%	\$ 721,015	96.3%
20% or more for less than six months	21,336	2.9
20% or more for six months or greater	6,139	0.8
Total	<u>\$ 748,490</u>	<u>100.0%</u>

The following table presents the total gross unrealized losses for the 1,116 fixed maturity and equity securities as of December 31, 2017, where the estimated fair value had declined and remained below amortized cost by the indicated amount (dollars in thousands):

	2017	
	Gross Unrealized Losses	% of Total
Less than 20%	\$ 113,466	97.0%
20% or more for less than six months	689	0.6
20% or more for six months or greater	2,838	2.4
Total	<u>\$ 116,993</u>	<u>100.0%</u>

The Company's determination of whether a decline in value is other-than-temporary includes an analysis of the underlying credit and the extent and duration of a decline in value. The Company's credit analysis of an investment includes determining whether the issuer is current on its contractual payments, evaluating whether it is probable that the Company will be able to collect all amounts due according to the contractual terms of the security and analyzing the overall ability of the Company to recover the amortized cost of the investment. In the Company's impairment review process, the duration and severity of an unrealized loss position for equity securities are given greater weight and consideration given the lack of contractual cash flows or deferability features.

The following table presents the estimated fair values and gross unrealized losses, including other-than-temporary impairment losses reported in AOCI, for 3,109 fixed maturity securities that have estimated fair values below amortized cost as of December 31, 2018 (dollars in thousands). These investments are presented by class and grade of security, as well as the length of time the related fair value has remained below amortized cost.

	Less than 12 months		12 months or greater		Total	
	Estimated Fair Value	Gross Unrealized Losses	Estimated Fair Value	Gross Unrealized Losses	Estimated Fair Value	Gross Unrealized Losses
December 31, 2018:						
Investment grade securities:						
Corporate	\$ 8,505,371	\$ 302,604	\$ 3,611,266	\$ 195,082	\$ 12,116,637	\$ 497,686
Canadian government	25,169	419	131,806	1,612	156,975	2,031
RMBS	269,558	2,488	836,741	22,760	1,106,299	25,248
ABS	1,102,677	24,271	381,609	8,523	1,484,286	32,794
CMBS	384,259	4,304	414,719	13,930	798,978	18,234
U.S. government	8,616	80	1,086,694	57,787	1,095,310	57,867
State and political subdivisions	103,504	1,538	157,330	7,472	260,834	9,010
Other foreign government	789,859	24,509	472,934	17,446	1,262,793	41,955
Total investment grade securities	11,189,013	360,213	7,093,099	324,612	18,282,112	684,825
Below investment grade securities:						
Corporate	755,679	42,760	122,559	14,646	878,238	57,406
Canadian government	443	34	1,770	243	2,213	277
RMBS	—	—	1,026	34	1,026	34
ABS	—	—	1,063	35	1,063	35
Other foreign government	128,725	5,574	7,479	339	136,204	5,913
Total below investment grade securities	884,847	48,368	133,897	15,297	1,018,744	63,665
Total fixed maturity securities	\$ 12,073,860	\$ 408,581	\$ 7,226,996	\$ 339,909	\$ 19,300,856	\$ 748,490

The following table presents the estimated fair values and gross unrealized losses, including other-than-temporary impairment losses reported in AOCI, for 1,116 fixed maturity and equity securities that have estimated fair values below amortized cost as of December 31, 2017 (dollars in thousands):

	Less than 12 months		12 months or greater		Total	
	Estimated Fair Value	Gross Unrealized Losses	Estimated Fair Value	Gross Unrealized Losses	Estimated Fair Value	Gross Unrealized Losses
December 31, 2017:						
Investment grade securities:						
Corporate	\$ 1,886,212	\$ 17,099	\$ 1,009,750	\$ 28,080	\$ 2,895,962	\$ 45,179
Canadian government	18,688	91	111,560	1,596	130,248	1,687
RMBS	566,699	5,852	224,439	6,004	791,138	11,856
ABS	434,274	2,707	168,524	2,434	602,798	5,141
CMBS	220,401	1,914	103,269	2,920	323,670	4,834
U.S. government	800,298	6,177	767,197	15,756	1,567,495	21,933
State and political subdivisions	43,510	242	68,666	4,054	112,176	4,296
Other foreign government	369,717	2,707	191,265	4,704	560,982	7,411
Total investment grade securities	4,339,799	36,789	2,644,670	65,548	6,984,469	102,337
Below investment grade securities:						
Corporate	194,879	3,317	75,731	6,933	270,610	10,250
Canadian government	1,995	20	—	—	1,995	20
RMBS	—	—	1,369	22	1,369	22
ABS	—	—	1,489	53	1,489	53
Other foreign government	28,600	113	15,134	551	43,734	664
Total below investment grade securities	225,474	3,450	93,723	7,559	319,197	11,009
Total fixed maturity securities	\$ 4,565,273	\$ 40,239	\$ 2,738,393	\$ 73,107	\$ 7,303,666	\$ 113,346
Non-redeemable preferred stock	\$ 82	\$ 1	\$ 26,471	\$ 2,225	\$ 26,553	\$ 2,226
Other equity securities	5,820	1,023	47,251	398	53,071	1,421
Total equity securities	\$ 5,902	\$ 1,024	\$ 73,722	\$ 2,623	\$ 79,624	\$ 3,647

The Company has no intention to sell, nor does it expect to be required to sell, the securities outlined in the table above, as of the dates indicated. However, unforeseen facts and circumstances may cause the Company to sell fixed maturity securities in the

ordinary course of managing its portfolio to meet certain diversification, credit quality and liquidity guidelines. Changes in unrealized losses are primarily driven by changes in interest rates.

Investment Income, Net of Related Expenses

Major categories of investment income, net of related expenses, consist of the following (dollars in thousands):

	2018	2017	2016
Fixed maturity securities available-for-sale	\$ 1,528,086	\$ 1,401,585	\$ 1,285,406
Equity securities	4,343	4,445	12,513
Mortgage loans on real estate	214,387	197,755	168,582
Policy loans	59,332	60,617	63,837
Funds withheld at interest	309,977	457,774	368,728
Short-term investments and cash and cash equivalents	14,349	7,171	8,051
Other invested assets	98,557	106,015	76,858
Investment income	2,229,031	2,235,362	1,983,975
Investment expense	(90,506)	(80,711)	(72,089)
Investment income, net of related expenses	\$ 2,138,525	\$ 2,154,651	\$ 1,911,886

Investment Related Gains (Losses), Net

Investment related gains (losses), net, consist of the following (dollars in thousands):

	2018	2017	2016
Fixed maturity securities available-for-sale:			
Other-than-temporary impairment losses	\$ (28,494)	\$ (42,639)	\$ (38,805)
Portion of loss recognized in accumulated other comprehensive income	—	—	74
Gain on investment activity	65,211	110,546	145,172
Loss on investment activity	(158,870)	(37,328)	(47,094)
Equity securities:			
Other-than-temporary impairment losses	—	(1,202)	—
Gain on investment activity	4,429	23	9,198
Loss on investment activity	(1,937)	(4,351)	(2,871)
Change in unrealized gains (losses) recognized in earnings	(23,184)	—	—
Other impairment losses and change in mortgage loan provision	(11,919)	(9,497)	(11,006)
Derivatives and other, net	(15,324)	152,328	39,527
Total investment related gains (losses), net	\$ (170,088)	\$ 167,880	\$ 94,195

The other-than-temporary impairment losses on fixed maturity securities for 2018, 2017 and 2016 are primarily due to emerging market and high-yield debt exposures. The fluctuations in investment related gains (losses) for derivatives and other are primarily due to changes in the fair value of embedded derivatives related to modco and funds withheld treaties, as a result of changes in interest rates, driven primarily by credit spreads. These fluctuations were partially offset by changes in the fair value of free-standing derivatives as a result of changes in value of underlying stock indices, movements in credit and inflation spreads, and changes in interest rates.

As of December 31, 2018 and 2017, the Company held non-income producing securities with amortized costs of \$41.3 million and \$38.8 million, and estimated fair values of \$42.7 million and \$39.3 million, respectively. Generally, securities are non-income producing when principal or interest is not paid primarily as a result of bankruptcies or credit defaults, but also include securities where amortization has been discontinued. During 2018, 2017 and 2016, the Company sold fixed maturity securities with fair values of \$5,784.6 million, \$2,550.1 million, and \$1,055.5 million at losses of \$158.9 million, \$37.3 million and \$47.1 million, respectively. During 2018, 2017 and 2016, the Company sold equity securities with fair values of \$32.8 million, \$177.7 million, and \$126.1 million at losses of \$1.9 million, \$4.4 million and \$2.9 million, respectively. The Company generally does not engage in short-term buying and selling of securities.

Securities Borrowing, Lending and Repurchase Agreements

The following table includes the amount of borrowed securities, securities lent and securities collateral received as part of the securities lending program, repurchased/reverse repurchased securities pledged and received and cash received as of December 31, 2018 and 2017 (dollars in thousands):

	2018		2017	
	Amortized Cost	Estimated Fair Value	Amortized Cost	Estimated Fair Value
Borrowed securities	\$ 335,781	\$ 366,663	\$ 358,875	\$ 377,820
Securities lending:				
Securities loaned	101,981	102,618	117,246	121,551
Securities received	n/a	112,000	n/a	128,000
Repurchase program/reverse repurchase program:				
Securities pledged	554,806	554,589	413,819	428,344
Securities received	n/a	530,932	n/a	417,550

The Company also held cash collateral for securities lending and the repurchase program/reverse repurchase programs of \$28.6 million and \$31.2 million as of December 31, 2018 and 2017, respectively. No cash or securities have been pledged by the Company for its securities borrowing program as of December 31, 2018 and 2017.

The following tables present information on the Company's securities lending and repurchase transactions as of December 31, 2018 and 2017, respectively (dollars in thousands). Collateral associated with certain borrowed securities is not included within the tables as the collateral pledged to each counterparty is the right to reinsurance treaty cash flows.

	December 31, 2018				
	Remaining Contractual Maturity of the Agreements				
	Overnight and Continuous	Up to 30 Days	30-90 Days	Greater than 90 Days	Total
Securities lending transaction:					
Corporate	\$ —	\$ —	\$ —	\$ 102,618	\$ 102,618
Total	—	—	—	102,618	102,618
Repurchase transactions:					
Corporate	—	—	—	254,151	254,151
U.S. government	—	—	—	221,572	221,572
Foreign government	—	—	—	78,866	78,866
Total	—	—	—	554,589	554,589
Total transactions	\$ —	\$ —	\$ —	\$ 657,207	\$ 657,207

Gross amount of recognized liabilities for securities lending and repurchase transactions in preceding table	\$ 671,492
Amounts related to agreements not included in offsetting disclosure	\$ 14,285

December 31, 2017

	Remaining Contractual Maturity of the Agreements				
	Overnight and Continuous	Up to 30 Days	30-90 Days	Greater than 90 Days	Total
Securities lending transaction:					
Corporate	\$ —	\$ —	\$ —	\$ 121,551	\$ 121,551
Total	—	—	—	121,551	121,551
Repurchase transactions:					
Corporate	—	—	312	184,334	\$ 184,646
U.S. government	—	—	—	220,765	220,765
Foreign government	—	—	—	21,802	21,802
Other	1,131	—	—	—	1,131
Total	1,131	—	312	426,901	428,344
Total transactions	\$ 1,131	\$ —	\$ 312	\$ 548,452	\$ 549,895

Gross amount of recognized liabilities for repurchase transactions in preceding table	\$ 576,786
Amounts related to agreements not included in offsetting disclosure	\$ 26,891

The Company has elected to offset amounts recognized as receivables and payables resulting from the repurchase/reverse repurchase programs. After the effect of offsetting, the net amount presented on the consolidated balance sheets was a liability of \$0.4 million and \$1.1 million as of December 31, 2018 and 2017, respectively. As of December 31, 2018 and 2017, the Company recognized payables resulting from cash received as collateral associated with a repurchase agreement as discussed above. Amounts owed to and due from the counterparties may be settled in cash or offset, in accordance with the agreements.

Mortgage Loans on Real Estate

Mortgage loans represented approximately 9.1% and 8.5% of the Company's total investments as of December 31, 2018 and 2017, respectively. As of December 31, 2018, mortgage loans were geographically dispersed throughout the U.S. with the largest concentrations in California (18.7%), Texas (10.9%) and Washington (7.4%) and include loans secured by properties in Canada (2.7%) and United Kingdom (0.1%). The recorded investment in mortgage loans on real estate presented below is gross of unamortized deferred loan origination fees and expenses, and valuation allowances.

The distribution of mortgage loans by property type is as follows as of December 31, 2018 and 2017 (dollars in thousands):

	2018		2017	
	Carrying Value	Percentage of Total	Carrying Value	Percentage of Total
Property type:				
Office building	\$ 1,725,748	34.6%	\$ 1,487,392	33.6%
Retail	1,432,394	28.7	1,270,676	28.8
Industrial	961,924	19.3	938,612	21.3
Apartment	571,291	11.5	510,052	11.6
Other commercial	291,997	5.9	206,439	4.7
Recorded investment	\$ 4,983,354	100.0%	\$ 4,413,171	100.0%
Unamortized balance of loan origination fees and expenses	(5,770)		(3,254)	
Valuation allowances	(11,286)		(9,384)	
Total mortgage loans on real estate	\$ 4,966,298		\$ 4,400,533	

The maturities of the mortgage loans as of December 31, 2018 and 2017 are as follows (dollars in thousands):

	2018		2017	
	Recorded Investment	% of Total	Recorded Investment	% of Total
Due within five years	\$ 1,425,598	28.6%	\$ 1,091,066	24.8%
Due after five years through ten years	2,686,264	53.9	2,516,872	57.0
Due after ten years	871,492	17.5	805,233	18.2
Total	\$ 4,983,354	100.0%	\$ 4,413,171	100.0%

The following tables set forth certain key credit quality indicators of the Company's recorded investment in mortgage loans as of December 31, 2018 and 2017 (dollars in thousands):

	Recorded Investment					
	Debt Service Ratios			Construction loans	Total	% of Total
	>1.20x	1.00x - 1.20x	<1.00x			
December 31, 2018:						
Loan-to-Value Ratio						
0% - 59.99%	\$ 2,410,556	\$ 61,246	\$ 38,177	\$ 13,691	\$ 2,523,670	50.6%
60% - 69.99%	1,618,374	73,908	38,120	18,929	1,749,331	35.1
70% - 79.99%	414,269	48,438	54,440	—	517,147	10.4
Greater than 80%	117,978	49,668	25,560	—	193,206	3.9
Total	<u>\$ 4,561,177</u>	<u>\$ 233,260</u>	<u>\$ 156,297</u>	<u>\$ 32,620</u>	<u>\$ 4,983,354</u>	<u>100.0%</u>

	Recorded Investment					
	Debt Service Ratios			Construction loans	Total	% of Total
	>1.20x	1.00x - 1.20x	<1.00x			
December 31, 2017:						
Loan-to-Value Ratio						
0% - 59.99%	\$ 2,148,428	\$ 53,979	\$ 3,801	\$ —	\$ 2,206,208	50.0%
60% - 69.99%	1,517,029	47,128	43,921	—	1,608,078	36.4
70% - 79.99%	396,446	19,461	15,367	—	431,274	9.8
Greater than 80%	120,850	30,713	6,362	9,686	167,611	3.8
Total	<u>\$ 4,182,753</u>	<u>\$ 151,281</u>	<u>\$ 69,451</u>	<u>\$ 9,686</u>	<u>\$ 4,413,171</u>	<u>100.0%</u>

The age analysis of the Company's past due recorded investments in mortgage loans as of December 31, 2018 and 2017 (dollars in thousands):

	2018	2017
31-60 days past due	\$ —	\$ 17,100
61-90 days past due	—	2,056
Total past due	—	19,156
Current	4,983,354	4,394,015
Total	<u>\$ 4,983,354</u>	<u>\$ 4,413,171</u>

The following table presents the recorded investment in mortgage loans, by method of measuring impairment, and the related valuation allowances, as of December 31, 2018 and 2017 (dollars in thousands):

	2018	2017
Mortgage loans:		
Individually measured for impairment	\$ 30,635	\$ 5,858
Collectively measured for impairment	4,952,719	4,407,313
Recorded investment	<u>\$ 4,983,354</u>	<u>\$ 4,413,171</u>
Valuation allowances:		
Individually measured for impairment	\$ —	\$ —
Collectively measured for impairment	11,286	9,384
Total valuation allowances	<u>\$ 11,286</u>	<u>\$ 9,384</u>

Information regarding the Company's loan valuation allowances for mortgage loans as of December 31, 2018, 2017 and 2016 are as follows (dollars in thousands):

	2018	2017	2016
Balance, beginning of period	\$ 9,384	\$ 7,685	\$ 6,813
Provision	1,918	1,691	872
Translation adjustment	(16)	8	—
Balance, end of period	<u>\$ 11,286</u>	<u>\$ 9,384</u>	<u>\$ 7,685</u>

Information regarding the portion of the Company's mortgage loans that were impaired as of December 31, 2018 and 2017 is as follows (dollars in thousands):

	Unpaid Principal Balance	Recorded Investment	Related Allowance	Carrying Value
December 31, 2018:				
Impaired mortgage loans with no valuation allowance recorded	\$ 30,660	\$ 30,635	\$ —	\$ 30,635
Impaired mortgage loans with valuation allowance recorded	—	—	—	—
Total impaired mortgage loans	<u>\$ 30,660</u>	<u>\$ 30,635</u>	<u>\$ —</u>	<u>\$ 30,635</u>
December 31, 2017:				
Impaired mortgage loans with no valuation allowance recorded	\$ 6,427	\$ 5,858	\$ —	\$ 5,858
Impaired mortgage loans with valuation allowance recorded	—	—	—	—
Total impaired mortgage loans	<u>\$ 6,427</u>	<u>\$ 5,858</u>	<u>\$ —</u>	<u>\$ 5,858</u>

The Company's average investment balance of impaired mortgage loans and the related interest income are reflected in the table below for the years ended December 31, 2018, 2017 and 2016 (dollars in thousands):

	2018		2017		2016	
	Average Investment ⁽¹⁾	Interest Income	Average Investment ⁽¹⁾	Interest Income	Average Investment ⁽¹⁾	Interest Income
Impaired mortgage loans with no valuation allowance recorded	\$ 24,240	\$ 1,129	\$ 3,621	\$ 186	\$ 2,249	\$ 142
Impaired mortgage loans with valuation allowance recorded	—	—	—	—	—	—
Total	<u>\$ 24,240</u>	<u>\$ 1,129</u>	<u>\$ 3,621</u>	<u>\$ 186</u>	<u>\$ 2,249</u>	<u>\$ 142</u>

(1) Average recorded investment represents the average loan balances as of the beginning of period and all subsequent quarterly end of period balances.

The Company did not acquire any impaired mortgage loans during the years ended December 31, 2018 and 2017. The Company had no mortgage loans that were on a nonaccrual status as of December 31, 2018 and 2017.

Policy Loans

Policy loans comprised approximately 2.5% and 2.6% of the Company's total investments as of December 31, 2018 and 2017, respectively, the majority of which are associated with one client. These policy loans present no credit risk because the amount of the loan cannot exceed the obligation due to the ceding company upon the death of the insured or surrender of the underlying policy. The provisions of the treaties in force and the underlying policies determine the policy loan interest rates. The Company earns a spread between the interest rate earned on policy loans and the interest rate credited to corresponding liabilities.

Funds Withheld at Interest

Funds withheld at interest comprised approximately 10.6% and 11.8% of the Company's total investments as of December 31, 2018 and 2017, respectively. Of the \$5.8 billion funds withheld at interest balance, net of embedded derivatives, as of December 31, 2018, \$3.8 billion of the balance is associated with one client. For reinsurance agreements written on a modco basis and certain agreements written on a coinsurance funds withheld basis, assets equal to the net statutory reserves are withheld and legally owned and managed by the ceding company and are reflected as funds withheld at interest on the Company's consolidated balance sheets. In the event of a ceding company's insolvency, the Company would need to assert a claim on the assets supporting its reserve liabilities. However, the risk of loss to the Company is mitigated by its ability to offset amounts it owes the ceding company for claims or allowances against amounts owed to the Company from the ceding company.

Other Invested Assets

Other invested assets include limited partnership interests, joint ventures (other than operating joint ventures), equity release mortgages, derivative contracts and fair value option ("FVO") contractholder-directed unit-linked investments. Other invested

assets also include Federal Home Loan Bank of Des Moines (“FHLB”) common stock, which is included in Other in the table below. Other invested assets represented approximately 3.5% and 2.9% of the Company’s total investments as of December 31, 2018 and 2017, respectively. Carrying values of these assets as of December 31, 2018 and 2017 are as follows (dollars in thousands):

	2018	2017
Limited partnership interests and real estate joint ventures	\$ 965,094	\$ 781,124
Equity release mortgages	475,905	219,940
Derivatives	180,699	137,613
FVO contractholder-directed unit-linked investments	197,770	218,541
Other	95,829	148,114
Total other invested assets	<u>\$ 1,915,297</u>	<u>\$ 1,505,332</u>

Note 5 DERIVATIVE INSTRUMENTS

Accounting for Derivative Instruments and Hedging Activities

See Note 2 – “Significant Accounting Policies and Pronouncements” for a detailed discussion of the accounting treatment for derivative instruments, including embedded derivatives and Note 6 – “Fair Value of Assets and Liabilities” for additional disclosures related to the fair value hierarchy for derivative instruments, including embedded derivatives.

Types of Derivatives Used by the Company

Credit Derivatives

The Company sells protection under single name credit default swaps and credit default swap index tranches to diversify its credit risk exposure in certain portfolios and, in combination with purchasing securities, to replicate characteristics of similar investments based on the credit quality and term of the credit default swap. Credit default triggers for indexed reference entities and single name reference entities are defined in the contracts. The Company’s maximum exposure to credit loss equals the notional value for credit default swaps. In the event of default of a referencing entity, the Company is typically required to pay the protection holder the full notional value less a recovery amount determined at auction.

The Company also purchases credit default swaps to reduce its risk against a drop in bond prices due to credit concerns of certain bond issuers. If a credit event, as defined by the contract, occurs, the Company is able to put the bond back to the counterparty at par.

Equity Derivatives

Exchange-traded equity futures are used primarily to economically hedge liabilities embedded in certain variable annuity products. With exchange-traded equity futures transactions, the Company agrees to purchase or sell a specified number of contracts, the value of which is determined by the relevant stock indices, and to post variation margin on a daily basis in an amount equal to the difference between the daily estimated fair values of those contracts. The Company enters into exchange-traded equity futures with regulated futures commission merchants that are members of the exchange.

Equity index options are used by the Company primarily to hedge minimum guarantees embedded in certain variable annuity products. To hedge against adverse changes in equity indices volatility, the Company buys put options. The contracts are net settled in cash based on differentials in the indices at the time of exercise and the strike price. Equity warrants have also been used by the Company to economically hedge the variability in anticipated cash flows for the acquisition of investment securities.

Foreign Currency Derivatives

Foreign currency swaps are used by the Company to reduce the risk from fluctuations in foreign currency exchange rates associated with its assets and liabilities denominated in foreign currencies. With a foreign currency swap transaction, the Company agrees with another party to exchange, at specified intervals, the difference between one currency and another at a forward exchange rate calculated by reference to an agreed upon principal amount. The principal amount of each currency is exchanged at the termination of the currency swap by each party. The Company uses foreign currency swaps in hedges of net investments in foreign operations and fair value hedges.

Foreign currency forwards are used by the Company to reduce the risk from fluctuations in foreign currency exchange rates associated with its assets and liabilities denominated in foreign currencies. With a foreign currency forward transaction, the Company agrees with another party to deliver a specified amount of an identified currency at a specified future date. The price is agreed upon at the time of the contract and payment for such a contract is made in a different currency at the specified future date. The Company uses foreign currency forwards in hedges of net investments in foreign operations and non-qualifying hedge relationships.

Interest Rate Derivatives

Interest rate swaps are used by the Company primarily to reduce market risks from changes in interest rates, to alter interest rate exposure arising from mismatches between assets and liabilities (duration mismatches) and to manage the risk of cash flows of liabilities that are variable based on a benchmark rate. With an interest rate swap, the Company agrees with another party to exchange, at specified intervals, the difference between two rates, which can be either fixed-rate or floating-rate interest amounts, tied to an agreed-upon notional principal amount. These transactions are executed pursuant to master agreements that provide for a single net payment or individual gross payments at each due date. The Company utilizes interest rate swaps in cash flow and non-qualifying hedging relationships.

The Company sells fee-based synthetic guaranteed investment contracts (“GICs”) to retirement plans that include investment-only, stable value contracts. The assets are owned by the trustees of such plans, who invest the assets under the terms of investment guidelines to which the Company agrees. The contracts contain a guarantee of a minimum rate of return on participant balances supported by the underlying assets, and a guarantee of liquidity to meet certain participant-initiated plan cash flow requirements. These contracts are reported as derivatives and recorded at fair value.

Other Derivatives

Consumer price index (“CPI”) swaps are used by the Company primarily to economically hedge liabilities embedded in certain insurance products where value is directly affected by changes in a designated benchmark consumer price index. With a CPI swap transaction, the Company agrees with another party to exchange the actual amount of inflation realized over a specified period of time for a fixed amount of inflation determined at inception. These transactions are executed pursuant to master agreements that provide for a single net payment or individual gross payments to be made by the counterparty at each due date. Most of these swaps will require a single payment to be made by one counterparty at the maturity date of the swap.

The Company enters into longevity swaps in the form of out-of-the-money options, which provide protection against changes in mortality improvement to retirement plans and insurers of such plans. With a longevity swap transaction, the Company agrees with another party to exchange a proportion of a notional value. The proportion is determined by the difference between a predefined benefit, and the realized benefit plus the future expected benefit, calculated by reference to a population index for a fixed premium.

Mortality swaps are used by the Company to hedge risk from changes in mortality experience associated with its reinsurance of life insurance risk. The Company agrees with another party to exchange, at specified intervals, a proportion of a notional value determined by the difference between a predefined expected and realized claim amount on a designated index of reinsured lives, for a fixed percentage (premium) each term.

The Company has certain embedded derivatives that are required to be separated from their host contracts and reported as derivatives. Host contracts include reinsurance treaties structured on a modco or funds withheld basis. Additionally, the Company reinsures equity-indexed annuity and variable annuity contracts with benefits that are considered embedded derivatives, including guaranteed minimum withdrawal benefits, guaranteed minimum accumulation benefits, and guaranteed minimum income benefits. The changes in fair values of embedded derivatives on equity-indexed annuities described below relate to changes in the fair value associated with capital market and other related assumptions. The Company’s utilization of a credit valuation adjustment did not have a material effect on the change in fair value of its embedded derivatives for the years ended December 31, 2018, 2017 and 2016.

Summary of Derivative Positions

Derivatives, except for embedded derivatives and longevity and mortality swaps, are carried on the Company's consolidated balance sheets in other invested assets or other liabilities, at fair value. Longevity and mortality swaps are included on the consolidated balance sheets in other assets or other liabilities, at fair value. Embedded derivative assets and liabilities on modco or funds withheld arrangements are included on the consolidated balance sheets with the host contract in funds withheld at interest, at fair value. Embedded derivative liabilities on indexed annuity and variable annuity products are included on the consolidated balance sheets with the host contract in interest-sensitive contract liabilities, at fair value. The following table presents the notional amounts and gross fair value of derivative instruments prior to taking into account the netting effects of master netting agreements as of December 31, 2018 and 2017 (dollars in thousands):

		December 31, 2018			December 31, 2017		
	Primary Underlying Risk	Notional Amount	Carrying Value/Fair Value		Notional Amount	Carrying Value/Fair Value	
			Assets	Liabilities		Assets	Liabilities
Derivatives not designated as hedging instruments:							
Interest rate swaps	Interest rate	\$ 1,040,588	\$ 47,652	\$ 961	\$ 996,204	\$ 59,809	\$ 2,372
Financial futures	Equity	325,620	—	—	412,438	—	—
Foreign currency swaps	Foreign currency	149,698	504	4,659	—	—	—
Foreign currency forwards	Foreign currency	25,000	—	234	6,030	—	28
CPI swaps	CPI	385,580	—	11,384	221,932	—	2,160
Credit default swaps	Credit	1,338,300	6,003	1,166	961,200	8,319	1,651
Equity options	Equity	439,158	42,836	—	632,251	23,271	—
Longevity swaps	Longevity	917,360	47,789	—	960,400	40,659	—
Mortality swaps	Mortality	25,000	—	369	—	—	1,683
Synthetic GICs	Interest rate	13,397,729	—	—	10,052,576	—	—
Embedded derivatives in:							
Modco or funds withheld arrangements		—	109,597	—	—	122,194	—
Indexed annuity products		—	—	776,940	—	—	861,758
Variable annuity products		—	—	167,925	—	—	152,470
Total non-hedging derivatives		18,044,033	254,381	963,638	14,243,031	254,252	1,022,122
Derivatives designated as hedging instruments:							
Interest rate swaps	Foreign currency/ Interest rate	435,000	—	27,257	435,000	—	20,389
Foreign currency swaps	Foreign currency	494,461	51,311	—	672,921	65,207	8,496
Foreign currency forwards	Foreign currency	911,197	50,974	—	553,175	1,265	7,720
Total hedging derivatives		1,840,658	102,285	27,257	1,661,096	66,472	36,605
Total derivatives		\$ 19,884,691	\$ 356,666	\$ 990,895	\$ 15,904,127	\$ 320,724	\$ 1,058,727

Fair Value Hedges

The Company designates and reports certain foreign currency swaps to hedge the foreign currency fair value exposure of foreign currency denominated assets as fair value hedges when they meet the requirements of the general accounting principles for Derivatives and Hedging. The gain or loss on the hedged item attributable to a change in foreign currency and the offsetting gain or loss on the related foreign currency swaps as of December 31, 2018, 2017 and 2016 were (dollars in thousands):

Type of Fair Value Hedge	Hedged Item	Gains (Losses) Recognized for Derivatives ⁽¹⁾	Gains (Losses) Recognized for Hedged Items ⁽¹⁾
For the Year Ended December 31, 2018:			
Foreign currency swaps	Foreign-denominated fixed maturity securities	\$ (11,164)	\$ 12,446
For the Year Ended December 31, 2017:			
Foreign currency swaps	Foreign-denominated fixed maturity securities	\$ 9,456	\$ (9,456)
For the Year Ended December 31, 2016:			
Foreign currency swaps	Foreign-denominated fixed maturity securities	\$ (1,700)	\$ 1,700

(1) The net amount represents the ineffective portion of the fair value hedges.

Cash Flow Hedges

Certain derivative instruments are designated as cash flow hedges when they meet the requirements of the general accounting principles for *Derivatives and Hedging*. The Company designates and accounts for the following as cash flows: (i) certain interest rate swaps, in which the cash flows of liabilities are variable based on a benchmark rate; (ii) certain interest rate swaps, in which the cash flows of assets are denominated in different currencies, commonly referred to as cross-currency swaps; and (iii) forward bond purchase commitments.

The following table presents the components of AOCI, before income tax, and the consolidated income statement classification where the gain or loss is recognized related to cash flow hedges for the years ended December 31, 2018, 2017 and 2016 (dollars in thousands):

	Amounts Included in AOCI
Balance December 31, 2015	\$ (29,397)
Gains (losses) deferred in other comprehensive income (loss) on the effective portion of cash flow hedges	27,110
Amounts reclassified to investment related (gains) losses, net	278
Amounts reclassified to investment income	(487)
Balance December 31, 2016	(2,496)
Gains (losses) deferred in other comprehensive income (loss) on the effective portion of cash flow hedges	6,316
Amounts reclassified to investment related (gains) losses, net	(775)
Amounts reclassified to investment income	(505)
Amounts reclassified to interest expense	79
Balance December 31, 2017	2,619
Gains (losses) deferred in other comprehensive income (loss) on the effective portion of cash flow hedges	6,644
Amounts reclassified to investment income	(292)
Amounts reclassified to interest expense	(183)
Balance December 31, 2018	\$ 8,788

As of December 31, 2018, the before-tax deferred net gains on derivative instruments recorded in AOCI that are expected to be reclassified to earnings during the next twelve months are approximately \$0.1 million and \$1.9 million in investment income and interest expense, respectively.

The following table presents the effective portion of derivatives in cash flow hedging relationships on the consolidated statements of income and the consolidated statements of stockholders' equity for the years ended December 31, 2018, 2017 and 2016 (dollars in thousands):

Derivative Type	Effective Portion			
	Gains (Losses) Deferred in OCI	Gains (Losses) Reclassified into Income from OCI		
		Investment Related Gains (Losses)	Investment Income	Interest Expense
For the year ended December 31, 2018:				
Interest rate	\$ 12,886	\$ —	\$ —	\$ 183
Foreign currency/Interest rate	(6,242)	—	292	—
Total	<u>\$ 6,644</u>	<u>\$ —</u>	<u>\$ 292</u>	<u>\$ 183</u>
For the year ended December 31, 2017:				
Interest rate	\$ (5,649)	\$ —	\$ —	\$ (79)
Foreign currency/Interest rate	11,955	—	380	—
Forward bond purchase commitments	10	775	125	—
Total	<u>\$ 6,316</u>	<u>\$ 775</u>	<u>\$ 505</u>	<u>\$ (79)</u>
For the year ended December 31, 2016:				
Interest rate	\$ 27,901	\$ —	\$ —	\$ —
Foreign currency/Interest rate	(791)	—	510	—
Forward bond purchase commitments	—	(278)	(23)	—
Total	<u>\$ 27,110</u>	<u>\$ (278)</u>	<u>\$ 487</u>	<u>\$ —</u>

For the years ended December 31, 2018, 2017 and 2016, the ineffective portion of derivatives reported as cash flow hedges was not material to the Company's results of operations. Also, there were no material amounts reclassified into earnings relating to instances in which the Company discontinued cash flow hedge accounting because the forecasted transaction did not occur by the

anticipated date or within the additional time period permitted by the authoritative guidance for the accounting for derivatives and hedging.

Hedges of Net Investments in Foreign Operations

The Company uses foreign currency swaps and foreign currency forwards to hedge a portion of its net investment in certain foreign operations against adverse movements in exchange rates. The following table illustrates the Company's net investments in foreign operations ("NIFO") hedges for the years ended December 31, 2018, 2017 and 2016 (dollars in thousands):

Type of NIFO Hedge ^{(1) (2)}	Derivative Gains (Losses) Deferred in AOCI		
	For the year ended		
	2018	2017	2016
Foreign currency swaps	\$ 31,431	\$ (37,567)	\$ (10,234)
Foreign currency forwards	55,913	(10,386)	—

(1) There were no sales or substantial liquidations of net investments in foreign operations that would have required the reclassification of gains or losses from accumulated other comprehensive income (loss) into investment income during the periods presented.

(2) There was no ineffectiveness recognized for the Company's hedges of net investments in foreign operations.

The cumulative foreign currency translation gain recorded in AOCI related to these hedges was \$201.0 million and \$113.7 million as of December 31, 2018 and 2017, respectively. If a hedged foreign operation was sold or substantially liquidated, the amounts in AOCI would be reclassified to the consolidated statements of income. A pro rata portion would be reclassified upon partial sale of a hedged foreign operation.

Non-qualifying Derivatives and Derivatives for Purposes Other Than Hedging

The Company uses various other derivative instruments for risk management purposes that either do not qualify or have not been qualified for hedge accounting treatment. The gain or loss related to the change in fair value for these derivative instruments is recognized in investment related gains (losses), net in the consolidated statements of income, except where otherwise noted.

A summary of the effect of non-hedging derivatives, including embedded derivatives, on the Company's consolidated statements of income for the years ended December 31, 2018, 2017 and 2016 is as follows (dollars in thousands):

		Gains (Losses) for the Years Ended December 31,		
		2018	2017	2016
Type of Non-hedging Derivative	Income Statement Location of Gains (Losses)			
Interest rate swaps	Investment related gains (losses), net	\$ (21,314)	\$ 11,278	\$ 7,649
Financial futures	Investment related gains (losses), net	21,200	(36,160)	(40,242)
Foreign currency swaps	Investment related gains (losses), net	(3,695)	—	—
Foreign currency forwards	Investment related gains (losses), net	(234)	591	1,630
Consumer price index swaps	Investment related gains (losses), net	(10,047)	(2,078)	(401)
Credit default swaps	Investment related gains (losses), net	(2,150)	18,118	18,100
Equity options	Investment related gains (losses), net	7,315	(42,953)	(28,270)
Longevity swaps	Other revenues	9,215	9,358	13,095
Mortality swaps	Other revenues	(386)	(921)	(172)
Subtotal		(96)	(42,767)	(28,611)
Embedded derivatives in:				
Modco or funds withheld arrangements	Investment related gains (losses), net	(12,597)	144,723	54,169
Indexed annuity products	Interest credited	27,591	(80,062)	10,708
Variable annuity products	Investment related gains (losses), net	(15,455)	32,166	7,835
Total non-hedging derivatives		\$ (557)	\$ 54,060	\$ 44,101

Credit Derivatives

The following table presents the estimated fair value, maximum amount of future payments and weighted average years to maturity of credit default swaps sold by the Company as of December 31, 2018 and 2017 (dollars in thousands):

Rating Agency Designation of Referenced Credit Obligations ⁽¹⁾	2018			2017		
	Estimated Fair Value of Credit Default Swaps	Maximum Amount of Future Payments under Credit Default Swaps ⁽²⁾	Weighted Average Years to Maturity ⁽³⁾	Estimated Fair Value of Credit Default Swaps	Maximum Amount of Future Payments under Credit Default Swaps ⁽²⁾	Weighted Average Years to Maturity ⁽³⁾
AAA/AA+/AA/AA-/A+/A/A-						
Single name credit default swaps	\$ 1,953	\$ 152,000	2.2	\$ 3,128	\$ 162,000	2.9
Subtotal	1,953	152,000	2.2	3,128	162,000	2.9
BBB+/BBB/BBB-						
Single name credit default swaps	2,930	353,700	2.2	4,469	361,700	2.9
Credit default swaps referencing indices	(76)	817,600	6.4	(55)	422,600	4.0
Subtotal	2,854	1,171,300	5.1	4,414	784,300	3.5
BB+/BB/BB-						
Single name credit default swaps	30	15,000	0.7	30	5,000	1.5
Subtotal	30	15,000	0.7	30	5,000	1.5
Total	\$ 4,837	\$ 1,338,300	4.7	\$ 7,572	\$ 951,300	3.4

(1) The rating agency designations are based on ratings from Standard and Poor's ("S&P").

(2) Assumes the value of the referenced credit obligations is zero.

(3) The weighted average years to maturity of the credit default swaps is calculated based on weighted average notional amounts.

Netting Arrangements and Credit Risk

Certain of the Company's derivatives are subject to enforceable master netting arrangements and reported as a net asset or liability in the consolidated balance sheets. The Company nets all derivatives that are subject to such arrangements.

The Company has elected to include all derivatives, except embedded derivatives, in the tables below, irrespective of whether they are subject to an enforceable master netting arrangement or a similar agreement. See Note 4 – "Investments" for information regarding the Company's securities borrowing, lending, repurchase and repurchase/reverse repurchase programs. See "Embedded Derivatives" above for information regarding the Company's bifurcated embedded derivatives.

The following table provides information relating to the netting of the Company's derivative instruments as of December 31, 2018 and December 31, 2017 (dollars in thousands):

	Gross Amounts Recognized	Gross Amounts Offset in the Balance Sheet	Net Amounts Presented in the Balance Sheet	Gross Amounts Not Offset in the Balance Sheet		Net Amount
				Financial Instruments ⁽¹⁾	Cash Collateral Pledged/Received	
December 31, 2018:						
Derivative assets	\$ 247,069	\$ (18,581)	\$ 228,488	\$ —	\$ (235,611)	\$ (7,123)
Derivative liabilities	46,030	(18,581)	27,449	(71,376)	(24,080)	(68,007)
December 31, 2017:						
Derivative assets	\$ 198,530	\$ (20,258)	\$ 178,272	\$ (862)	\$ (185,900)	\$ (8,490)
Derivative liabilities	44,499	(20,258)	24,241	(58,156)	(22,221)	(56,136)

(1) Includes initial margin posted to a central clearing partner.

The Company may be exposed to credit-related losses in the event of non-performance by counterparties to derivative financial instruments with a positive fair value. Generally, the credit exposure of the Company's derivative contracts is limited to the fair value at the reporting date plus or minus any collateral posted or held by the Company. The Company had no credit exposure related to its derivative contracts, as of December 31, 2018 and 2017, as the net amount of collateral pledged to the Company from counterparties exceeded the fair value of the derivative contracts.

Derivatives may be exchange-traded or they may be privately negotiated contracts, which are referred to as over-the-counter ("OTC") derivatives. Certain of the Company's OTC derivatives are cleared and settled through central clearing counterparties ("OTC cleared") and others are bilateral contracts between two counterparties. The Company manages its credit risk related to OTC derivatives by entering into transactions with creditworthy counterparties, maintaining collateral arrangements and through

the use of master netting agreements that provide for a single net payment to be made by one counterparty to another at each due date and upon termination. The Company is only exposed to the default of the central clearing counterparties for OTC cleared derivatives, and these transactions require initial and daily variation margin collateral postings. Exchange-traded derivatives are settled on a daily basis, thereby reducing the credit risk exposure in the event of non-performance by counterparties to such financial instruments.

Note 6 FAIR VALUE OF ASSETS AND LIABILITIES

Fair Value Measurement

General accounting principles for *Fair Value Measurements and Disclosures* define fair value as the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. These principles also establish a fair value hierarchy that requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value and describes three levels of inputs that may be used to measure fair value:

Level 1 - Unadjusted quoted prices in active markets for identical assets or liabilities. Active markets are defined as having the following characteristics for the measured asset/liability: (i) many transactions, (ii) current prices, (iii) price quotes not varying substantially among market makers, (iv) narrow bid/ask spreads and (v) most information publicly available. The Company's Level 1 assets and liabilities are traded in active exchange markets.

Level 2 - Observable inputs other than Level 1 prices such as quoted prices for similar assets or liabilities; quoted prices in markets that are not active; or market standard valuation techniques and assumptions that use significant inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities. Such observable inputs include benchmarking prices for similar assets in active, liquid markets, quoted prices in markets that are not active and observable yields and spreads in the market. The Company's Level 2 assets and liabilities include investment securities with quoted prices that are traded less frequently than exchange-traded instruments and derivative contracts whose values are determined using market standard valuation techniques. Level 2 valuations are generally obtained from third party pricing services for identical or comparable assets or liabilities or through the use of valuation methodologies using observable market inputs. Prices from servicers are validated through analytical reviews and assessment of current market activity.

Level 3 - Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the related assets or liabilities. Level 3 assets and liabilities include those whose value is determined using market standard valuation techniques described above. When observable inputs are not available, the market standard techniques for determining the estimated fair value of certain securities that trade infrequently, and therefore have little transparency, rely on inputs that are significant to the estimated fair value and that are not observable in the market or cannot be derived principally from or corroborated by observable market data. These unobservable inputs can be based in large part on management judgment or estimation and cannot be supported by reference to market activity. Even though unobservable, management believes these inputs are based on assumptions deemed appropriate given the circumstances and consistent with what other market participants would use when pricing similar assets and liabilities. Prices are determined using valuation methodologies such as discounted cash flow models and other similar techniques that require management's judgment or estimation in developing inputs that are consistent with those other market participants would use when pricing similar assets and liabilities. Non-binding broker quotes, which are utilized when pricing service information is not available, are reviewed for reasonableness based on the Company's understanding of the market, and are generally considered Level 3. Under certain circumstances, based on its observations of transactions in active markets, the Company may conclude the prices received from independent third party pricing services or brokers are not reasonable or reflective of market activity. In those instances, the Company would apply internally developed valuation techniques to the related assets or liabilities. Additionally, the Company's embedded derivatives, all of which are associated with reinsurance treaties, and longevity and mortality swaps are classified in Level 3 since their values include significant unobservable inputs.

When inputs used to measure the fair value of an asset or liability fall within different levels of the hierarchy, the level within which the fair value measurement is categorized is based on the lowest level input that is significant to the fair value measurement in its entirety, except for fair value measurements using NAV. For example, a Level 3 fair value measurement may include inputs that are observable (Levels 1 and 2) and unobservable (Level 3). Therefore, gains and losses for such assets and liabilities categorized within Level 3 may include changes in fair value that are attributable to both observable inputs (Levels 1 and 2) and unobservable inputs (Level 3).

Assets and Liabilities by Hierarchy Level

Assets and liabilities measured at fair value on a recurring basis as of December 31, 2018 and 2017 are summarized below (dollars in thousands):

December 31, 2018:

December 31, 2018:		Fair Value Measurements Using:			
	Total	Level 1		Level 2	Level 3
Assets:					
Fixed maturity securities – available-for-sale:					
Corporate	\$ 23,982,119	\$ —	\$ 22,651,194	\$ 1,330,925	
Canadian government	3,892,385	—	3,364,261	528,124	
RMBS	1,869,221	—	1,862,366	6,855	
ABS	2,149,204	—	2,053,632	95,572	
CMBS	1,419,034	—	1,419,012	22	
U.S. government	2,185,874	2,067,529	100,320	18,025	
State and political subdivisions	752,194	—	741,992	10,202	
Other foreign government	3,742,315	—	3,737,309	5,006	
Total fixed maturity securities – available-for-sale	39,992,346	2,067,529	35,930,086	1,994,731	
Equity securities	82,197	48,737	—	33,460	
Funds withheld at interest – embedded derivatives	109,597	—	—	109,597	
Cash equivalents	485,167	473,509	11,658	—	
Short-term investments	105,991	4,989	98,774	2,228	
Other invested assets:					
Derivatives:					
Interest rate swaps	37,976	—	37,976	—	
Foreign currency forwards	50,740	—	50,740	—	
Credit default swaps	4,466	—	4,466	—	
Equity options	36,206	—	36,206	—	
Foreign currency swaps	51,311	—	51,311	—	
FVO contractholder-directed unit-linked investments	197,770	196,781	989	—	
Total other invested assets	378,469	196,781	181,688	—	
Other assets - longevity swaps	47,789	—	—	47,789	
Total	\$ 41,201,556	\$ 2,791,545	\$ 36,222,206	\$ 2,187,805	
Liabilities:					
Interest-sensitive contract liabilities – embedded derivatives	\$ 944,865	\$ —	\$ —	\$ 944,865	
Other liabilities:					
Derivatives:					
Interest rate swaps	18,542	—	18,542	—	
Foreign currency swaps - non-hedged	4,155	—	4,155	—	
CPI swaps	11,384	—	11,384	—	
Credit default swaps	(371)	—	(371)	—	
Equity options	(6,630)	—	(6,630)	—	
Mortality swaps	369	—	—	369	
Total	\$ 972,314	\$ —	\$ 27,080	\$ 945,234	

December 31, 2017:

December 31, 2017:		Fair Value Measurements Using:			
	Total	Level 1		Level 2	Level 3
Assets:					
Fixed maturity securities – available-for-sale:					
Corporate	\$ 23,210,968	\$ —	\$ 21,873,696	\$ 1,337,272	
Canadian government	4,220,076	—	3,626,134	593,942	
RMBS	1,719,880	—	1,611,998	107,882	
ABS	1,648,362	—	1,524,888	123,474	
CMBS	1,303,387	—	1,300,153	3,234	
U.S. government	1,943,592	1,818,006	103,075	22,511	
State and political subdivisions	703,428	—	662,225	41,203	
Other foreign government	3,401,127	—	3,396,035	5,092	
Total fixed maturity securities – available-for-sale	38,150,820	1,818,006	34,098,204	2,234,610	
Equity securities:					
Non-redeemable preferred stock	39,806	39,806	—	—	
Other equity securities	60,346	60,346	—	—	
Funds withheld at interest – embedded derivatives	122,194	—	—	122,194	
Cash equivalents	356,788	354,071	2,717	—	
Short-term investments	50,746	—	47,650	3,096	
Other invested assets:					
Derivatives:					
Interest rate swaps	51,359	—	51,359	—	
Foreign currency forwards	730	—	730	—	
CPI swaps	(221)	—	(221)	—	
Credit default swaps	5,908	—	5,908	—	
Equity options	16,932	—	16,932	—	
Foreign currency swaps	62,905	—	62,905	—	
FVO contractholder-directed unit-linked investments	218,541	217,618	923	—	
Total other invested assets	356,154	217,618	138,536	—	
Other assets - longevity swaps	40,659	—	—	40,659	
Total	\$ 39,177,513	\$ 2,489,847	\$ 34,287,107	\$ 2,400,559	
Liabilities:					
Interest-sensitive contract liabilities – embedded derivatives	\$ 1,014,228	\$ —	\$ —	\$ 1,014,228	
Other liabilities:					
Derivatives:					
Interest rate swaps	14,311	—	14,311	—	
Foreign currency forwards	7,213	—	7,213	—	
CPI swaps	1,939	—	1,939	—	
Credit default swaps	(760)	—	(760)	—	
Equity options	(6,339)	—	(6,339)	—	
Foreign currency swaps	6,194	—	6,194	—	
Mortality swaps	1,683	—	—	1,683	
Total	\$ 1,038,469	\$ —	\$ 22,558	\$ 1,015,911	

The Company may utilize information from third parties, such as pricing services and brokers, to assist in determining the fair value for certain assets and liabilities; however, management is ultimately responsible for all fair values presented in the Company's financial statements. This includes responsibility for monitoring the fair value process, ensuring objective and reliable valuation practices and pricing of assets and liabilities, and approving changes to valuation methodologies and pricing sources. The selection of the valuation technique(s) to apply considers the definition of an exit price and the nature of the asset or liability being valued and significant expertise and judgment is required.

The Company performs initial and ongoing analysis and review of the various techniques utilized in determining fair value to ensure that they are appropriate and consistently applied, and that the various assumptions are reasonable. The Company analyzes and reviews the information and prices received from third parties to ensure that the prices represent a reasonable estimate of the fair value and to monitor controls around pricing, which includes quantitative and qualitative analysis and is overseen by the Company's investment and accounting personnel. Examples of procedures performed include, but are not limited to, review of pricing trends, comparison of a sample of executed prices of securities sold to the fair value estimates, comparison of fair value estimates to management's knowledge of the current market, and ongoing confirmation that third party pricing services use, wherever possible, market-based parameters for valuation. In addition, the Company utilizes both internal and external cash flow

models to analyze the reasonableness of fair values utilizing credit spread and other market assumptions, where appropriate. As a result of the analysis, if the Company determines there is a more appropriate fair value based upon the available market data, the price received from the third party is adjusted accordingly. The Company also determines if the inputs used in estimated fair values received from pricing services are observable by assessing whether these inputs can be corroborated by observable market data.

For assets and liabilities reported at fair value, the Company utilizes when available, fair values based on quoted prices in active markets that are regularly and readily obtainable. Generally, these are very liquid investments and the valuation does not require management judgment. When quoted prices in active markets are not available, fair value is based on market valuation techniques, market comparable pricing and the income approach. The use of different techniques, assumptions and inputs may have a material effect on the estimated fair values of the Company's securities holdings. For the periods presented, the application of market standard valuation techniques applied to similar assets and liabilities has been consistent.

The methods and assumptions the Company uses to estimate the fair value of assets and liabilities measured at fair value on a recurring basis are summarized below. See "Valuation Process for Fair Value Measurements Categorized within Level 3" for additional information on Level 3 valuations.

Fixed Maturity Securities – The fair values of the Company's publicly-traded fixed maturity securities are generally based on prices obtained from independent pricing services. Prices from pricing services are sourced from multiple vendors, and a vendor hierarchy is maintained by asset type based on historical pricing experience and vendor expertise. The Company generally receives prices from multiple pricing services for each security, but ultimately uses the price from the vendor that is highest in the hierarchy for the respective asset type. To validate reasonableness, prices are periodically reviewed as explained above. Consistent with the fair value hierarchy described above, securities with quotes from pricing services are generally reflected within Level 2, as they are primarily based on observable pricing for similar assets and/or other market observable inputs. If the pricing information received from third party pricing services is not reflective of market activity or other inputs observable in the market, the Company may challenge the price through a formal process with the pricing service.

If the Company ultimately concludes that pricing information received from the independent pricing service is not reflective of fair value, non-binding broker quotes are used, if available. If the Company concludes that the values from both pricing services and brokers are not reflective of fair value, an internally developed valuation may be prepared; however, this occurs infrequently. Internally developed valuations or non-binding broker quotes are also used to determine fair value in circumstances where vendor pricing is not available. These valuations may use significant unobservable inputs, which reflect the Company's assumptions about the inputs that market participants would use in pricing the asset. Observable market data may not be available in certain circumstances such as market illiquidity and credit events related to the security. Pricing service overrides, internally developed valuations and non-binding broker quotes are generally based on significant unobservable inputs and are reflected as Level 3 in the valuation hierarchy.

The inputs used in the valuation of corporate and government securities include, but are not limited to standard market observable inputs that are derived from, or corroborated by, market observable data including market yield curve, duration, call provisions, observable prices and spreads for similar publicly traded or privately placed issues that incorporate the credit quality and industry sector of the issuer. For private placements and structured securities, valuation is based primarily on matrix pricing or other similar techniques using standard market inputs including spreads for actively traded securities, spreads off benchmark yields, expected prepayment speeds and volumes, current and forecasted loss severity, rating, weighted average coupon, weighted average maturity, average delinquency rates, geographic region, debt service coverage ratios and issuance-specific information including, but not limited to: collateral type, payment terms of the underlying assets, payment priority within the tranche, structure of the security, deal performance and vintage of loans.

When observable inputs are not available, the market standard valuation techniques for determining the estimated fair value of certain types of securities that trade infrequently, and therefore have little or no price transparency, rely on inputs that are significant to the estimated fair value that are not observable in the market or cannot be derived principally from or corroborated by observable market data, such as market illiquidity. Other significant unobservable inputs used in the fair value measurement of the Company's private debt investments include a multiple of earnings before interest, taxes, depreciation and amortization ("EBITDA"). These unobservable inputs can be based in large part on management judgment or estimation, and cannot be supported by reference to market activity. Even though unobservable, these inputs are based on assumptions deemed appropriate given the circumstances and are believed to be consistent with what other market participants would use when pricing such securities.

Embedded Derivatives – The fair value of embedded derivative liabilities, including those calculated by third parties, are monitored through the use of attribution reports to quantify the effect of underlying sources of fair value change, including capital market inputs based on policyholder account values, interest rates and short-term and long-term implied volatilities, from period to period. Actuarial assumptions are based on experience studies performed internally in combination with available industry information and are reviewed on a periodic basis, at least annually.

For embedded derivative liabilities associated with the underlying products in reinsurance treaties, primarily equity-indexed and variable annuity treaties, the Company utilizes a discounted cash flow model, which includes an estimate of future equity option purchases and an adjustment for a CVA. The variable annuity embedded derivative calculations are performed by third parties based on methodology and input assumptions provided by the Company. To validate the reasonableness of the resulting fair value, the Company's internal actuaries perform reviews and analytical procedures on the results. The capital market inputs to the model, such as equity indexes, short-term equity volatility and interest rates, are generally observable. The valuation also requires certain significant inputs, which are generally not observable and accordingly, the valuation is considered Level 3 in the fair value hierarchy.

The fair value of embedded derivatives associated with funds withheld reinsurance treaties is determined based upon a total return swap technique with reference to the fair value of the investments held by the ceding company that support the Company's funds withheld at interest asset with an adjustment for a CVA. The fair value of the underlying assets is generally based on market observable inputs using industry standard valuation techniques. The valuation also requires certain significant inputs, which are generally not observable and accordingly, the valuation is considered Level 3 in the fair value hierarchy.

Equity Securities – Equity securities consist principally of exchange-traded funds and common and preferred stock of publicly and privately traded companies. The fair values of publicly traded equity securities are primarily based on quoted market prices in active markets and are classified within Level 1 in the fair value hierarchy. Non-binding broker quotes and internally developed evaluations for equity securities are generally based on significant unobservable inputs and are reflected as Level 3 in the fair value hierarchy.

Credit Valuation Adjustment – The Company uses a structural default risk model to estimate a CVA. The input assumptions are a combination of externally derived and published values (default threshold and uncertainty), market inputs (interest rate, equity price per share, debt per share, equity price volatility) and insurance industry data (Loss Given Default), adjusted for market recoverability.

Cash Equivalents and Short-Term Investments – Cash equivalents and short-term investments include money market instruments, commercial paper and other highly liquid debt instruments. Money market instruments are generally valued using unadjusted quoted prices in active markets that are accessible for identical assets and are primarily classified as Level 1. The fair value of certain other cash equivalents and short-term investments, such as bonds with original maturities twelve months or less, are based upon other market observable data and are typically classified as Level 2. However, certain short-term investments may incorporate significant unobservable inputs resulting in a Level 3 classification. Various time deposits, certificates of deposit and sweeps carried as cash equivalents or short-term investments are not measured at estimated fair value and therefore are excluded from the tables presented.

FVO Contractholder-Directed Unit-Linked Investments – FVO contractholder-directed investments supporting unit-linked variable annuity type liabilities primarily consist of exchange-traded funds and, to a lesser extent, fixed maturity securities and cash and cash equivalents. The fair values of the exchange-traded securities are primarily based on quoted market prices in active markets and are classified within Level 1 of the hierarchy. The fair value of the fixed maturity contractholder-directed securities is determined on a basis consistent with the methodologies described above for fixed maturity securities and are classified within Level 2 of the hierarchy.

Derivative Assets and Derivative Liabilities – All of the derivative instruments utilized by the Company, except for longevity and mortality swaps, are classified within Level 2 on the fair value hierarchy. These derivatives are principally valued using an income approach. Valuations of interest rate contracts are based on present value techniques, which utilize significant inputs that may include the swap yield curve, London Interbank Offered Rate ("LIBOR") basis curves, and repurchase rates. Valuations of foreign currency contracts are based on present value techniques, which utilize significant inputs that may include the swap yield curve, LIBOR basis curves, currency spot rates, and cross currency basis curves. Valuations of credit contracts, are based on present value techniques, which utilize significant inputs that may include the swap yield curve, credit curves, and recovery rates. Valuations of equity market contracts, are based on present value techniques, which utilize significant inputs that may include the swap yield curve, spot equity index levels, and dividend yield curves. Valuations of equity market contracts, option-based, are based on option pricing models, which utilize significant inputs that may include the swap yield curve, spot equity index levels, dividend yield curves, and equity volatility.

Longevity and Mortality Swaps – The Company utilizes a discounted cash flow model to estimate the fair value of longevity and mortality swaps. The fair value of these swaps includes an accrual for premiums payable and receivable. Some inputs to the valuation model are generally observable, such as interest rates and actual population mortality experience. The valuation also requires significant inputs that are generally not observable and, accordingly, the valuation is considered Level 3 in the fair value hierarchy.

Transfers between Levels 1 and 2

Transfers between Levels 1 and 2 are made to reflect changes in observability of inputs and market activity. The Company recognizes transfers of assets and liabilities into and out of levels within the fair value hierarchy at the beginning of the quarter in which the actual event or change in circumstances that caused the transfer occurs. There were no transfers between Level 1 and Level 2 for the year ended December 31, 2018. The following table presents the transfers between Level 1 and Level 2 during the year ended December 31, 2017 (dollars in thousands):

	2017	
	Transfers from Level 1 to Level 2	Transfers from Level 2 to Level 1
Fixed maturity securities - available-for-sale:		
Corporate	\$ 596,809	\$ 88,674
Other foreign government	317,640	—

Quantitative Information Regarding Internally-Priced Assets and Liabilities

The following table presents quantitative information about significant unobservable inputs used in Level 3 fair value measurements that are developed internally by the Company as of December 31, 2018 and 2017 (dollars in thousands):

	Fair Value		Valuation Technique	Unobservable Input	Range (Weighted Average)	
	2018	2017			2018	2017
Assets:						
Corporate	\$ 642,647	\$ 173,579	Market comparable securities	Liquidity premium	0-5% (1%)	0-2% (1%)
				EBITDA Multiple	5.9x-7.5x (6.5x)	—
ABS	77,842	—	Market comparable securities	Liquidity premium	0-1% (1%)	—
U.S. government	18,025	22,511	Market comparable securities	Liquidity premium	0-1% (1%)	0-1% (1%)
State and political subdivisions	—	4,616	Market comparable securities	Liquidity premium	—	1%
Other foreign government	5,006	—	Market comparable securities	Liquidity premium	1%	—
Equity securities	25,007	—	Market comparable securities	Liquidity premium	4%	—
				EBITDA Multiple	6.9x-12.3x (7.9x)	—
Funds withheld at interest-embedded derivatives	109,597	122,194	Total return swap	Mortality	0-100% (2%)	0-100% (2%)
				Lapse	0-35% (10%)	0-35% (9%)
				Withdrawal	0-5% (3%)	0-5% (3%)
				CVA	0-5% (1%)	0-5% (1%)
				Crediting rate	2-4% (2%)	2-4% (2%)
Longevity swaps	47,789	40,659	Discounted cash flow	Mortality	0-100% (2%)	0-100% (2%)
				Mortality improvement	(10%)-10% (3%)	(10%)-10% (3%)
Liabilities:						
Interest-sensitive contract liabilities- embedded derivatives- indexed annuities	776,940	861,758	Discounted cash flow	Mortality	0-100% (2%)	0-100% (2%)
				Lapse	0-35% (10%)	0-35% (9%)
				Withdrawal	0-5% (3%)	0-5% (3%)
				Option budget projection	2-4% (2%)	2-4% (2%)
Interest-sensitive contract liabilities- embedded derivatives- variable annuities	167,925	152,470	Discounted cash flow	Mortality	0-100% (1%)	0-100% (1%)
				Lapse	0-25% (5%)	0-25% (5%)
				Withdrawal	0-7% (5%)	0-7% (3%)
				CVA	0-5% (1%)	0-5% (1%)
				Long-term volatility	0-27% (13%)	0-27% (8%)
Mortality swaps	369	1,683	Discounted cash flow	Mortality	0-100% (1%)	0-100% (1%)

Valuation Process for Fair Value Measurements Categorized within Level 3

As of December 31, 2018 and 2017, respectively, the Company classified approximately 5.0% and 5.9% of its fixed maturity securities in the Level 3 category. These securities primarily consist of private placement corporate securities, bank loans and Canadian provincial strips with inactive trading markets.

The significant unobservable inputs used in the fair value measurement of the Company's corporate, sovereign, government-backed, other political subdivision and equity security investments include probability of default, liquidity premium and subordination premium. Significant increases (decreases) in any of those inputs in isolation would result in a significantly lower (higher) fair value measurement. Generally, a change in the assumption used for the probability of default is accompanied by a directionally similar change in the assumptions used for the liquidity premium and subordination premium. For securities with a fair value derived using the market comparable pricing valuation technique, liquidity premium is the only significant unobservable input.

Other significant unobservable inputs used in the fair value measurement of the Company's private debt and equity investments include a multiple of earnings before interest, taxes, depreciation and amortization ("EBITDA"). An increase (decrease) in the EBITDA multiple would result in a higher (lower) fair value measurement.

The significant unobservable inputs used in the fair value measurement of the Company's asset and mortgage-backed securities are prepayment rates, probability of default, liquidity premium and loss severity in the event of default. Significant increases (decreases) in any of those inputs in isolation would result in a significantly lower (higher) fair value measurement. Generally, a change in the assumption used for the probability of default is accompanied by a directionally similar change in the assumption used for the liquidity premium and loss severity and a directionally opposite change in the assumption used for prepayment rates.

The actuarial assumptions used in the fair value of embedded derivatives, which include assumptions related to lapses, withdrawals, and mortality, are based on experience studies performed by the Company in combination with available industry information and are reviewed on a periodic basis, at least annually. The significant unobservable inputs used in the fair value measurement of embedded derivatives are assumptions associated with policyholder experience and selected capital market assumptions for equity-indexed and variable annuities. The selected capital market assumptions, which include long-term implied volatilities, are projections based on short-term historical information. Changes in interest rates, equity indices, equity volatility, CVA, and actuarial assumptions regarding policyholder experience may result in significant fluctuations in the value of embedded derivatives.

Fair value measurements associated with funds withheld reinsurance treaties are generally not materially sensitive to changes in unobservable inputs associated with policyholder experience. The primary drivers of change in these fair values are related to movements of credit spreads, which are generally observable. Increases (decreases) in market credit spreads tend to decrease (increase) the fair value of embedded derivatives. Increases (decreases) in the CVA assumption tend to decrease (increase) the magnitude of the fair value of embedded derivatives.

Fair value measurements associated with variable annuity treaties are sensitive to both capital markets inputs and policyholder experience inputs. Increases (decreases) in lapse rates tend to decrease (increase) the value of the embedded derivatives associated with variable annuity treaties. Increases (decreases) in the long-term volatility assumption tend to increase (decrease) the fair value of embedded derivatives. Increases (decreases) in the CVA assumption tend to decrease (increase) the magnitude of the fair value of embedded derivatives.

The actuarial assumptions used in the fair value of longevity and mortality swaps include assumptions related to the level and volatility of mortality. The assumptions are based on studies performed by the Company in combination with available industry information and are reviewed on a periodic basis, at least annually.

Changes in Level 3 Assets and Liabilities

Assets and liabilities transferred into Level 3 are due to a lack of observable market transactions and price information. Assets and liabilities are transferred out of Level 3 when circumstances change such that significant inputs can be corroborated with market observable data. This may be due to a significant increase in market activity for the asset or liability, a specific event, or one or more significant input(s) becoming observable. Transfers out of Level 3 were primarily the result of the Company obtaining observable pricing information or a third party pricing quotation that appropriately reflects the fair value of those assets and liabilities. The Company also transferred equity securities with a fair value of approximately \$38.9 million into Level 3 as a result of the adoption of the new accounting guidance for the recognition and measurement of equity securities.

The reconciliations for all assets and liabilities measured at fair value on a recurring basis using significant unobservable inputs (Level 3) are as follows (dollars in thousands):

For the year ended December 31, 2018:

	Fixed maturity securities - available-for-sale			
	Corporate	Canadian government	RMBS	ABS
Fair value, beginning of period	\$ 1,337,272	\$ 593,942	\$ 107,882	\$ 123,474
Total gains/losses (realized/unrealized)				
Included in earnings, net:				
Investment income, net of related expenses	(1,045)	13,965	(129)	224
Investment related gains (losses), net	(4,651)	—	312	1,910
Included in other comprehensive income	(32,983)	(79,783)	(1,786)	(1,344)
Purchases ⁽¹⁾	509,134	—	52,279	42,120
Sales ⁽¹⁾	(106,005)	—	(4,961)	(462)
Settlements ⁽¹⁾	(273,898)	—	(4,633)	(57,476)
Transfers into Level 3	9,948	—	3,031	73,289
Transfers out of Level 3	(106,847)	—	(145,140)	(86,163)
Fair value, end of period	\$ 1,330,925	\$ 528,124	\$ 6,855	\$ 95,572
Unrealized gains and losses recorded in earnings for the period relating to those Level 3 assets and liabilities that were still held at the end of the period				
Included in earnings, net:				
Investment income, net of related expenses	\$ (998)	\$ 13,965	\$ 3	\$ 209
Investment related gains (losses), net	(6,320)	—	—	—

For the year ended December 31, 2018 (continued):

	Fixed maturity securities - available-for-sale			
	CMBS	U.S. government	State and political subdivisions	Other foreign government
Fair value, beginning of period	\$ 3,234	\$ 22,511	\$ 41,203	\$ 5,092
Total gains/losses (realized/unrealized)				
Included in earnings, net:				
Investment income, net of related expenses	—	(423)	9	—
Investment related gains (losses), net	1	(208)	—	—
Included in other comprehensive income	(65)	(436)	66	(86)
Purchases ⁽¹⁾	—	418	—	—
Sales ⁽¹⁾	(1,751)	—	—	—
Settlements ⁽¹⁾	(5)	(3,837)	(494)	—
Transfers into Level 3	1,752	—	9,859	—
Transfers out of Level 3	(3,144)	—	(40,441)	—
Fair value, end of period	\$ 22	\$ 18,025	\$ 10,202	\$ 5,006
Unrealized gains and losses recorded in earnings for the period relating to those Level 3 assets and liabilities that were still held at the end of the period				
Included in earnings, net:				
Investment income, net of related expenses	\$ —	\$ (417)	\$ 8	\$ —

For the year ended December 31, 2018 (continued):

	Equity securities	Funds withheld at interest-embedded derivatives	Short-term investments	Other assets - longevity swaps	Interest-sensitive contract liabilities embedded derivatives	Other liabilities - mortality swaps
Fair value, beginning of period	\$ —	\$ 122,194	\$ 3,096	\$ 40,659	\$ (1,014,228)	\$ (1,683)
Total gains/losses (realized/unrealized)						
Included in earnings, net:						
Investment related gains (losses), net	(12,600)	(12,597)	—	—	(15,455)	—
Interest credited	—	—	—	—	27,590	—
Included in other comprehensive income	—	—	1	(2,085)	—	—
Other revenues	—	—	—	9,215	—	(386)
Purchases ⁽¹⁾	13,962	—	2,624	—	(19,182)	—
Sales ⁽¹⁾	(6,759)	—	(250)	—	—	—
Settlements ⁽¹⁾	(48)	—	(461)	—	76,410	1,700
Transfers into Level 3	38,905	—	—	—	—	—
Transfers out of Level 3	—	—	(2,782)	—	—	—
Fair value, end of period	<u>\$ 33,460</u>	<u>\$ 109,597</u>	<u>\$ 2,228</u>	<u>\$ 47,789</u>	<u>\$ (944,865)</u>	<u>\$ (369)</u>
Unrealized gains and losses recorded in earnings for the period relating to those Level 3 assets and liabilities that were still held at the end of the period						
Included in earnings, net:						
Investment related gains (losses), net	\$ (15,992)	\$ (12,597)	\$ —	\$ —	\$ (22,393)	\$ —
Other revenues	—	—	—	9,215	—	(386)
Interest credited	—	—	—	—	(48,819)	—

For the year ended December 31, 2017:

	Fixed maturity securities - available-for-sale			
	Corporate	Canadian government	RMBS	ABS
Fair value, beginning of period	\$ 1,272,253	\$ 475,965	\$ 160,291	\$ 219,280
Total gains/losses (realized/unrealized)				
Included in earnings, net:				
Investment income, net of related expenses		(1,429)	13,180	(346)
Investment related gains (losses), net		4,991	—	729
Included in other comprehensive income		(6,719)	104,797	2,341
Purchases ⁽¹⁾		408,995	—	76,792
Sales ⁽¹⁾		(89,248)	—	(28,043)
Settlements ⁽¹⁾		(285,958)	—	(18,988)
Transfers into Level 3		47,360	—	9,100
Transfers out of Level 3		(12,973)	—	(93,994)
Fair value, end of period	<u>\$ 1,337,272</u>	<u>\$ 593,942</u>	<u>\$ 107,882</u>	<u>\$ 123,474</u>
Unrealized gains and losses recorded in earnings for the period relating to those Level 3 assets and liabilities that were still held at the end of the period				
Included in earnings, net:				
Investment income, net of related expenses	\$	(1,457)	\$ 13,180	\$ (196)
Investment related gains (losses), net		(5,389)	—	(346)

For the year ended December 31, 2017 (continued):

	Fixed maturity securities - available-for-sale			
	CMBS	U.S. government	State and political subdivisions	Other foreign government
Fair value, beginning of period	\$ 21,145	\$ 24,488	\$ 41,666	\$ 12,869
Total gains/losses (realized/unrealized)				
Included in earnings, net:				
Investment income, net of related expenses	709	(461)	(55)	(1)
Investment related gains (losses), net	(595)	—	—	—
Included in other comprehensive income	(71)	19	(15)	(252)
Purchases ⁽¹⁾	—	465	—	496
Sales ⁽¹⁾	(3,720)	—	—	—
Settlements ⁽¹⁾	(5,404)	(2,000)	(843)	(672)
Transfers into Level 3	1,302	—	7,294	—
Transfers out of Level 3	(10,132)	—	(6,844)	(7,348)
Fair value, end of period	\$ 3,234	\$ 22,511	\$ 41,203	\$ 5,092
Unrealized gains and losses recorded in earnings for the period relating to those Level 3 assets and liabilities that were still held at the end of the period				
Included in earnings, net:				
Investment income, net of related expenses	\$ —	\$ (461)	\$ (54)	\$ (1)

For the year ended December 31, 2017 (continued):

	Short-term investments	Funds withheld at interest-embedded derivatives	Other assets - longevity swaps	Interest-sensitive contract liabilities embedded derivatives	Other liabilities - mortality swaps
Fair value, beginning of period	\$ 3,346	\$ (22,529)	\$ 26,958	\$ (990,308)	\$ (2,462)
Total gains/losses (realized/unrealized)					
Included in earnings, net:					
Investment related gains (losses), net	—	144,723	—	32,166	—
Interest credited	—	—	—	(80,062)	—
Included in other comprehensive income	11	—	4,343	—	—
Other revenues	—	—	9,358	—	(921)
Purchases ⁽¹⁾	3,703	—	—	(55,237)	—
Settlements ⁽¹⁾	(335)	—	—	79,213	1,700
Transfers out of Level 3	(3,629)	—	—	—	—
Fair value, end of period	\$ 3,096	\$ 122,194	\$ 40,659	\$ (1,014,228)	\$ (1,683)
Unrealized gains and losses recorded in earnings for the period relating to those Level 3 assets and liabilities that were still held at the end of the period					
Included in earnings, net:					
Investment related gains (losses), net	\$ —	\$ 144,723	\$ —	\$ 23,472	\$ —
Other revenues	—	—	9,358	—	(921)
Interest credited	—	—	—	(159,276)	—

For the year ended December 31, 2016:

Fixed maturity securities - available-for-sale				
	Corporate	Canadian government	RMBS	ABS
Fair value, beginning of period	\$ 1,226,970	\$ 416,076	\$ 330,649	\$ 303,836
Total gains/losses (realized/unrealized)				
Included in earnings, net:				
Investment income, net of related expenses	(2,399)	12,197	(595)	801
Investment related gains (losses), net	(4,756)	—	(2,153)	1,101
Included in other comprehensive income	10,022	47,692	(1,621)	(2,696)
Purchases ⁽¹⁾	312,720	—	103,553	138,522
Sales ⁽¹⁾	(60,399)	—	(167,684)	(38,681)
Settlements ⁽¹⁾	(195,016)	—	(38,495)	(61,770)
Transfers into Level 3	14,098	—	1,728	56,105
Transfers out of Level 3	(28,987)	—	(65,091)	(177,938)
Fair value, end of period	\$ 1,272,253	\$ 475,965	\$ 160,291	\$ 219,280
Unrealized gains and losses recorded in earnings for the period relating to those Level 3 assets and liabilities that were still held at the end of the period				
Included in earnings, net:				
Investment income, net of related expenses	\$ (2,343)	\$ 12,197	\$ (158)	\$ 734
Investment related gains (losses), net	(817)	—	(231)	—

For the year ended December 31, 2016 (continued):

Fixed maturity securities - available-for-sale				
	CMBS	U.S. government	State and political subdivisions	Other foreign government
Fair value, beginning of period	\$ 68,563	\$ 26,265	\$ 38,342	\$ 14,065
Total gains/losses (realized/unrealized)				
Included in earnings, net:				
Investment income, net of related expenses	1,677	(487)	215	—
Investment related gains (losses), net	(876)	—	—	—
Included in other comprehensive income	(5,887)	39	962	110
Purchases ⁽¹⁾	1,545	508	6,952	—
Sales ⁽¹⁾	(41,143)	—	—	—
Settlements ⁽¹⁾	(552)	(1,837)	(599)	(1,306)
Transfers into Level 3	—	—	—	—
Transfers out of Level 3	(2,182)	—	(4,206)	—
Fair value, end of period	\$ 21,145	\$ 24,488	\$ 41,666	\$ 12,869
Unrealized gains and losses recorded in earnings for the period relating to those Level 3 assets and liabilities that were still held at the end of the period				
Included in earnings, net:				
Investment income, net of related expenses	\$ 1,552	\$ (487)	\$ 215	\$ —

For the year ended December 31, 2016 (continued):

	Short-term investments	Funds withheld at interest- embedded derivatives	Other assets - longevity swaps	Interest- sensitive contract liabilities embedded derivatives	Other liabilities - mortality swaps
Fair value, beginning of period	\$ —	\$ (76,698)	\$ 14,996	\$ (1,070,584)	\$ (2,619)
Total gains/losses (realized/unrealized)					
Included in earnings, net:					
Investment related gains (losses), net	—	54,169	—	7,834	—
Interest credited	—	—	—	10,709	—
Included in other comprehensive income	—	—	(1,133)	—	—
Other revenues	—	—	13,095	—	(172)
Purchases ⁽¹⁾	3,365	—	—	(12,725)	—
Settlements ⁽¹⁾	(19)	—	—	74,458	329
Fair value, end of period	\$ 3,346	\$ (22,529)	\$ 26,958	\$ (990,308)	\$ (2,462)

Unrealized gains and losses recorded in earnings for the period relating to those Level 3 assets and liabilities that were still held at the end of the period

 Included in earnings, net:

Investment related gains (losses), net	\$ —	\$ 54,169	\$ —	\$ (4,579)	\$ —
Other revenues	—	—	13,095	—	(172)
Interest credited	—	—	—	(63,748)	—

- (1) The amount reported within purchases, sales and settlements is the purchase price (for purchases) and the sales/settlement proceeds (for sales and settlements) based upon the actual date purchased or sold/settled. Items purchased and sold/settled in the same period are excluded from the rollforward. The Company had no issuances during the period.

Nonrecurring Fair Value Measurements

The following table presents information for financial instruments measured at an estimated fair value on a nonrecurring basis during the periods presented and still held at the reporting date (for example, when there is evidence of impairment). The estimated fair values for these financial instruments were determined using significant unobservable inputs (Level 3).

(dollars in thousands)	Carrying Value After Measurement		Net Investment Gains (Losses)	
	At December 31,		Years ended December 31,	
	2018	2017	2018	2017
Limited partnership interests ⁽¹⁾	\$ 4,596	\$ 4,656	\$ (3,200)	\$ (7,204)
Private equities ⁽²⁾	—	106	—	(531)

- (1) The impaired limited partnership interests presented above were accounted for using the cost method. Impairments on these cost method investments were recognized at estimated fair value determined using the net asset values of the Company's ownership interest as provided in the financial statements of the investees. The market for these investments has limited activity and price transparency.
- (2) The fair value of the Company's private equity investments is based on external valuation models.

Fair Value of Financial Instruments

The Company is required by general accounting principles for *Fair Value Measurements and Disclosures* to disclose the fair value of certain financial instruments including those that are not carried at fair value. The following table presents the carrying amounts and estimated fair values of the Company's financial instruments, which were not measured at fair value on a recurring basis, as of December 31, 2018 and 2017 (dollars in thousands). This table excludes any payables or receivables for collateral under repurchase agreements and other transactions. The estimated fair value of the excluded amount approximates carrying value as they equal the amount of cash collateral received/paid.

December 31, 2018:	Carrying Value ⁽¹⁾	Estimated Fair Value	Fair Value Measurement Using:				
			Level 1	Level 2	Level 3	NAV	
Assets:							
Mortgage loans on real estate	\$ 4,966,298	\$ 4,917,416	\$ —	\$ —	\$ 4,917,416	\$ —	
Policy loans	1,344,980	1,344,980	—	1,344,980	—	—	
Funds withheld at interest	5,655,055	5,802,518	—	—	5,802,518	—	
Cash and cash equivalents	1,404,566	1,404,566	1,404,566	—	—	—	
Short-term investments	36,607	36,607	36,607	—	—	—	
Other invested assets	945,731	941,449	4,640	83,203	477,214	376,392	
Accrued investment income	427,893	427,893	—	427,893	—	—	
Liabilities:							
Interest-sensitive contract liabilities	\$ 14,547,436	\$ 14,611,011	\$ —	\$ —	\$ 14,611,011	\$ —	
Long-term debt	2,787,873	2,752,047	—	—	2,752,047	—	
Collateral finance and securitization notes	681,961	626,731	—	—	626,731	—	
December 31, 2017:							
Assets:							
Mortgage loans on real estate	\$ 4,400,533	\$ 4,477,654	\$ —	\$ —	\$ 4,477,654	\$ —	
Policy loans	1,357,624	1,357,624	—	1,357,624	—	—	
Funds withheld at interest	5,955,092	6,275,623	—	—	6,275,623	—	
Cash and cash equivalents	946,736	946,736	946,736	—	—	—	
Short-term investments	42,558	42,558	42,558	—	—	—	
Other invested assets	690,198	718,282	28,540	67,778	286,839	335,125	
Accrued investment income	392,721	392,721	—	392,721	—	—	
Liabilities:							
Interest-sensitive contract liabilities	\$ 12,683,872	\$ 12,917,243	\$ —	\$ —	\$ 12,917,243	\$ —	
Long-term debt	2,788,365	2,959,912	—	—	2,959,912	—	
Collateral finance and securitization notes	783,938	722,145	—	—	722,145	—	

(1) Carrying values presented herein may differ from those in the Company's consolidated balance sheets because certain items within the respective financial statement captions may be measured at fair value on a recurring basis.

Mortgage Loans on Real Estate – The fair value of mortgage loans on real estate is estimated by discounting cash flows, both principal and interest, using current interest rates for mortgage loans with similar credit ratings and similar remaining maturities. As such, inputs include current treasury yields and spreads, which are based on the credit rating and average life of the loan, corresponding to the market spreads. The valuation of mortgage loans on real estate is considered Level 3 in the fair value hierarchy.

Policy Loans – Policy loans typically carry an interest rate that is adjusted annually based on an observable market index and therefore carrying value approximates fair value. The valuation of policy loans is considered Level 2 in the fair value hierarchy.

Funds Withheld at Interest – The carrying value of funds withheld at interest approximates fair value except where the funds withheld are specifically identified in the agreement. When funds withheld are specifically identified in the agreement, the fair value is based on the fair value of the underlying assets that are held by the ceding company. Ceding companies use a variety of sources and pricing methodologies, which are not transparent to the Company and may include significant unobservable inputs, to value the securities that are held in distinct portfolios, therefore the valuation of these funds withheld assets are considered Level 3 in the fair value hierarchy.

Cash and Cash Equivalents and Short-term Investments – The carrying values of cash and cash equivalents and short-term investments approximates fair values due to the short-term maturities of these instruments and are considered Level 1 in the fair value hierarchy.

Other Invested Assets – This primarily includes limited partnership interests accounted for using the cost method, FHLB common stock, cash collateral and equity release mortgages. The fair value of limited partnership interests and other investments accounted for using the cost method is determined using the NAV of the Company's ownership interest as provided in the financial statements of the investees. The fair value of the Company's common stock investment in the FHLB is considered to be the carrying value and it is considered Level 2 in the fair value hierarchy. The fair value of the Company's cash collateral is considered to be the carrying value and considered to be Level 1 in the fair value hierarchy. The fair value of the Company's equity release mortgage loan portfolio, considered Level 3 in the fair value hierarchy, is estimated by discounting cash flows, both principal and interest, using a risk-free rate plus an illiquidity premium. The cash flow analysis considers future expenses, changes in property prices, and actuarial analysis of borrower behavior, mortality and morbidity.

Accrued Investment Income – The carrying value for accrued investment income approximates fair value as there are no adjustments made to the carrying value. This is considered Level 2 in the fair value hierarchy.

Interest-Sensitive Contract Liabilities – The carrying and fair values of interest-sensitive contract liabilities reflected in the table above exclude contracts with significant mortality risk. The fair value of the Company's interest-sensitive contract liabilities utilizes a market standard technique with both capital market inputs and policyholder behavior assumptions, as well as cash values adjusted for recapture fees. The capital market inputs to the model, such as interest rates, are generally observable. Policyholder behavior assumptions are generally not observable and may require use of significant management judgment. The valuation of interest-sensitive contract liabilities is considered Level 3 in the fair value hierarchy.

Long-term Debt/Collateral Finance and Securitization Notes – The fair value of the Company's long-term debt, and collateral finance and securitization notes is generally estimated by discounting future cash flows using market rates currently available for debt with similar remaining maturities and reflecting the credit risk of the Company, including inputs when available, from actively traded debt of the Company or other companies with similar credit quality. The valuation of long-term debt, and collateral finance and securitization notes is generally obtained from brokers and is considered Level 3 in the fair value hierarchy.

Note 7 REINSURANCE

In the normal course of business, the Company seeks to limit its exposure to loss on any single insured and to recover a portion of benefits paid by ceding reinsurance to other insurance enterprises or reinsurers under excess coverage and coinsurance contracts. In the individual life markets, the Company retains a maximum of \$8.0 million of coverage per individual life. Claims in excess of this retention amount are retroceded to retrocessionaires; however, the Company remains fully liable to the ceding company for the entire amount of risk it assumes. In certain limited situations the Company has retained more than \$8.0 million per individual policy. The Company enters into agreements with other reinsurers to mitigate the residual risk related to the over-retained policies. Additionally, due to some lower face amount reinsurance coverage provided by the Company in addition to individual life, such as group life, disability and health, under certain circumstances, the Company could potentially incur net claims totaling more than \$8.0 million per individual life.

Retrocession reinsurance treaties do not relieve the Company from its obligations to direct writing companies. Failure of retrocessionaires to honor their obligations could result in losses to the Company. Consequently, allowances would be established for amounts deemed uncollectible. At December 31, 2018 and 2017, no allowances were deemed necessary. The Company regularly evaluates the financial condition of the insurance companies from which it assumes and to which it cedes reinsurance.

Retrocessions are arranged through the Company's retrocession pools for amounts in excess of the Company's retention limit. As of December 31, 2018 and 2017, all rated retrocession pool participants followed by the A.M. Best Company were rated "A-(excellent)" or better except one pool member that was rated "B+." The Company verifies retrocession pool participants' ratings on a quarterly basis. For a majority of the retrocessionaires that were not rated, security in the form of letters of credit or trust assets has been posted. In addition, the Company performs annual financial reviews of its retrocessionaires to evaluate financial stability and performance. In addition to its third party retrocessionaires, various RGA reinsurance subsidiaries retrocede amounts in excess of their retention to affiliated subsidiaries.

The following table presents information for the Company's ceded reinsurance receivable assets, including the respective amount and A.M. Best rating for each reinsurer representing in excess of five percent of the total as of December 31, 2018 or 2017 (dollars in thousands):

Reinsurer	A.M. Best Rating	2018		2017	
		Amount	% of Total	Amount	% of Total
Reinsurer A	A+	\$ 303,036	40.0%	\$ 301,478	38.6%
Reinsurer B	A+	193,324	25.5	203,898	26.1
Reinsurer C	A	69,885	9.2	67,723	8.7
Reinsurer D	A+	40,004	5.3	40,528	5.2
Reinsurer E	A++	36,600	4.8	40,592	5.2
Other reinsurers		114,723	15.2	127,808	16.2
Total		<u>\$ 757,572</u>	<u>100.0%</u>	<u>\$ 782,027</u>	<u>100.0%</u>

Included in the total ceded reinsurance receivables balance were \$242.8 million and \$243.8 million of claims recoverable, of which \$17.4 million and \$1.9 million were in excess of 90 days past due, as of December 31, 2018 and 2017, respectively.

The effect of reinsurance on net premiums is as follows (dollars in thousands):

Years ended December 31,	2018	2017	2016
Direct	\$ 62,526	\$ 61,571	\$ 57,562
Reinsurance assumed	11,341,284	10,642,462	10,049,587
Reinsurance ceded	(860,034)	(862,903)	(858,278)
Net premiums	<u>\$ 10,543,776</u>	<u>\$ 9,841,130</u>	<u>\$ 9,248,871</u>

The effect of reinsurance on claims and other policy benefits as follows (dollars in thousands):

Years ended December 31,	2018	2017	2016
Direct	\$ 107,405	\$ 104,447	\$ 105,435
Reinsurance assumed	9,997,173	9,281,590	8,621,647
Reinsurance ceded	(785,649)	(867,120)	(733,707)
Net claims and other policy benefits	<u>\$ 9,318,929</u>	<u>\$ 8,518,917</u>	<u>\$ 7,993,375</u>

The effect of reinsurance on life insurance in force is shown in the following schedule (dollars in millions):

	Direct	Assumed	Ceded	Net	Assumed/Net %
December 31, 2018	\$ 1,363	\$ 3,329,181	\$ 186,172	\$ 3,144,372	105.9%
December 31, 2017	1,462	3,297,275	205,529	3,093,208	106.6
December 31, 2016	1,576	3,062,525	214,727	2,849,374	107.5

At December 31, 2018 and 2017, respectively, the Company provided approximately \$18.1 billion and \$16.2 billion of financial reinsurance, as measured by pre-tax statutory surplus, risk based capital and other financial reinsurance structures, to other insurance companies under financial reinsurance transactions to assist ceding companies in meeting applicable regulatory requirements. Generally, such financial reinsurance is provided by the Company committing cash or assuming insurance liabilities, which are collateralized by future profits on the reinsured business. The Company earns a fee based on the amount of net outstanding financial reinsurance.

Reinsurance agreements, whether facultative or automatic, may provide for recapture rights on the part of the ceding company. Recapture rights permit the ceding company to reassume all or a portion of the risk formerly ceded to the reinsurer after an agreed-upon period of time, generally 10 years, or in some cases due to changes in the financial condition or ratings of the reinsurer. Recapture of business previously ceded does not affect premiums ceded prior to the recapture of such business, but would reduce premiums in subsequent periods. Additionally, some treaties give the ceding company the right to request the Company to place assets in trust for their benefit to support their reserve credits, in the event of a downgrade of the Company's ratings to specified levels, generally non-investment grade levels, or if minimum levels of financial condition are not maintained. As of December 31, 2018 and 2017, these treaties had approximately \$3,421.0 million and \$2,901.1 million, respectively, in statutory reserves. Assets placed in trust continue to be owned by the Company, but their use is restricted based on the terms of the trust agreement. Securities with an amortized cost of \$2,910.2 million and \$2,214.1 million were held in trust to satisfy collateral requirements for reinsurance business for the benefit of certain RGA subsidiaries at December 31, 2018 and 2017, respectively. In addition, the Company's collateral financing operations have asset in trust requirements. See Note 14 – "Collateral Finance and Securitization Notes" for additional information. Securities with an amortized cost of \$20,072.7 million and \$15,584.3 million, as of December 31, 2018 and 2017, respectively, were held in trust to satisfy collateral requirements under certain third-party reinsurance treaties. Under

certain conditions, RGA may be obligated to move reinsurance from one RGA subsidiary company to another or make payments under the treaty. These conditions include change in control or ratings of the subsidiary, insolvency, nonperformance under a treaty, or loss of reinsurance license of such subsidiary.

Note 8 DEFERRED POLICY ACQUISITION COSTS

The following reflects the amounts of policy acquisition costs deferred and amortized (dollars in thousands):

<u>Years ended December 31,</u>	2018	2017	2016
Balance, beginning of year	\$ 3,239,824	\$ 3,338,605	\$ 3,392,437
Capitalization	607,743	348,470	350,233
Amortization (including interest)	(437,696)	(432,474)	(341,115)
Change in value of embedded derivatives	14,658	(70,392)	(40,077)
Attributed to unrealized investment gains (losses)	26,608	(8,220)	(3,541)
Foreign currency translation	(53,367)	63,835	(19,332)
Balance, end of year	<u>\$ 3,397,770</u>	<u>\$ 3,239,824</u>	<u>\$ 3,338,605</u>

Some reinsurance agreements involve reimbursing the ceding company for allowances and commissions in excess of first-year premiums. These amounts represent acquisition costs and are capitalized to the extent deemed recoverable from the future premiums and amortized against future profits of the business. This type of agreement presents a risk to the extent that the business lapses faster than originally anticipated, resulting in future profits being insufficient to recover the Company's investment.

Note 9 INCOME TAX

The Tax Cuts and Jobs Act ("U.S. Tax Reform") was signed into law on December 22, 2017. U.S. Tax Reform made broad changes to the U.S. tax code, including (1) reducing the U.S. federal corporate tax rate from 35 percent to 21 percent; (2) imposed a one-time transition tax on certain unrepatriated earnings of foreign subsidiaries; (3) generally eliminated U.S. federal income taxes on dividends from foreign subsidiaries; (4) eliminated the corporate alternative minimum tax ("AMT") and changed how existing AMT credits can be realized; (5) created the base erosion anti-abuse tax ("BEAT"); (6) established a new provision designed to tax global intangible low-taxed income ("GILTI"), which allows for the possibility of using foreign tax credits and a deduction of up to 50% to offset the income tax liability (subject to some limitations); and (7) modified the rules related to uses and limitations of net operating loss carryforwards created in tax years beginning after December 31, 2017.

In connection with the Company's initial analysis of the impact of U.S. Tax Reform, it recorded a discrete provisional net tax benefit of \$1,033.8 million in the period ending December 31, 2017. This estimated net benefit primarily consisted of the U.S. federal rate reduction from 35% to 21% applied to the net deferred tax liability. The Company provisionally estimated there would be no one-time transition tax on unrepatriated earnings of foreign subsidiaries. Further, as a result of U.S. Tax Reform, the Company established a valuation allowance of \$58.9 million related to U.S. foreign tax credit carryforwards. The valuation allowance related to the Company's interpretation of the changes in the ability to use existing foreign tax credit carryforwards against future foreign branch profits.

The SEC issued Staff Accounting Bulletin 118 ("SAB 118"), which provides guidance on accounting for the tax effects of U.S. Tax Reform. SAB 118 provides a measurement period that should not extend beyond one year from U.S. Tax Reform enactment date for companies to complete the accounting under ASC 740. The Company completed its accounting for the effects of U.S. Tax Reform within the measurement period during the fourth quarter of 2018.

The Company's refinement of the provisional estimates for the impact of U.S. Tax Reform resulted in the aforementioned valuation allowance adjustment and other immaterial adjustments to the amounts originally estimated. Upon review of the Proposed Treasury Regulations issued during the year and completion of the accumulated and current earnings and profits calculations of the Company's foreign subsidiaries, no adjustment to the provisional estimate of the transition tax on unrepatriated earnings was necessary.

The valuation allowance established with U.S. Tax Reform was released in 2018. The Company recognized an uncertain tax position due to the expiration of the statute of limitations. Concurrent with this recognition of a prior year tax position, the Company established a new uncertain tax liability. The foreign tax credits were used to offset the new uncertain tax liability, hence a valuation allowance was no longer necessary.

Under GAAP, the Company is allowed to make an accounting policy choice of either (1) treating taxes due on future U.S. inclusions in taxable income related to the GILTI as a current-period expense when incurred ("the period cost method") or (2) factoring such amounts into a Company's measurement of its deferred taxes ("the deferred method"). The Company made a policy election to account for GILTI as a period cost.

For the year ended December 31, 2018, the Company is not subject to the BEAT. The Company continues to monitor guidance as it is issued; however, it does not expect changes in guidance to result in a BEAT liability.

The effective tax rate for 2018 was lower than the U.S. Statutory rate of 21.0% primarily as a result of the release of a valuation allowance on foreign tax credits, which partially offset tax expense related to GILTI and valuation allowance increases. The effective tax rate for 2017 was lower than the U.S. Statutory rate of 35% primarily as a result of accounting for the effects of U.S. Tax Reform and income generated in non-U.S. jurisdictions with lower tax rates than the U.S. See the table below for additional information.

Pre-tax income for the years ended December 31, 2018, 2017 and 2016 consists of the following (dollars in thousands):

	2018	2017	2016
Pre-tax income - U.S.	\$ 626,197	\$ 870,532	\$ 758,496
Pre-tax income - foreign	219,623	272,283	285,450
Total pre-tax income	<u>\$ 845,820</u>	<u>\$ 1,142,815</u>	<u>\$ 1,043,946</u>

The provision for income tax expense for the years ended December 31, 2018, 2017 and 2016 consists of the following (dollars in thousands):

	2018	2017	2016
Current income tax expense (benefit):			
U.S.	\$ 78,431	\$ 131,108	\$ 1,020
U.S. Tax Reform	(68,080)	—	—
Foreign	43,120	36,830	47,706
Total current	<u>53,471</u>	<u>167,938</u>	<u>48,726</u>
Deferred income tax expense (benefit):			
U.S.	62,890	159,853	273,928
U.S. Tax Reform	5,907	(1,033,755)	—
Foreign	7,710	26,598	19,849
Total deferred	<u>76,507</u>	<u>(847,304)</u>	<u>293,777</u>
Total provision for income taxes	<u>\$ 129,978</u>	<u>\$ (679,366)</u>	<u>\$ 342,503</u>

The Company's effective tax rate differed from the U.S. federal income tax statutory rate of 21%, 35%, and 35% as a result of the following for the years ended December 31, 2018, 2017 and 2016 (dollars in thousands):

	2018	2017	2016
Tax provision at U.S. statutory rate	\$ 177,622	\$ 399,985	\$ 365,381
Increase (decrease) in income taxes resulting from:			
U.S. Tax Reform	(62,173)	(1,033,755)	—
Foreign tax rate differing from U.S. tax rate	4,526	(21,867)	(13,974)
Differences in tax basis in foreign jurisdictions	(23,257)	(23,324)	(17,770)
Deferred tax valuation allowance	23,144	29,458	10,963
Amounts related to audit contingencies	1,516	(7,184)	111
Equity compensation excess benefit	(6,103)	(10,532)	—
Corporate rate changes	1,008	(6,065)	—
GILTI, net of credits	10,400	—	—
Subpart F for non-full inclusion companies	583	1,528	1,783
Foreign tax credits	(2,544)	(1,681)	(1,683)
Return to provision adjustments	(1,305)	(4,674)	(1,473)
Other, net	6,561	(1,255)	(835)
Total provision for income taxes	<u>\$ 129,978</u>	<u>\$ (679,366)</u>	<u>\$ 342,503</u>
Effective tax rate	<u>15.4%</u>	<u>(59.4)%</u>	<u>32.8%</u>

Total income taxes for the years ended December 31, 2018, 2017 and 2016 were as follows (dollars in thousands):

	2018	2017	2016
Provision for income taxes	\$ 129,978	\$ (679,366)	\$ 342,503
Income tax from OCI and additional paid-in-capital:			
Net unrealized holding gain (loss) on debt and equity securities recognized for financial reporting purposes	(367,933)	306,849	157,929
Exercise of stock options	—	—	(162)
Foreign currency translation	19,101	(42,153)	21,081
Unrealized pension and post retirement	134	404	1,772
Total income taxes provided	<u>\$ (218,720)</u>	<u>\$ (414,266)</u>	<u>\$ 523,123</u>

The tax effects of temporary differences that give rise to significant portions of the deferred income tax assets and liabilities at December 31, 2018 and 2017, are presented in the following tables (dollars in thousands):

	2018	2017
Deferred income tax assets:		
Nondeductible accruals	\$ 86,092	\$ 80,905
Differences between tax and financial reporting amounts concerning certain reinsurance transactions	102,014	96,043
Differences in the tax basis of cash and invested assets	28,398	557
Investment income differences	80,200	43,230
Deferred acquisition costs capitalized for tax	124,707	88,531
Net operating loss carryforward	405,958	535,374
Capital loss and tax credit carryforwards	32,897	102,143
Subtotal	<u>860,266</u>	<u>946,783</u>
Valuation allowance	<u>(181,110)</u>	<u>(226,884)</u>
Total deferred income tax assets	<u>679,156</u>	<u>719,899</u>
Deferred income tax liabilities:		
Deferred acquisition costs capitalized for financial reporting	843,328	627,378
Differences between tax and financial reporting amounts concerning certain reinsurance transactions	1,151,419	1,547,101
Differences in the tax basis of cash and invested assets	345,836	674,569
Investment income differences	9,493	1,858
Differences in foreign currency translation	52,928	33,803
Anticipated future tax credit reduction	25,433	—
Total deferred income tax liabilities	<u>2,428,437</u>	<u>2,884,709</u>
Net deferred income tax liabilities	<u>\$ 1,749,281</u>	<u>\$ 2,164,810</u>
Balance sheet presentation of net deferred income tax liabilities:		
Included in other assets	\$ 49,519	\$ 33,499
Included in deferred income taxes	1,798,800	2,198,309
Net deferred income tax liabilities	<u>\$ 1,749,281</u>	<u>\$ 2,164,810</u>

As of December 31, 2018, the valuation allowance against deferred tax assets was \$181.1 million. During 2018, a valuation allowance on the U.S. Foreign tax credit carryforwards of \$65.1 million was released. This release partially offset a \$24.5 million increase to the valuation allowance related to the net operating losses of RGA Reinsurance Company of Australia Limited (“RGA Australia”) and increases and decreases to the valuation allowance in jurisdictions where the Company does not have a history of earnings. Further movement in the valuation allowance includes foreign currency translation and reclassifications with other deferred tax assets of (\$12.8) million.

As of December 31, 2017, the valuation allowance against deferred tax assets was approximately \$226.9 million. During 2017 a valuation allowance was established on the U.S. Foreign tax credit carryforwards of \$65.1 million, RGA Australia net operating losses of \$20.1 million, as well as on the deferred tax assets of other jurisdictions of \$3.3 million. Further movement in the valuation allowance includes foreign currency translation and reclassifications with other deferred tax assets of \$10.6 million and (\$5.6) million, respectively. The other significant components of the valuation allowance relate to a partial valuation allowance on the net operating loss carryforwards in RGA Australia and the foreign tax credit carryforwards in RGA International Reinsurance Company dac (“RGA International”). A valuation allowance also exists against the deferred tax assets of other branches and legal entities most of which there is no history of earnings in recent years.

The earnings of substantially all of the Company’s foreign subsidiaries have been permanently reinvested in foreign operations. No provision has been made for U.S. tax or foreign withholding taxes that may be applicable upon any repatriation or sale. At December 31, 2018 and 2017, the financial reporting basis in excess of the tax basis for which no deferred taxes have been recognized was approximately \$1,364.1 million and \$1,442.9 million, respectively. As U.S. Tax Reform generally eliminates U.S. federal income taxes on dividends from foreign subsidiaries, the Company does not expect to incur material income taxes if these funds are repatriated.

During 2018, 2017 and 2016, the Company received federal and foreign income tax refunds of approximately \$2.4 million, \$11.6 million and \$6.9 million, respectively. The Company made cash income tax payments of approximately \$144.1 million, \$48.7 million and \$68.0 million in 2018, 2017 and 2016, respectively.

The following table presents consolidated net operating losses (“NOL”) as of December 31, 2018 (dollars in millions):

	2018
NOL with no expiration and with no valuation allowance	\$ 52
NOL with a full valuation allowance	167
NOL with no expiration and a partial valuation allowance	396
NOL with expiration dates between 2029 & 2035 with no valuation allowance	1,118
Total net operating loss carryforwards	<u>\$ 1,733</u>

These net operating losses, other than the net operating losses for which there is a valuation allowance, are expected to be utilized in the normal course of business during the period allowed for carryforwards and in any event, are not expected to be lost, due to the application of tax planning strategies that management would utilize.

As of December 31, 2018 the Company had foreign tax credit carryforwards of \$27.8 million in Ireland and as of December 31, 2017, the Company had \$152.0 million of foreign tax credit carryforwards in the U.S. and Ireland. The Ireland foreign tax credit carryforward has a full valuation allowance.

The Company files income tax returns in the U.S. federal jurisdiction and various state and foreign jurisdictions. The Company is under continuous examination by the Internal Revenue Service and is subject to audit by taxing authorities in other foreign jurisdictions in which the Company has significant business operations. The income tax years under examination vary by jurisdiction. The Company is no longer subject to U.S. federal income tax examinations by tax authorities for years prior to 2015, Canadian tax authorities for years prior to 2014 and with a few exceptions, the Company is no longer subject to state and foreign income tax examinations by tax authorities for years prior to 2013.

As of December 31, 2018, the Company’s total amount of unrecognized tax benefits was \$324.6 million and the total amount of unrecognized tax benefits that would affect the effective tax rate, if recognized, was \$12.8 million. Management believes there will be no material impact to the Company’s effective tax rate related to unrecognized tax benefits over the next 12 months.

A reconciliation of the beginning and ending amount of unrecognized tax benefits for the years ended December 31, 2018, 2017 and 2016, is as follows (dollars in thousands):

	Total Unrecognized Tax Benefits		
	2018	2017	2016
Beginning balance, January 1	\$ 321,224	\$ 297,290	\$ 296,213
Accounting for business combinations	521	—	—
Additions for tax positions of prior years	255,970	247,596	226,720
Reductions for tax positions of prior years	(256,587)	(246,894)	(229,719)
Additions for tax positions of current year	3,682	36,438	4,186
Payment on deposit	(185)	—	—
Settlements with tax authorities	—	(13,206)	(110)
Ending balance, December 31	<u>\$ 324,625</u>	<u>\$ 321,224</u>	<u>\$ 297,290</u>

The Company recognized a benefit in interest expense associated with uncertain tax positions in 2018, 2017 and 2016 of \$3.3 million, \$5.0 million and \$8.4 million, respectively. Additionally, the Company recognized penalties of \$0.3 million in 2016. As of December 31, 2018 and 2017, the Company had \$11.6 million and \$15.1 million, respectively, of accrued interest related to unrecognized tax benefits. There are no penalties accrued as of December 31, 2018 or December 31, 2017.

Note 10 EMPLOYEE BENEFIT PLANS

Certain subsidiaries of the Company are sponsors or administrators of both qualified and non-qualified defined benefit pension plans (“Pension Plans”). The largest of these plans is a non-contributory qualified defined benefit pension plan sponsored by RGA Reinsurance Company (“RGA Reinsurance”) that covers U.S. employees. The benefits under the Pension Plans are generally based on years of service and compensation levels.

The Company also provides select health care and life insurance benefits for certain retired employees. The health care benefits are provided through a self-insured welfare benefit plan. Employees become eligible for these benefits if they meet minimum age and service requirements. The retiree’s cost for health care benefits varies depending upon the credited years of service. Effective January 1, 2017, employees hired in the U. S. are not eligible for retiree health care benefits. The effect of the amendment was recorded in 2016 in AOCI and is being amortized through prior service cost. Virtually all retirees, or their beneficiaries, contribute

a portion of the total cost of postretirement health benefits. Prepaid benefit costs and accrued benefit liabilities are included in other assets and other liabilities, respectively, in the Company's consolidated balance sheets.

A December 31 measurement date is used for all of the defined benefit and postretirement plans. The status of these plans as of December 31, 2018 and 2017 is summarized below (dollars in thousands):

	December 31,			
	Pension Benefits		Other Benefits	
	2018	2017	2018	2017
Change in benefit obligation:				
Benefit obligation at beginning of year	\$ 172,143	\$ 161,955	\$ 70,198	\$ 60,524
Service cost	12,502	10,686	3,028	2,543
Interest Cost	5,405	5,326	2,319	2,118
Participant contributions	—	—	432	354
Amendments	—	159	—	—
Actuarial (gains) losses	(1,045)	11,336	(7,172)	5,510
Settlement (gains) losses	—	(438)	—	—
Settlements	—	(12,907)	—	—
Benefits paid	(7,801)	(5,974)	(1,409)	(851)
Foreign exchange translations and other adjustments	(2,600)	2,000	—	—
Benefit obligation at end of year	<u>\$ 178,604</u>	<u>\$ 172,143</u>	<u>\$ 67,396</u>	<u>\$ 70,198</u>

	December 31,			
	Pension Benefits		Other Benefits	
	2018	2017	2018	2017
Change in plan assets:				
Fair value of plan assets at beginning of year	\$ 103,236	\$ 84,770	\$ —	\$ —
Actual return on plan assets	(6,464)	14,481	—	—
Employer contributions	13,590	22,866	977	497
Participant contributions	—	—	432	354
Disbursement for settlements	—	(12,907)	—	—
Benefits paid and expenses	(7,801)	(5,974)	(1,409)	(851)
Fair value of plan assets at end of year	<u>\$ 102,561</u>	<u>\$ 103,236</u>	<u>\$ —</u>	<u>\$ —</u>
Funded status at end of year	<u>\$ (76,043)</u>	<u>\$ (68,907)</u>	<u>\$ (67,396)</u>	<u>\$ (70,198)</u>

	December 31,					
	Qualified Plans		Non-Qualified Plans ⁽¹⁾		Total	
	2018	2017	2018	2017	2018	2017
Aggregate fair value of plan assets	\$ 102,561	\$ 103,236	\$ —	\$ —	\$ 102,561	\$ 103,236
Aggregate projected benefit obligations	112,093	107,072	66,511	65,071	178,604	172,143
Under funded	<u>\$ (9,532)</u>	<u>\$ (3,836)</u>	<u>\$ (66,511)</u>	<u>\$ (65,071)</u>	<u>\$ (76,043)</u>	<u>\$ (68,907)</u>

(1) For non-qualified plans, there are no required funding levels.

	December 31,			
	Pension Benefits		Other Benefits	
	2018	2017	2018	2017
Amounts recognized in accumulated other comprehensive income:				
Net actuarial loss	\$ 48,744	\$ 40,058	\$ 25,923	\$ 35,672
Net prior service cost (credit)	436	804	(10,491)	(11,806)
Total	<u>\$ 49,180</u>	<u>\$ 40,862</u>	<u>\$ 15,432</u>	<u>\$ 23,866</u>

The following table presents information for qualified and non-qualified pension plans with a projected benefit obligation in excess of plan assets as of December 31, 2018 and 2017 (dollars in thousands):

	2018	2017
Projected benefit obligation	\$ 178,604	\$ 172,143
Fair value of plan assets	102,561	103,236

The following table presents information for pension plans with an accumulated benefit obligation in excess of plan assets as of December 31, 2018 and 2017 (dollars in thousands):

	2018	2017
Accumulated benefit obligation	\$ 174,400	\$ 169,705
Fair value of plan assets	102,561	103,236

The components of net periodic benefit cost, included in other operating expenses on the consolidated statements of income, and other changes in plan assets and benefit obligations recognized in other comprehensive income were as follows (dollars in thousands):

	Pension Benefits			Other Benefits		
	2018	2017	2016	2018	2017	2016
Net periodic benefit cost:						
Service cost	\$ 12,502	\$ 10,686	\$ 10,319	\$ 3,028	\$ 2,543	\$ 2,883
Interest cost	5,405	5,326	4,790	2,319	2,118	2,259
Expected return on plan assets	(7,535)	(6,215)	(5,138)	—	—	—
Amortization of net actuarial losses	3,728	4,382	4,323	2,577	1,992	1,827
Amortization of prior service cost (credit)	344	344	294	(1,315)	(1,315)	(622)
Settlements	—	4,785	1,026	—	—	—
Net periodic benefit cost	14,444	19,308	15,614	6,609	5,338	6,347
Other changes in plan assets and benefit obligations recognized in other comprehensive income:						
Net actuarial (gains) losses	12,954	2,633	8,785	(7,172)	5,507	6,228
Amortization of net actuarial (losses)	(3,728)	(4,382)	(4,323)	(2,577)	(1,992)	(1,827)
Amortization of prior service (cost) credit	(344)	(344)	(294)	1,315	1,315	622
Settlements	—	(4,785)	(1,026)	—	—	—
Prior service cost (credit)	—	159	—	—	—	(13,743)
Foreign exchange translations and other adjustments	(565)	759	707	—	—	—
Total recognized in other comprehensive income	8,317	(5,960)	3,849	(8,434)	4,830	(8,720)
Total recognized in net periodic benefit cost and other comprehensive income	\$ 22,761	\$ 13,348	\$ 19,463	\$ (1,825)	\$ 10,168	\$ (2,373)

During 2019, the Company expects to contribute \$16.3 million and \$1.5 million to the pension plans and other benefit plans, respectively.

The following benefit payments, which reflect expected future service as appropriate, are expected to be paid (dollars in thousands):

	Pension Benefits	Other Benefits
2019	\$ 9,977	\$ 1,528
2020	12,013	1,835
2021	11,663	2,209
2022	14,229	2,633
2023	14,128	3,009
2024-2028	77,832	20,359

Assumptions

Weighted average assumptions used to determine the accumulated benefit obligation and net benefit cost or income were as follows:

	Pension Benefits			Other Benefits		
	2018	2017	2016	2018	2017	2016
Discount rate used to determine benefit obligation	4.02%	3.40%	3.80%	4.17%	3.56%	4.10%
Discount rate used to determine net benefit cost or income	3.41%	3.81%	3.95%	3.56%	4.10%	4.43%
Expected long-term rate of return on plan assets	7.35%	7.35%	7.35%	—%	—%	—%
Rate of compensation increases	4.17%	4.16%	4.08%	—%	—%	—%

The expected rate of return on plan assets is based on anticipated performance of the various asset sectors in which the plan invests, weighted by target allocation percentages. Anticipated future performance is based on long-term historical returns of the plan assets by sector, adjusted for the long-term expectations on the performance of the markets. While the precise expected return derived using this approach may fluctuate from year to year, the policy is to hold this long-term assumption constant as long as it remains within reasonable tolerance from the derived rate. This process is consistent for all plan assets as all the assets are invested in mutual funds.

The assumed health care cost trend rates used in measuring the accumulated non-pension post-retirement benefit obligation were as follows:

	December 31,	
	2018	2017
Pre-Medicare eligible claims	8% down to 5% in 2024	9% down to 5% in 2024
Medicare eligible claims	8% down to 5% in 2024	9% down to 5% in 2024

Plan Assets

Target allocations of U.S. qualified pension plan assets are determined with the objective of maximizing returns and minimizing volatility of net assets through adequate asset diversification and partial liability immunization. Adjustments are made to target allocations based on the Company's assessment of the effect of economic factors and market conditions. The target allocations for plan assets are 60% equity securities and 40% debt securities as of December 31, 2018 and 2017. The Company's plan assets are primarily invested in mutual funds. The mutual funds include holdings of S&P 500 securities, large-cap securities, mid-cap securities, small-cap securities, international securities, corporate debt securities, U.S. and other government securities, mortgage-related securities and cash.

Equity and debt securities are exposed to various risks, such as interest rate risk, credit risk and overall market volatility. Due to the level of risk associated with certain investment securities, changes in the values of investment securities will occur and any change would affect the amounts reported in the financial statements.

The fair values of the Company's qualified pension plan assets as of December 31, 2018 and 2017 are summarized below (dollars in thousands):

	December 31, 2018			
	Fair Value Measurement Using:			
	Total	Level 1	Level 2	Level 3
Mutual Funds ⁽¹⁾	\$ 102,414	\$ 102,414	\$ —	\$ —
Cash	147	147	—	—
Total	\$ 102,561	\$ 102,561	\$ —	\$ —

(1) Mutual funds were invested 25% in U.S. equity funds, 42% in U.S. fixed income funds, 17% in non-U.S. equity funds and 16% in other.

	December 31, 2017			
	Fair Value Measurement Using:			
	Total	Level 1	Level 2	Level 3
Mutual Funds ⁽²⁾	\$ 103,106	\$ 103,106	\$ —	\$ —
Cash	130	130	—	—
Total	\$ 103,236	\$ 103,236	\$ —	\$ —

(2) Mutual funds were invested 27% in U.S. equity funds, 36% in U.S. fixed income funds, 22% in non-U.S. equity funds and 15% in other.

As of December 31, 2018 and 2017, the Company classified all of its qualified pension plan assets in the Level 1 category as quoted prices in active markets are available for these assets. See Note 6 – “Fair Value of Asset and Liabilities” for additional detail on the fair value hierarchy.

Savings and Investment Plans

Certain subsidiaries of RGA also sponsor savings and investment plans under which a portion of employee contributions are matched. Subsidiary contributions to these plans were \$15.3 million, \$14.2 million and \$9.9 million in 2018, 2017 and 2016, respectively.

Note 11 FINANCIAL CONDITION AND NET INCOME ON A STATUTORY BASIS – SIGNIFICANT SUBSIDIARIES

The domestic and foreign insurance subsidiaries of RGA prepare their statutory financial statements in conformity with statutory accounting practices prescribed or permitted by the applicable state insurance department or local regulatory authority, which vary materially from statements prepared in accordance with GAAP. Prescribed statutory accounting practices in the U.S. include publications of the National Association of Insurance Commissioners (“NAIC”), as well as state laws, local regulations and general administrative rules. The differences between statutory financial statements and financial statements prepared in accordance with GAAP vary between jurisdictions. The principal differences between GAAP and NAIC are that statutory financial statements do not reflect deferred policy acquisition costs and limit deferred tax assets, life benefit reserves predominately use interest rate and mortality assumptions prescribed by the NAIC and local regulatory agencies, bonds are generally carried at amortized cost and reinsurance assets and liabilities are presented net of reinsurance.

Statutory net income, and capital and surplus of the Company’s insurance subsidiaries, determined in accordance with statutory accounting practices prescribed by the applicable state insurance department or local regulatory authority are as follows (dollars in thousands):

	Statutory Capital & Surplus		Statutory Net Income (Loss)		
	2018	2017	2018	2017	2016
RGA Americas Reinsurance Company, Ltd.	\$ 4,298,368	\$ 4,833,890	\$ 208,999	\$ 624,145	\$ 282,226
RGA Reinsurance (U.S.)	2,078,654	1,584,007	659,941	138,359	148,576
Reinsurance Company of Missouri	2,053,379	1,557,453	(24,907)	(183,136)	272,038
RGA Reinsurance Company (Barbados) Ltd.	1,169,790	1,278,006	48,779	309,346	95,859
RGA Atlantic Reinsurance Company Ltd.	1,083,181	812,307	256,080	213,511	110,172
RGA Life Reinsurance Company of Canada	896,760	1,006,190	(37,922)	25,971	13,947
RGA Australia	433,406	476,528	(37,208)	78,497	(7,694)
Other insurance subsidiaries	2,572,307	2,694,317	345,249	65,658	130,289

Each U.S. domestic insurance subsidiary’s state of domicile imposes minimum risk-based capital (“RBC”) requirements that were developed by the NAIC. The formulas for determining the amount of RBC specify various weighting factors that are applied to financial balances or various levels of activity based on the perceived degree of risk. Regulatory compliance is determined by a ratio of total adjusted capital, as defined by the NAIC, to authorized control level RBC, as defined by the NAIC. Companies below specific trigger points or ratios are classified within certain levels, each of which requires specified corrective action. Each of RGA’s U.S. domestic insurance subsidiaries exceeded the minimum RBC requirements for all periods presented herein. These requirements do not represent a significant constraint for the payment of dividends by RGA’s U.S. domestic insurance companies.

The licensing orders of the Company’s special purpose companies stipulate a minimum amount of capital required based on the purpose of the entity and the underlying business. These companies are subject to enhanced oversight by the regulator which includes filing detailed plans of operations before commencing operations or making material changes to existing agreements or entering into new agreements. Each of the Company’s Special Purpose Life Reinsurance Captives (“SPLRC”) exceeded the minimum capital requirements for all periods presented herein.

The Company’s foreign insurance subsidiaries prepare financial statements in accordance with local regulatory requirements. The regulatory authorities in these foreign jurisdictions establish some form of minimum regulatory capital and surplus requirements. All of the Company’s foreign insurance subsidiaries have regulatory capital and surplus that exceed the local minimum requirements. These requirements do not represent a significant constraint for the payment of dividends by the Company’s foreign insurance companies.

The state of domicile of certain of the Company’s SPLRCs follow prescribed accounting practices differing from NAIC statutory accounting practices (“NAIC SAP”) applicable to their statutory financial statements. Specifically, these prescribed practices require that surplus note interest accrued but not approved for payment be reported as a direct reduction of surplus and an addition to the surplus note balance. Under NAIC SAP, surplus note interest is not to be reported until approved for payment and is reported as a reduction of net investment income in the Summary of Operations. In addition, these prescribed practices allow the SPLRC

to reflect letters of credit issued for its benefit as an admitted asset and a direct credit to unassigned surplus. Under NAIC SAP, letters of credit issued on behalf of the reporting company are not reported on the balance sheet.

A reconciliation of the Company's surplus between NAIC SAP and practices prescribed by the state of domicile is shown below (dollars in thousands):

	December 31,	
	2018	2017
Prescribed practice – surplus note	\$ 624,266	\$ 726,531
Prescribed practice – letters of credit	(976,100)	(960,100)
Surplus (deficit) – NAIC SAP	<u>\$ (351,834)</u>	<u>\$ (233,569)</u>

Reinsurance Company of Missouri ("RCM"), RGA Reinsurance and Chesterfield Reinsurance Company ("Chesterfield Re") are subject to Missouri statutory provisions that restrict the payment of dividends. They may not pay dividends in any 12-month period in excess of the greater of the prior year's statutory net gain from operations or 10% of statutory capital and surplus at the preceding year-end, without regulatory approval. Aurora National Life Assurance Company ("Aurora National") is subject to California statutory provisions that are identical to those imposed by Missouri regarding the ability of Aurora National to pay dividends to RGA Reinsurance. The applicable statutory provisions only permit an insurer to pay a shareholder dividend from unassigned surplus. As of January 1, 2018, RGA Reinsurance could pay maximum dividends, without prior approval, of approximately \$653.9 million. Any dividends paid by RGA Reinsurance would be paid to RCM, its parent company, which in turn has restrictions related to its ability to pay dividends to RGA.

Chesterfield Re would pay dividends to its immediate parent Chesterfield Financial Holdings LLC, ("Chesterfield Financial"), which would in turn pay dividends to RCM, subject to the terms of the indenture for the embedded value securitization transaction, in which Chesterfield Financial cannot declare or pay any dividends so long as any private placement notes are outstanding. The Missouri Department of Insurance, Financial Institution and Professional Registration, allows RCM to pay a dividend to RGA to the extent RCM received the dividend from its subsidiaries, without limitation related to the level of unassigned surplus. Dividend payments from other subsidiaries are subject to regulations in the jurisdiction of domicile, which are generally based on their earnings and/or capital level.

Dividend payments from non-U.S. operations are subject to similar restrictions established by local regulators. The non-U.S. regulatory regimes also commonly limit the dividend payments to the parent to a portion of the prior year's statutory income, as determined by the local accounting principles. The regulators of the Company's non-U.S. operations may also limit or prohibit profit repatriations or other transfers of funds to the U.S. if such transfers are deemed to be detrimental to the solvency or financial strength of the non-U.S. operations, or for other reasons. Most of the non-U.S. operating subsidiaries are second tier subsidiaries that are owned by various non-U.S. holding companies. The capital and rating considerations applicable to the first tier subsidiaries may also impact the dividend flow to RGA.

There are no regulatory restrictions that limit the payment of dividends by RGA, except those generally applicable to Missouri corporations. Dividends are payable by Missouri corporations only under the circumstances specified in The General and Business Corporation Law of Missouri. RGA would not be permitted to pay common stock dividends if there is any accrued and unpaid interest on its subordinated debentures and its junior subordinated debentures. Furthermore, the ability of RGA to pay dividends is dependent on business conditions, income, cash requirements of the Company, receipt of dividends from its subsidiaries, financial covenant provisions and other relevant factors.

Note 12 COMMITMENTS, CONTINGENCIES AND GUARANTEES

Commitments

Funding of Investments

The Company's commitments to fund investments as of December 31, 2018 and 2017 are presented in the following table (dollars in thousands):

	2018	2017
Limited partnership interests and joint ventures	\$ 523,903	\$ 485,197
Commercial mortgage loans	22,605	40,815
Bank loans and private placements	137,076	60,472
Equity release mortgages	264,858	153,937

The Company anticipates that the majority of its current commitments will be invested over the next five years; however, these commitments could become due any time at the request of the counterparties. Bank loans and private placements are included in fixed maturity securities available-for-sale.

Leases

The Company leases office space and furniture and equipment under non-cancelable operating lease agreements, which expire at various dates. Future minimum office space annual rentals under non-cancelable operating leases at December 31, 2018 are as follows (dollars in thousands):

	Operating Leases
2019	\$ 13,578
2020	11,541
2021	9,447
2022	8,587
2023	8,248
Thereafter	14,101

Rent expenses amounted to approximately \$17.5 million, \$15.7 million and \$13.7 million for the years ended December 31, 2018, 2017 and 2016, respectively.

Off-Balance Sheet Arrangements

In 2013, the Company executed a series of incentive agreements with the County of St. Louis, Missouri (the “County”). Under these agreements, the Company transferred its newly constructed world headquarters to the County in exchange for taxable industrial revenue bonds (the “bonds”), in a series of bond issuances during 2013 and 2014, with a maximum amount of \$150.0 million. As a result, the Company was able to reduce the cost of constructing and operating its world headquarters by reducing certain state and local tax expenditures. The Company simultaneously leased the world headquarters from the County and has an option to purchase the world headquarters for a nominal fee upon tendering the bonds back to the County. The payments due to the Company under the terms of the bonds and the amounts owed by the Company under the terms of the lease agreement qualify for the right of offset under GAAP. As such, neither the bonds nor the lease obligation is recorded on the consolidated balance sheets as an asset or liability, respectively. The world headquarters is recorded as an asset of the Company in “Other assets” on the consolidated balance sheets.

Contingencies

Litigation

The Company is subject to litigation in the normal course of its business. The Company currently has no material litigation. A legal reserve is established when the Company is notified of an arbitration demand or litigation or is notified that an arbitration demand or litigation is imminent, it is probable that the Company will incur a loss as a result and the amount of the probable loss is reasonably capable of being estimated.

Other Contingencies

The Company indemnifies its directors and officers as provided in its charters and by-laws. Since this indemnity generally is not subject to limitation with respect to duration or amount, the Company does not believe that it is possible to determine the maximum potential amount due under this indemnity in the future.

Guarantees

Statutory Reserve Support

RGA, through wholly-owned subsidiaries, has committed to provide statutory reserve support to third-parties, in exchange for a fee, by funding loans if certain defined events occur. Such statutory reserves are required under the U.S. Valuation of Life Policies Model Regulation (commonly referred to as Regulation XXX for term life insurance policies and Regulation A-XXX for universal life secondary guarantees). The third-parties have recourse to RGA should the subsidiary fail to provide the required funding, however, as of December 31, 2018, the Company does not believe that it will be required to provide any funding under these commitments as the occurrence of the defined events is considered remote. The following table presents the maximum potential obligation for these commitments as of December 31, 2018 (dollars in millions):

<u>Commitment Period</u>	<u>Maximum Potential Obligation</u>
2023	\$ 500.0
2033	450.0
2034	2,000.0
2035	1,314.2
2036	2,658.0
2037	6,750.0
2038	800.0

Other Guarantees

RGA has issued guarantees to third parties on behalf of its subsidiaries for the payment of amounts due under certain reinsurance treaties, securities borrowing and repurchase arrangements, financing arrangements and office lease obligations, whereby if a subsidiary fails to meet an obligation, RGA or one of its other subsidiaries will make a payment to fulfill the obligation. In limited circumstances, treaty guarantees are granted to ceding companies in order to provide them additional security, particularly in cases where RGA's subsidiary is relatively new, unrated, or not of a significant size, relative to the ceding company. Liabilities supported by the treaty guarantees, before consideration for any legally offsetting amounts due from the guaranteed party are reflected on the Company's consolidated balance sheets in a policy related liability. Potential guaranteed amounts of future payments will vary depending on production levels and underwriting results. Guarantees related to securities borrowing and repurchase arrangements provide additional security to third parties should a subsidiary fail to provide securities when due. RGA's guarantees issued as of December 31, 2018 and 2017 are reflected in the following table (dollars in thousands):

	<u>2018</u>	<u>2017</u>
Treaty guarantees	\$ 1,392,352	\$ 1,047,449
Treaty guarantees, net of assets in trust	1,291,445	926,393
Securities borrowing and repurchase arrangements	269,980	294,325
Financing arrangements	61,273	86,183
Lease obligations	392	1,662

Note 13 DEBT

Long-Term Debt

The Company's long-term debt consists of the following as of December 31, 2018 and 2017 (dollars in thousands):

	<u>2018</u>	<u>2017</u>
\$400 million 6.45% Senior Notes due 2019	\$ 399,941	\$ 399,873
\$400 million 5.00% Senior Notes due 2021	399,466	399,245
\$400 million 4.70% Senior Notes due 2023	399,288	399,138
\$400 million 3.95% Senior Notes due 2026	399,988	399,987
\$100 million 4.09% Promissory Note due 2039	89,098	91,787
\$400 million 6.20% Subordinated Debentures due 2042	400,000	400,000
\$400 million 5.75% Subordinated Debentures due 2056	400,000	400,000
\$400 million Variable Rate Junior Subordinated Debentures due 2065	318,743	318,740
Sub-total	2,806,524	2,808,770
Unamortized issuance costs	(18,651)	(20,405)
Long-term Debt	\$ 2,787,873	\$ 2,788,365

RGA has entered into an interest rate swap on its Variable Rate Junior Subordinated Debentures that effectively fixes the interest rate on these securities at 4.82% until December 2037.

Certain of the Company's debt agreements contain financial covenant restrictions related to, among others, liens, the issuance and disposition of stock of restricted subsidiaries, minimum requirements of consolidated net worth, maximum ratios of debt to capitalization and change of control provisions. A material ongoing covenant default could require immediate payment of the amount due, including principal, under the various agreements. Additionally, the Company's debt agreements contain cross-default covenants, which would make outstanding borrowings immediately payable in the event of a material uncured covenant default under any of the agreements, including, but not limited to, non-payment of indebtedness when due for an amount in excess of the amounts set forth in those agreements, bankruptcy proceedings, or any other event that results in the acceleration of the maturity of indebtedness. As of December 31, 2018 and 2017, the Company had \$2,806.5 million and \$2,808.8 million, respectively, in outstanding borrowings under its debt agreements and was in compliance with all covenants under those agreements. As of December 31, 2018 and 2017, the average interest rate on long-term debt outstanding was 5.24%.

The ability of the Company to make debt principal and interest payments depends on the earnings and surplus of subsidiaries, investment earnings on undeployed capital proceeds, and the Company's ability to raise additional funds. Future principal payments due on long-term debt, excluding discounts, as of December 31, 2018, were as follows (dollars in thousands):

	Calendar Year					
	2019	2020	2021	2022	2023	Thereafter
Long-term debt	\$ 402,802	\$ 2,919	\$ 403,040	\$ 3,167	\$ 403,299	\$ 1,593,674

Credit and Committed Facilities

The Company has obtained bank letters of credit in favor of various affiliated and unaffiliated insurance companies from which the Company assumes business. These letters of credit represent guarantees of performance under the reinsurance agreements and allow ceding companies to take statutory reserve credits. Certain of these letters of credit contain financial covenant restrictions. At December 31, 2018 and 2017, there were approximately \$105.6 million and \$120.1 million, respectively, of undrawn outstanding bank letters of credit in favor of third parties. Additionally, the Company utilizes letters of credit primarily to secure reserve credits when it retrocedes business to its affiliated subsidiaries. The Company cedes business to its affiliates to help reduce the amount of regulatory capital required in certain jurisdictions such as the U.S. and the United Kingdom. As of December 31, 2018 and 2017, \$1,356.9 million and \$1,492.2 million, respectively, in undrawn letters of credit from various banks were outstanding, primarily backing reinsurance between the various subsidiaries of the Company. The banks providing letters of credit to the Company are included on the NAIC list of approved banks.

The Company maintains eight committed credit facilities, a syndicated revolving credit facility with a capacity of \$850.0 million and seven letter of credit facilities with a combined capacity of \$1,260.3 million. The Company may borrow cash and obtain letters of credit in multiple currencies under its syndicated revolving credit facility. The following table provides additional information on the Company's existing committed credit facilities as of December 31, 2018 and 2017 (dollars in thousands):

Current Capacity	Maturity Date	Amount Utilized ⁽¹⁾ December 31,		Basis of Fees
		2018	2017	
\$191,583 ⁽²⁾	March 2019	\$ 4,156	\$ 5,952	Fixed
188,000	November 2019	188,000	188,000	Fixed
105,735 ⁽²⁾	December 2019	105,735	117,135	Fixed
100,000	June 2020	—	75,573	Fixed
100,000	May 2021	61,000	100,000	Fixed
75,000	June 2021	33,900	61,900	Fixed
500,000	May 2022	395,000	500,000	Debt rating and utilization %
850,000	August 2023	18,153	95,564	Senior unsecured long-term debt rating

(1) Represents issued but undrawn letters of credit. There was no cash borrowed for the periods presented.

(2) Foreign currency denominated facility, amounts presented are in U.S. dollars.

Fees associated with the Company's other letters of credit are not fixed for periods in excess of one year and are based on the Company's ratings and the general availability of these instruments in the marketplace. Total fees expensed associated with the Company's letters of credit were \$9.7 million, \$10.5 million and \$7.9 million for the years ended December 31, 2018, 2017 and 2016, respectively, and are included in policy acquisition costs and other insurance expenses.

Note 14 COLLATERAL FINANCE AND SECURITIZATION NOTES

Collateral Finance Notes

In 2006, RGA's subsidiary, Timberlake Financial L.L.C. ("Timberlake Financial"), issued \$850.0 million of Series A Floating Rate Insured Notes, due June 2036, in a private placement. The notes were issued to fund the collateral requirements for statutory reserves required by Regulation XXX on specified term life insurance policies reinsured by RGA Reinsurance and retroceded to Timberlake Re. Proceeds from the notes, along with a \$112.8 million direct investment by RGA, were deposited into a series of accounts that collateralize the notes and are not available to satisfy the general obligations of the Company. As of December 31, 2018 and 2017, respectively, the Company held assets in trust and in custody of \$767.9 million and \$841.5 million, of which \$57.1 million and \$39.7 million were held in a Debt Service Coverage account to cover interest payments on the notes. Interest on the notes accrues at an annual rate of 1-month LIBOR plus a base rate margin, payable monthly, and totaled \$9.4 million, \$6.4 million and \$4.2 million in 2018, 2017 and 2016, respectively.

In 2015, RGA's subsidiary, RGA Reinsurance Company (Barbados) Ltd. ("RGA Barbados") obtained CAD\$200.0 million of collateral financing from a third party through 2020, enabling RGA Barbados to support collateral requirements for Canadian reinsurance transactions. The obligation is reflected on the consolidated balance sheets in collateral finance and securitization notes. Interest on the collateral financing is payable quarterly and accrues at 3-month Canadian Dealer Offered Rate plus a margin and totaled \$5.1 million, \$4.2 million and \$4.0 million in 2018, 2017 and 2016, respectively.

In 2015, RGA's subsidiary, RGA Americas Reinsurance Company, Ltd. ("RGA Americas"), entered into a collateral financing transaction pursuant to which it issued a CAD\$150 million note and, in return, obtained a CAD\$150 million demand note issued by a designated series of a Delaware master trusts. The demand note matures in October 2020 and is used to support collateral requirements for Canadian reinsurance transactions.

The demand note is secured by a portfolio of specified assets that have an aggregate market value at least equal to the principal amount of the demand note and a payment obligation pledged by a third party financial institution. The principal amount of the demand note is payable upon demand by the holder, which creates a corresponding payment under the note issued by RGA Americas. The note issued by RGA Americas bears interest at a rate equal to the rate on the corresponding demand note, plus an amount representing fees payable to the applicable third party financial institution. Through December 31, 2018, no principal payments have been received or are currently due on the demand note and, as a result, there was no payment obligation under the note issued by RGA Americas. Accordingly, the notes are not reflected in the Company's consolidated balance sheet or the table below, as of that date.

Securitization Notes

In 2014, RGA's subsidiary, Chesterfield Financial Holdings LLC, ("Chesterfield Financial"), issued \$300.0 million of asset-backed notes due December 2024 in a private placement. The notes were issued as part of an embedded value securitization transaction covering a closed block of policies assumed by RGA Reinsurance and retroceded to Chesterfield Re. Proceeds from the notes, along with a direct investment by the Company, were applied by Chesterfield Financial to (i) pay certain transaction-related expenses, (ii) establish a reserve account owned by Chesterfield Financial and pledged to the indenture trustee for the benefit of the holders of the notes (primarily to cover interest payments on the notes), and (iii) to fund an initial stock purchase from and capital contribution to Chesterfield Re to capitalize Chesterfield Re and to finance the payment of a ceding commission by Chesterfield Re to RGA Reinsurance under the retrocession agreement. As of December 31, 2018 and 2017, the Company held deposits in trust of \$13.5 million and \$19.4 million, respectively, to cover interest payments on the notes, which are not available to satisfy the general obligations of the Company. Interest on the notes accrues at an annual rate of 4.50%, payable quarterly, and totaled \$9.5 million, \$11.3 million and \$13.1 million in 2018, 2017 and 2016, respectively. The notes represent senior, secured indebtedness of Chesterfield Financial. Limited support is provided by RGA for temporary potential liquidity events at Chesterfield Financial and for temporary potential statutory capital and surplus events at Chesterfield Re. Otherwise, there is no legal recourse to RGA or its other subsidiaries. The notes are not insured or guaranteed by any other person or entity.

The Company's collateral finance and securitization notes consist of the following as of December 31, 2018 and 2017 (dollars in thousands):

	2018	2017
Timberlake Financial	\$ 368,207	\$ 411,951
RGA Barbados	131,602	159,100
Chesterfield Financial	185,700	217,800
Unamortized issuance costs	(3,548)	(4,913)
Total	<u>\$ 681,961</u>	<u>\$ 783,938</u>

Note 15 SEGMENT INFORMATION

The Company has geographic-based and business-based operational segments. Geographic-based operations are further segmented into traditional and financial solutions businesses.

The U.S. and Latin America Traditional segment provides individual and group life and health reinsurance to domestic clients for a variety of products through yearly renewable term agreements, coinsurance, and modified coinsurance. The U.S. and Latin America Financial Solutions segment includes asset-intensive products that concentrate on the investment risk within underlying annuities and corporate-owned life insurance policies, and financial reinsurance that assists ceding companies in meeting applicable regulatory requirements while enhancing their financial strength and regulatory surplus position.

The Canada Traditional segment is primarily engaged in individual life reinsurance, and to a lesser extent creditor, group life and health, critical illness and disability reinsurance, through yearly renewable term and coinsurance agreements. The Canada Financial Solutions segment concentrates on assisting clients with longevity risk transfer structures within underlying annuities and pension benefit obligations, and on assisting clients in meeting applicable regulatory requirements while enhancing their financial strength and regulatory surplus position through financial reinsurance structures.

The Europe, Middle East and Africa Traditional segment provides individual and group life and health products through yearly renewable term and coinsurance agreements, reinsurance of critical illness coverage that provides a benefit in the event of the diagnosis of a pre-defined critical illness and underwritten annuities. The Europe, Middle East and Africa Financial Solutions segment provides longevity, asset-intensive and financial reinsurance. Longevity reinsurance takes the form of closed block annuity reinsurance and longevity swap structures.

The Asia Pacific Traditional segment provides individual and group life and health reinsurance, critical illness coverage, disability and superannuation through yearly renewable term and coinsurance agreements. The Asia Pacific Financial Solutions segment provides financial reinsurance, asset-intensive and certain disability and life blocks.

Corporate and Other revenues primarily include investment income from unallocated invested assets, investment related gains and losses and service fees. Corporate and Other expenses consist of the offset to capital charges allocated to the operating segments within the policy acquisition costs and other insurance income line item, unallocated overhead and executive costs, interest expense related to debt, and the investment income and expense associated with the Company's collateral finance and securitization transactions and service business expenses. Additionally, Corporate and Other includes results from certain wholly-owned subsidiaries, such as RGAX, and joint ventures that, among other activities, develop and market technology, and provide consulting and outsourcing solutions for the insurance and reinsurance industries. In the past two years, the Company has increased its investment and expenditures in this area in an effort to both support its clients and generate new future revenue streams.

The accounting policies of the segments are the same as those described in Note 2 – "Significant Accounting Policies and Pronouncements." The Company measures segment performance primarily based on profit or loss from operations before income taxes. There are no intersegment reinsurance transactions and the Company does not have any material long-lived assets.

The Company allocates capital to its segments based on an internally developed economic capital model, the purpose of which is to measure the risk in the business and to provide a basis upon which capital is deployed. The economic capital model considers the unique and specific nature of the risks inherent in the Company's businesses. As a result of the economic capital allocation process, a portion of investment income is attributed to the segments based on the level of allocated capital. In addition, the segments are charged for excess capital utilized above the allocated economic capital basis. This charge is included in policy acquisition costs and other insurance expenses.

Information related to revenues, income (loss) before income taxes, interest expense, depreciation and amortization, and assets of the Company's operations are summarized below (dollars in thousands):

For the years ended December 31,	2018	2017	2016
Revenues:			
U.S. and Latin America:			
Traditional	\$ 6,295,733	\$ 6,100,171	\$ 5,964,968
Financial Solutions	907,245	1,150,378	840,446
Total	<u>7,202,978</u>	<u>7,250,549</u>	<u>6,805,414</u>
Canada:			
Traditional	1,224,404	1,103,520	1,118,004
Financial Solutions	48,588	48,938	46,938
Total	<u>1,272,992</u>	<u>1,152,458</u>	<u>1,164,942</u>
Europe, Middle East and Africa:			
Traditional	1,494,605	1,362,075	1,195,149
Financial Solutions	349,886	311,071	340,518
Total	<u>1,844,491</u>	<u>1,673,146</u>	<u>1,535,667</u>
Asia Pacific:			
Traditional	2,416,848	2,210,686	1,771,150
Financial Solutions	54,479	73,775	63,382
Total	<u>2,471,327</u>	<u>2,284,461</u>	<u>1,834,532</u>
Corporate and Other	83,876	155,155	180,956
Total	<u>\$ 12,875,664</u>	<u>\$ 12,515,769</u>	<u>\$ 11,521,511</u>
For the years ended December 31,	2018	2017	2016
Income (loss) before income taxes:			
U.S. and Latin America:			
Traditional	\$ 286,410	\$ 373,434	\$ 371,101
Financial Solutions	250,478	401,584	283,380
Total	<u>536,888</u>	<u>775,018</u>	<u>654,481</u>
Canada:			
Traditional	112,308	120,218	134,705
Financial Solutions	9,576	16,643	7,945
Total	<u>121,884</u>	<u>136,861</u>	<u>142,650</u>
Europe, Middle East and Africa:			
Traditional	55,119	70,486	30,059
Financial Solutions	196,387	123,514	138,007
Total	<u>251,506</u>	<u>194,000</u>	<u>168,066</u>
Asia Pacific:			
Traditional	177,501	148,786	113,928
Financial Solutions	(5,966)	13,130	4,063
Total	<u>171,535</u>	<u>161,916</u>	<u>117,991</u>
Corporate and Other	(235,993)	(124,980)	(39,242)
Total	<u>\$ 845,820</u>	<u>\$ 1,142,815</u>	<u>\$ 1,043,946</u>
For the years ended December 31,	2018	2017	2016
Interest expense:			
Corporate and Other	\$ 147,355	\$ 146,025	\$ 137,623
Total	<u>\$ 147,355</u>	<u>\$ 146,025</u>	<u>\$ 137,623</u>

For the years ended December 31,	2018	2017	2016
Depreciation and amortization:			
U.S. and Latin America:			
Traditional	\$ 272,555	\$ 284,959	\$ 271,732
Financial Solutions	95,306	208,790	155,560
Total	367,861	493,749	427,292
Canada:			
Traditional	22,109	24,057	22,170
Financial Solutions	9	10	11
Total	22,118	24,067	22,181
Europe, Middle East and Africa:			
Traditional	45,140	35,000	46,562
Financial Solutions	384	91	72
Total	45,524	35,091	46,634
Asia Pacific:			
Traditional	114,870	114,333	45,562
Financial Solutions	1,885	1,448	1,492
Total	116,755	115,781	47,054
Corporate and Other	22,104	37,276	13,894
Total	\$ 574,362	\$ 705,964	\$ 557,055

The table above includes amortization of DAC, including the effect from investment related gains and losses.

For the years ended December 31,	2018	2017
Assets:		
U.S. and Latin America:		
Traditional	\$ 19,235,781	\$ 18,603,423
Financial Solutions	19,870,388	15,959,206
Total	39,106,169	34,562,629
Canada:		
Traditional	4,200,792	4,161,452
Financial Solutions	154,000	126,372
Total	4,354,792	4,287,824
Europe, Middle East and Africa:		
Traditional	3,643,174	3,099,495
Financial Solutions	4,737,529	5,274,993
Total	8,380,703	8,374,488
Asia Pacific:		
Traditional	5,680,978	4,915,442
Financial Solutions	1,180,745	1,198,585
Total	6,861,723	6,114,027
Corporate and Other	5,831,858	7,175,850
Total	\$ 64,535,245	\$ 60,514,818

Companies in which RGA has significant influence over the operating and financing decisions but are not required to be consolidated, are reported on the equity basis of accounting. The equity in the net income of such investments is not material to the results of operations or financial position of individual segments or the Company taken as a whole. Capital expenditures of each reporting segment were immaterial in the periods noted.

No individual client generated 10% or more of the Company's total gross premiums on a consolidated basis in 2018, 2017 and 2016. For the purpose of this disclosure, companies that are within the same insurance holding company structure are combined.

Note 16 POLICY CLAIMS AND BENEFITS

Liabilities for Unpaid Claims and Claim Expense

The Company uses several actuarial methods to compute incurred-but-not reported liabilities. These methods use historical claim reporting patterns to develop a triangle of reported claim amounts. The claim triangle is then used to develop the ultimate claims amount and the incurred-but-not reported liabilities. Expected claim methods use exposure data such as premiums to develop the ultimate claim amount. The final method blends the estimates from the development and the expected claim methods. There were no significant changes in methodologies during 2018.

The following tables provide information on incurred and paid claims development, net of retrocession, for short-duration reinsurance contracts for the Company's U.S. and Latin America and Asia Pacific Traditional segments, which primarily relate to group life and health (including disability) business. The short-duration business for the Company's other segments is immaterial. Liabilities for claims and claims adjustment expenses, net of reinsurance equals total incurred claims less cumulative paid claims plus outstanding liabilities prior to 2012.

The Company provides reinsurance on large quota share transactions. It is common industry practice for cedants to provide loss information on a bulk basis without comprehensive claim details. Additionally, a claim under aggregate stop loss coverage may be the result of thousands of claims, but the Company only pays the excess amount. Therefore, it is impractical to provide meaningful claim count detail by accident year in the tables shown below.

U.S. and Latin America (in thousands)								As of December 31, 2018
Incurred Claims and Allocated Claim Adjustments, Net of Reinsurance ⁽¹⁾								Total of Incurred-but-Not-Reported Liabilities Plus Expected Development on Reported Claims
Accident Year	For the Years Ended December 31,							
	2012	2013	2014	2015	2016	2017	2018	
2012	\$ 322,579	\$ 309,119	\$ 297,037	\$ 298,262	\$ 299,098	\$ 297,688	\$ 296,717	\$ —
2013		349,262	332,907	338,977	336,552	336,436	336,323	24
2014			407,953	411,373	396,383	397,151	396,010	272
2015				459,524	460,917	465,167	461,947	1,505
2016					500,843	499,785	500,725	4,885
2017						485,442	513,722	27,190
2018							538,456	234,548
						Total	\$ 3,043,900	
Cumulative Paid Claims and Allocated Claim Adjustment Expense, Net of Reinsurance ⁽¹⁾								
Accident Year	For the Years Ended December 31,							
	2012	2013	2014	2015	2016	2017	2018	
2012	\$ 109,323	\$ 222,139	\$ 243,890	\$ 252,018	\$ 258,297	\$ 263,565	\$ 268,073	
2013		114,457	248,828	277,130	285,817	292,067	297,126	
2014			128,813	304,578	337,081	349,078	356,026	
2015				146,196	360,658	407,282	422,102	
2016					184,940	392,517	436,892	
2017						189,853	402,759	
2018							182,560	
						Total	\$ 2,365,538	
						All outstanding claims prior to 2012, net of reinsurance	178,024	
						Liabilities for claims and claim adjustment expense, net of reinsurance	\$ 856,386	

(1) 2012-2017 Unaudited.

Asia Pacific
(in thousands)

As of
December 31, 2018

Incurred Claims and Allocated Claim Adjustments, Net of Reinsurance ⁽¹⁾								Total of Incurred-but-Not-Reported Liabilities Plus Expected Development on Reported Claims
Accident Year	For the Years Ended December 31,							
	2012	2013	2014	2015	2016	2017	2018	
2012	\$ 207,882	\$ 279,008	\$ 283,316	\$ 286,632	\$ 294,265	\$ 303,340	\$ 309,287	\$ 10,352
2013		292,769	313,126	303,779	301,168	314,283	328,017	16,728
2014			277,049	300,336	265,431	272,247	284,237	21,339
2015				278,491	257,146	251,650	267,292	32,392
2016					227,653	211,425	212,722	40,376
2017						216,499	214,707	63,383
2018							253,691	156,761
						Total	\$ 1,869,953	

Cumulative Paid Claims and Allocated Claim Adjustment Expense, Net of Reinsurance ⁽¹⁾							
Accident Year	For the Years Ended December 31,						
	2012	2013	2014	2015	2016	2017	2018
2012	\$ 49,321	\$ 135,322	\$ 185,322	\$ 222,987	\$ 243,549	\$ 259,917	\$ 274,830
2013		49,805	144,247	209,347	235,923	261,299	282,961
2014			34,519	135,668	177,439	206,176	228,873
2015				48,962	118,579	167,350	202,273
2016					38,310	97,769	133,091
2017						35,442	87,037
2018							31,871
						Total	\$ 1,240,936
						All outstanding claims prior to 2012, net of reinsurance	112,373
						Liabilities for claims and claim adjustment expense, net of reinsurance	\$ 741,390

(1) 2012-2017 Unaudited.

The following is unaudited supplementary information about average historical claims duration as of December 31, 2018:

Average Annual Payout of Incurred Claims by Age, Net of Reinsurance							
Years	1	2	3	4	5	6	7
U.S. and Latin America	34.7%	41.9%	8.6%	2.9%	1.9%	1.6%	1.5%
Asia Pacific	15.5%	28.4%	17.1%	10.9%	7.5%	5.9%	4.8%

Reconciliation of the Disclosure of Incurred and Paid Claims Development to the Liability for Unpaid Claims and Claims Adjustment Expenses

The reconciliation of the net incurred and paid claims development tables to the liability for claims and claim adjustment expense in the consolidated balance sheet as of December 31, 2018 is as follows (dollars in thousands):

	2018
Liabilities for claims and claim adjustment expense, net of reinsurance:	
U.S. and Latin America	\$ 856,386
Asia Pacific	741,390
Liabilities for claims and claim adjustment expense, net of reinsurance	<u>1,597,776</u>
Adjustments to reconcile to total policy claims and future policy benefits:	
Reinsurance recoverable	16,121
Effect of discounting	(141,689)
Unallocated claims adjustment expense	5,907
Total adjustments	<u>(119,661)</u>
Other short-duration contracts:	
Canada	128,831
Europe, Middle East and Africa	383,936
Other	177,416
Liability for unpaid claims and claim adjustment expense - short-duration	<u>2,168,298</u>
Liability for unpaid claims and claim adjustment expense - long-duration	<u>4,416,370</u>
Total liability for unpaid claims and claim adjustment expense (included in future policy benefits and other policy-related balances)	<u>\$ 6,584,668</u>

Rollforward of Claims and Claim Adjustment Expenses

The liability for unpaid claims is reported in future policy benefits and other policy-related balances within the Company's consolidated balance sheet. Activity associated with unpaid claims is summarized below (dollars in thousands):

	2018	2017	2016
Balance at beginning of year	\$ 5,896,469	\$ 5,180,802	\$ 4,977,836
Less: reinsurance recoverable	(455,547)	(394,821)	(405,583)
Net balance at beginning of year	<u>5,440,922</u>	<u>4,785,981</u>	<u>4,572,253</u>
Incurred:			
Current year	10,048,866	8,911,640	8,562,036
Prior years	131,181	14,364	(134,765)
Total incurred	<u>10,180,047</u>	<u>8,926,004</u>	<u>8,427,271</u>
Payments:			
Current year	(4,602,535)	(4,513,606)	(4,385,839)
Prior years	(4,691,722)	(4,004,038)	(3,777,137)
Total payments	<u>(9,294,257)</u>	<u>(8,517,644)</u>	<u>(8,162,976)</u>
Other changes:			
Interest accretion	24,802	19,443	18,151
Foreign exchange adjustments	(199,428)	227,138	(68,718)
Total other changes	<u>(174,626)</u>	<u>246,581</u>	<u>(50,567)</u>
Net balance at end of year	6,152,086	5,440,922	4,785,981
Plus: reinsurance recoverable	432,582	455,547	394,821
Balance at end of year	<u>\$ 6,584,668</u>	<u>\$ 5,896,469</u>	<u>\$ 5,180,802</u>

Incurred claims related to prior years reflected in the table above, resulted in part from developed claims for prior years being different than were anticipated when the liabilities for unpaid claims were originally estimated. These trends have been considered in establishing the current year liability for unpaid claims.

Note 17 EQUITY

Common stock

The changes in number of common stock shares, issued, held in treasury and outstanding are as follows for the periods indicated:

	Issued	Held In Treasury	Outstanding
Balance, December 31, 2015	79,137,758	13,933,232	65,204,526
Common Stock acquired	—	1,356,892	(1,356,892)
Stock-based compensation ⁽¹⁾	—	(454,868)	454,868
Balance, December 31, 2016	79,137,758	14,835,256	64,302,502
Common Stock acquired	—	208,680	(208,680)
Stock-based compensation ⁽¹⁾	—	(358,273)	358,273
Balance, December 31, 2017	79,137,758	14,685,663	64,452,095
Common Stock acquired	—	1,932,055	(1,932,055)
Stock-based compensation ⁽¹⁾	—	(294,328)	294,328
Balance, December 31, 2018	79,137,758	16,323,390	62,814,368

(1) Represents net shares issued from treasury pursuant to the Company's stock-based compensation programs.

Common stock held in treasury

Common stock held in treasury is accounted for at average cost. Gains resulting from the reissuance of "Common stock held in treasury" are credited to "Additional paid-in capital." Losses resulting from the reissuance of "Common stock held in treasury" are charged first to "Additional paid-in capital" to the extent the Company has previously recorded gains on treasury share transactions, then to "Retained earnings."

During 2017, RGA's board of directors authorized and amended a share repurchase program, with no expiration date, to repurchase up to \$400.0 million of RGA's outstanding common stock. In connection with this authorization, the board of directors terminated all previously announced repurchase authorizations. The following table summarizes the Company's current share repurchase program activity for the years ended 2018 and 2017 (dollar amounts in thousands, except per share amounts):

Year of Repurchase	Shares Repurchased	Amount Paid	Average Per Share
2018	1,932,055	\$ 283,524	\$ 146.75
2017	208,680	26,897	\$ 128.89
Total	2,140,735	\$ 310,421	

During 2016, RGA's board of directors authorized and amended a share repurchase program, with no expiration date, to repurchase up to \$400.0 million of RGA's outstanding common stock. During 2016, RGA repurchased 1,356,892 shares of common stock under this program for \$116.5 million.

On January 24, 2019, RGA's board of directors authorized a share repurchase program for up to \$400.0 million of RGA's outstanding common stock. The authorization was effective immediately and does not have an expiration date. In connection with this new authorization, the board of directors terminated the stock repurchase authority granted in 2017.

The timing and amount of share repurchases are determined by management based upon market conditions and other considerations. Factors could affecting the timing and amount of any future repurchases under the share repurchase authorization, include increased capital needs of the Company due to changes in regulatory capital requirements, opportunities for growth and acquisitions, and the effect of adverse market conditions on the segments.

Accumulated other comprehensive income (loss)

The following table presents the components of the Company's other comprehensive income (loss) for the years ended December 31, 2018, 2017 and 2016 (dollars in thousands):

For the year ended December 31, 2018:

	Before-Tax Amount	Tax (Expense) Benefit	After-Tax Amount
Foreign currency translation adjustments:			
Change arising during year	\$ (148,018)	\$ (759)	\$ (148,777)
Foreign currency swap	87,344	(18,342)	69,002
Net foreign currency translation adjustments	(60,674)	(19,101)	(79,775)
Unrealized gains on investments: ⁽¹⁾			
Unrealized net holding gains arising during the year	(1,834,656)	393,653	(1,441,003)
Less: Reclassification adjustment for net gains realized in net income	(122,221)	25,720	(96,501)
Net unrealized gains	(1,712,435)	367,933	(1,344,502)
Unrealized pension and postretirement benefits:			
Net prior service cost arising during the year	(947)	182	(765)
Net gain arising during the period	1,063	(316)	747
Unrealized pension and postretirement benefits, net	116	(134)	(18)
Other comprehensive income (loss)	\$ (1,772,993)	\$ 348,698	\$ (1,424,295)

For the year ended December 31, 2017:

	Before-Tax Amount	Tax (Expense) Benefit	After-Tax Amount
Foreign currency translation adjustments:			
Change arising during year	\$ 74,926	\$ 25,369	\$ 100,295
Foreign currency swap	(47,953)	16,784	(31,169)
Net foreign currency translation adjustments	26,973	42,153	69,126
Unrealized gains on investments: ⁽¹⁾			
Unrealized net holding gains arising during the year	1,029,591	(313,729)	715,862
Less: Reclassification adjustment for net gains realized in net income	25,039	(7,011)	18,028
Net unrealized gains	1,004,552	(306,718)	697,834
Change in unrealized OTTI on fixed maturity securities	375	(131)	244
Unrealized pension and postretirement benefits:			
Net prior service cost arising during the year	11,717	(4,095)	7,622
Net gain arising during the period	(10,587)	3,691	(6,896)
Unrealized pension and postretirement benefits, net	1,130	(404)	726
Other comprehensive income (loss)	\$ 1,033,030	\$ (265,100)	\$ 767,930

For the year ended December 31, 2016:

	Before-Tax Amount	Tax (Expense) Benefit	After-Tax Amount
Foreign currency translation adjustments:			
Change arising during year	\$ 39,925	\$ (24,663)	\$ 15,262
Foreign currency swap	(10,234)	3,582	(6,652)
Net foreign currency translation adjustments	29,691	(21,081)	8,610
Unrealized gains on investments: ⁽¹⁾			
Unrealized net holding gains arising during the year	641,606	(180,448)	461,158
Less: Reclassification adjustment for net gains realized in net income	65,798	(23,029)	42,769
Net unrealized gains	575,808	(157,419)	418,389
Change in unrealized OTTI on fixed maturity securities	1,457	(510)	947
Unrealized pension and postretirement benefits:			
Net prior service cost arising during the year	444	(149)	295
Net gain arising during the period	4,427	(1,623)	2,804
Unrealized pension and postretirement benefits, net	4,871	(1,772)	3,099
Other comprehensive income (loss)	\$ 611,827	\$ (180,782)	\$ 431,045

(1) Includes cash flow hedges. See Note 5 for additional information on cash flow hedges.

A summary of the components of net unrealized appreciation (depreciation) of balances carried at fair value is as follows (dollars in thousands):

For the years ended December 31,	2018	2017	2016
Change in net unrealized appreciation (depreciation) on:			
Fixed maturity securities available-for-sale	\$ (1,759,230)	\$ 987,570	\$ 561,906
Other investments ⁽¹⁾	20,187	25,577	18,900
Effect on unrealized appreciation on:			
Deferred policy acquisition costs	26,608	(8,220)	(3,541)
Net unrealized appreciation (depreciation)	<u>\$ (1,712,435)</u>	<u>\$ 1,004,927</u>	<u>\$ 577,265</u>

(1) Includes cash flow hedges. See Note 5 for additional information on cash flow hedges.

The balance of and changes in each component of AOCI were as follows (dollars in thousands):

	Accumulated Currency Translation Adjustments	Unrealized Appreciation (Depreciation) of Investments ⁽¹⁾	Pension and Postretirement Benefits	Accumulated Other Comprehensive Income (Loss)
Balance, December 31, 2015	\$ (181,151)	\$ 935,697	\$ (46,262)	\$ 708,284
OCI before reclassifications	29,691	646,887	(951)	675,627
Amounts reclassified from AOCI	—	(69,622)	5,822	(63,800)
Deferred income tax benefit (expense)	(21,081)	(157,929)	(1,772)	(180,782)
Balance, December 31, 2016	(172,541)	1,355,033	(43,163)	1,139,329
OCI before reclassifications	26,973	1,039,387	(4,273)	1,062,087
Amounts reclassified from AOCI	—	(34,460)	5,403	(29,057)
Deferred income tax benefit (expense)	42,153	(306,849)	(404)	(265,100)
Adoption of new accounting standard	17,065	147,550	(8,243)	156,372
Balance, December 31, 2017	(86,350)	2,200,661	(50,680)	2,063,631
OCI before reclassifications	(60,674)	(1,860,789)	(5,218)	(1,926,681)
Amounts reclassified from AOCI	—	148,354	5,334	153,688
Deferred income tax benefit (expense)	(19,101)	367,933	(134)	348,698
Adoption of new accounting standard	(2,573)	—	—	(2,573)
Balance, December 31, 2018	<u>\$ (168,698)</u>	<u>\$ 856,159</u>	<u>\$ (50,698)</u>	<u>\$ 636,763</u>

(1) Includes cash flow hedges of \$8,788, \$2,619 and \$(2,496) as of December 31, 2018, 2017 and 2016, respectively. See Note 5 for additional information on cash flow hedges.

The following table presents the amounts of AOCI reclassifications for the years ended December 31, 2018 and 2017 (dollars in thousands):

Details about AOCI Components	Amount Reclassified from AOCI		Affected Line Item in Statement of Income
	2018	2017	
Net unrealized investment gains (losses):			
Net unrealized gains and losses on available-for-sale securities	\$ (122,221)	\$ 25,039	Investment related gains (losses), net
Cash flow hedges - Interest rate	183	(79)	(1)
Cash flow hedges - Currency/Interest rate	292	380	(1)
Cash flow hedges - Forward bond purchase commitments	—	900	(1)
Deferred policy acquisition costs attributed to unrealized gains and losses	(26,608)	8,220	(2)
Total	(148,354)	34,460	
Provision for income taxes	31,208	(10,308)	
Net unrealized gains (losses), net of tax	<u>\$ (117,146)</u>	<u>\$ 24,152</u>	
Amortization of defined benefit plan items:			
Prior service cost (credit)	\$ 971	\$ 971	(3)
Actuarial gains/(losses)	(6,305)	(6,374)	(3)
Total	(5,334)	(5,403)	
Provision for income taxes	1,176	1,891	
Amortization of defined benefit plans, net of tax	<u>\$ (4,158)</u>	<u>\$ (3,512)</u>	
Total reclassifications for the period	<u>\$ (121,304)</u>	<u>\$ 20,640</u>	

(1) See Note 5 for information on cash flow hedges.

(2) See Note 8 for information on deferred policy acquisition costs.

(3) See Note 10 for information on employee benefit plans.

Equity Based Compensation

The Company adopted the RGA Flexible Stock Plan (the “Plan”) in February 1993, as amended, and the Flexible Stock Plan for Directors (the “Directors Plan”) in January 1997, as amended, (collectively, the “Stock Plans”). The Stock Plans provide for the award of benefits (collectively “Benefits”) of various types, including stock options, stock appreciation rights (“SARs”), restricted stock, performance shares, cash awards, and other stock-based awards, to key employees, officers, directors and others performing significant services for the benefit of the Company or its subsidiaries. As of December 31, 2018, shares authorized for the granting of Benefits under the Plan and the Directors Plan totaled 14,960,077 and 412,500 respectively. The Company uses treasury shares or shares made available from authorized but unissued shares to support the future exercise of options or settlement of awards granted under its stock plans.

Equity-based compensation expense of \$30.1 million, \$22.3 million, and \$33.1 million related to grants or awards under the Stock Plans was recognized in 2018, 2017 and 2016, respectively. Equity-based compensation expense is principally related to the issuance of stock options, performance contingent restricted units, stock appreciation rights and restricted stock.

In general, options granted under the Plan become exercisable over vesting periods ranging from one to five years. Options are generally granted with an exercise price equal to the stock’s fair value at the date of grant and expire 10 years after the date of grant. There are no options outstanding under the Directors Plan during the periods presented. Information with respect to grants under the Stock Plans follows.

Stock Options

The following table presents a summary of stock option activity:

	Number of Options	Weighted-Average Exercise Price	Aggregate Intrinsic Value (in millions)
Outstanding December 31, 2017	2,309,769	\$ 75.17	
Granted	164,889	\$ 150.87	
Exercised	(286,874)	\$ 59.45	
Forfeited	(17,341)	\$ 119.63	
Outstanding December 31, 2018	<u>2,170,443</u>	<u>\$ 82.65</u>	\$ 126.7
Options exercisable	<u>1,633,182</u>	<u>\$ 73.09</u>	\$ 110.1

The intrinsic value of options exercised was \$25.6 million, \$42.1 million, and \$41.4 million for 2018, 2017 and 2016, respectively.

Range of Exercise Prices	Options Outstanding			Options Exercisable	
	Number Outstanding as of 12/31/2018	Weighted-Average Remaining Contractual Life (years)	Weighted-Average Exercise Price	Number Exercisable as of 12/31/2018	Weighted-Average Exercise Price
\$0.00 - \$49.99	163,805	0.9	\$ 43.97	163,805	\$ 43.97
\$50.00 - \$59.99	775,518	3.5	\$ 58.26	775,518	\$ 58.26
\$60.00 - \$69.99	839	4.2	\$ 60.24	839	\$ 60.24
\$70.00 - \$79.99	159,593	5.2	\$ 78.48	159,593	\$ 78.48
\$90.00 +	1,070,688	7.4	\$ 106.87	533,427	\$ 102.00
Totals	2,170,443	5.3	\$ 82.65	1,633,182	\$ 73.09

The following table presents the weighted average assumptions used to determine the fair value of stock options issued:

For the years ended December 31,	2018	2017	2016
Dividend yield	1.33%	1.26%	1.58%
Risk-free rate of return	2.79%	2.32%	1.69%
Expected volatility	21.4%	22.8%	28.1%
Expected life (years)	7.0	7.0	7.0
Weighted average exercise price of stock options granted	\$ 150.87	\$ 129.72	\$ 93.53
Weighted average fair value of stock options granted	\$ 36.31	\$ 31.57	\$ 24.52

The Black-Scholes model was used to determine the fair value recognized in the financial statements of stock options that have been granted. The Company used daily historical volatility when calculating stock option values. The benchmark rate is based on observed interest rates for instruments with maturities similar to the expected term of the stock options. Dividend yield is determined based on historical dividend distributions compared to the price of the underlying common stock as of the valuation date and held constant over the life of the stock options. The Company estimated expected life using the historical average years to exercise or cancellation.

Performance Shares

Performance shares, also referred to as performance contingent units (“PCUs”), are units that, if they vest, are multiplied by a performance factor to produce a number of final PCUs that are paid in the Company’s common stock. Each PCU represents the right to receive up to two shares of Company common stock, depending on the results of certain performance measures over a three-year period. The compensation expense related to the PCUs is recognized ratably over the requisite performance period. Performance shares are accounted for as equity awards, but are not credited with dividend-equivalents for actual dividends paid on the Company’s common stock during the performance period.

Restricted Stock Units

In general, restricted stock units (“RSUs”) become payable at the end of a three- or ten-year vesting period. Each RSU, if they vest, represents the right to receive one share of Company common stock. RSUs awarded under the plan generally have no strike price and are included in the Company’s shares outstanding.

The following table presents a summary of Performance Share and Restricted Stock Unit activity:

	Performance Contingent Units	Restricted Stock Units
Outstanding December 31, 2017	463,259	77,358
Granted	110,042	20,393
Paid	(170,080)	(28,023)
Forfeited	(7,350)	(2,729)
Outstanding December 31, 2018	395,871	66,999

During 2018, the Company issued 110,042 PCUs to key employees at a weighted average fair value per unit of \$150.87. In May 2018 and May 2017, RGA’s board of directors approved a 1.07 and 0.75 share payout for each PCU granted in 2016 and 2015, resulting in the issuance of 170,080 and 137,083 shares of common stock from treasury, respectively.

As of December 31, 2018, the total compensation cost of non-vested awards not yet recognized in the financial statements was \$24.7 million. It is estimated that these costs will vest over a weighted average period of 1.4 years.

The majority of the awards granted each year under the board-approved incentive compensation package and Directors Plan are made in the first quarter of each year.

Note 18 QUARTERLY RESULTS OF OPERATIONS (UNAUDITED)

Years Ended December 31,
(in thousands, except per share data)

	First	Second	Third	Fourth
2018				
Total Revenues	\$ 3,173,707	\$ 3,195,908	\$ 3,227,531	\$ 3,278,518
Total benefits and expenses	3,035,782	2,948,620	2,904,870	3,140,572
Income before income taxes	137,925	247,288	322,661	137,946
Net Income	100,230	204,374	301,199	110,039
Earnings Per Share:				
Basic earnings per share	\$ 1.55	\$ 3.19	\$ 4.76	\$ 1.75
Diluted earnings per share	1.52	3.13	4.68	1.72
2017				
Total Revenues	\$ 3,008,740	\$ 3,129,276	\$ 3,145,310	\$ 3,232,443
Total benefits and expenses	2,800,896	2,789,961	2,805,148	2,976,949
Income before income taxes	207,844	339,315	340,162	255,494
Net Income	145,512	232,190	227,591	1,216,888
Earnings Per Share:				
Basic earnings per share	\$ 2.26	\$ 3.60	\$ 3.53	\$ 18.89
Diluted earnings per share	2.22	3.54	3.47	18.49

Note 19 SUBSEQUENT EVENT

On January 24, 2019, RGA's board of directors authorized a share repurchase program for up to \$400.0 million of RGA's outstanding common stock. The authorization was effective immediately and does not have an expiration date. Repurchases would be made in accordance with applicable securities laws and would be made through market transactions, block trades, privately negotiated transactions or other means or a combination of these methods, with the timing and number of shares repurchased dependent on a variety of factors, including share price, corporate and regulatory requirements and market and business conditions. Repurchases may be commenced or suspended from time to time without prior notice. In connection with this new authorization, the board of directors terminated the stock repurchase authority granted in 2017.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Stockholders of
Reinsurance Group of America, Incorporated
Chesterfield, Missouri

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Reinsurance Group of America, Incorporated and subsidiaries (the "Company") as of December 31, 2018 and 2017, and the related consolidated statements of income, comprehensive income, stockholders' equity, and cash flows for each of the three years in the period ended December 31, 2018, and the related notes, and the schedules listed in the Index at Item 15 (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2018, in conformity with accounting principles generally accepted in the United States of America.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2018, based on the criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission and our report dated February 27, 2019 expressed an unqualified opinion on the Company's internal control over financial reporting.

Basis for Opinion

These consolidated financial statements and financial statement schedules are the responsibility of the Company's management. Our responsibility is to express an opinion on the financial statements and financial statement schedules based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ DELOITTE & TOUCHE LLP

St. Louis, Missouri
February 27, 2019

We have served as the Company's auditor since 2000.

Item 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None.

Item 9A. CONTROLS AND PROCEDURES

The Chief Executive Officer and the Chief Financial Officer have evaluated the effectiveness of the design and operation of the Company's disclosure controls and procedures as defined in Exchange Act Rule 13a-15(e) as of the end of the period covered by this report. Based on that evaluation, the Chief Executive Officer and the Chief Financial Officer concluded that these disclosure controls and procedures were effective.

There was no change in the Company's internal control over financial reporting as defined in Exchange Act Rule 13a-15(f) during the quarter ended December 31, 2018, that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting.

Management's Annual Report on Internal Control Over Financial Reporting

Management of the Company is responsible for establishing and maintaining adequate internal control over financial reporting. In fulfilling this responsibility, estimates and judgments by management are required to assess the expected benefits and related costs of control procedures. The objectives of internal control include providing management with reasonable, but not absolute, assurance that assets are safeguarded against loss from unauthorized use or disposition, and that transactions are executed in accordance with management's authorization and recorded properly to permit the preparation of consolidated financial statements in conformity with accounting principles generally accepted in the United States of America.

Financial management has documented and evaluated the effectiveness of the internal control of the Company as of December 31, 2018 pertaining to financial reporting in accordance with the criteria established in "Internal Control – Integrated Framework (2013)" by the Committee of Sponsoring Organizations of the Treadway Commission.

In the opinion of management, the Company maintained effective internal control over financial reporting as of December 31, 2018.

Deloitte & Touche LLP, an independent registered public accounting firm, has issued an attestation report on the effectiveness of the Company's internal control over financial reporting.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Stockholders of
Reinsurance Group of America, Incorporated
Chesterfield, Missouri

Opinion on Internal Control over Financial Reporting

We have audited the internal control over financial reporting of Reinsurance Group of Americas Incorporated and subsidiaries (the “Company”) as of December 31, 2018, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by COSO.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated financial statements as of and for the year ended December 31, 2018, of the Company and our report dated February 27, 2019, expressed an unqualified opinion on those consolidated financial statements and financial statement schedules.

Basis of Opinion

The Company’s management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying *Management’s Annual Report on Internal Control over Financial Reporting*. Our responsibility is to express an opinion on the Company’s internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control over Financial Reporting

A company’s internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company’s internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company’s assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ DELOITTE & TOUCHE LLP

St. Louis, Missouri
February 27, 2019

Item 9B. OTHER INFORMATION

None.

Part III

Item 10. DIRECTORS, EXECUTIVE OFFICERS, AND CORPORATE GOVERNANCE

Information with respect to Directors of the Company is incorporated by reference to the Proxy Statement under the captions “Nominees and Continuing Directors” and “Section 16(a) Beneficial Ownership Reporting Compliance”. The Proxy Statement will be filed pursuant to Regulation 14A within 120 days of the end of the Company’s fiscal year.

Executive Officers

The following is certain additional information concerning each individual who is an executive officer of the Company or its primary U.S.-based operating subsidiary, RGA Reinsurance Company.

John W. Hayden, 52, is Senior Vice President, Controller. Mr. Hayden joined the Company in March 2000 and held the position of Vice President, SEC Reporting and Investor Relations prior to his current role. Before coming to RGA, Mr. Hayden served in a finance position at General American Life Insurance Company and prior to that position, he was a senior manager at KPMG LLP, in the financial services audit practice, specializing in the insurance industry. Mr. Hayden also serves as a director and officer of several RGA subsidiaries.

William L. Hutton, 59, is Executive Vice President, General Counsel and Secretary of the Company. He is responsible for legal services provided throughout the RGA enterprise. Mr. Hutton joined the Company in 2001 and held several positions in the legal function before becoming General Counsel in 2011. Prior to joining the Company, he served as counsel at General American Life Insurance Company and was in private practice with two law firms in St. Louis, Missouri. Mr. Hutton also serves as an officer of several RGA subsidiaries.

Todd C. Larson, 55, is Senior Executive Vice President, Chief Financial Officer. He is also a member of the Company’s Executive Committee. Mr. Larson joined the Company in May 1995 as Controller and held several positions in the finance function, including the position of Executive Vice President, Corporate Finance and Treasurer, before becoming Global Chief Risk Officer in July 2014. Mr. Larson assumed the role of Chief Financial Officer in May 2016. Mr. Larson previously was Assistant Controller at Northwestern Mutual Life Insurance Company from 1994 through 1995 and prior to that position was an accountant for KPMG LLP from 1985 through 1993. Mr. Larson also serves as a director and officer of several RGA subsidiaries.

John P. Laughlin, 64, is Executive Vice President of Global Financial Solutions (“GFS”). He is also a member of the Company’s Executive Committee. Mr. Laughlin joined the Company in 1995 through a joint venture acquisition that ultimately became RGA Financial Group, L.L.C. Mr. Laughlin heads the Company’s GFS unit, which is responsible for all of RGA’s financial reinsurance, asset-intensive reinsurance and bulk longevity business worldwide. Prior to joining the Company, Mr. Laughlin worked at ITT Financial Corporation and Liberty Financial Management. Mr. Laughlin also serves as a director and officer of several RGA subsidiaries.

Anna Manning, 60, is President and Chief Executive Officer of the Company. She is also a member of the Company’s Executive Committee. Prior to her current role, Ms. Manning held the position of Senior Executive Vice President, Structured Solutions, which includes the Company’s Global Financial Solutions and Global Acquisitions businesses. Ms. Manning joined the Company in 2007 as Executive Vice President and Chief Operating Officer for RGA International Corporation, followed by four years as Executive Vice President of U.S. Markets. Prior to joining the Company, Ms. Manning spent 19 years in actuarial consulting at Tillinghast Towers Perrin, following an actuarial career in the Canadian marketplace at Manulife Financial from 1981 through 1988. She is a Fellow of the Canadian Institute of Actuaries (“FCIA”), and a Fellow of the Society of Actuaries (“FSA”).

Timothy Matson, 60, is Executive Vice President, Chief Investment Officer. He is also a member of the Company’s Executive Committee. Mr. Matson joined the Company in August, 2014 and is responsible for directing RGA’s investment policy and strategy, and for managing the company’s global asset portfolio. Before joining the Company, he held investment management positions with Aetna and ING, in both the U.S. and Asia, and was the Chief Investment Officer of Cathay Conning Asset Management (“CCAM”), a joint venture based in Hong Kong. He is a Chartered Financial Analyst and a member of the CFA Society of St. Louis. Mr. Matson also serves as a director and officer of several RGA subsidiaries.

Alain Néemeh, 51, is Senior Executive Vice President, Chief Operating Officer. He is also a member of the Company’s Executive Committee. Prior to his current role, Mr. Néemeh was Senior Executive Vice President, Global Life and Health, a position he held since 2015. From 2006 to 2014, Mr. Néemeh was President and Chief Executive Officer of RGA Life Reinsurance

Company of Canada (“RGA Canada”). In addition, from 2012, Mr. Néemeh had executive responsibility for the Company’s Australia and New Zealand operations. Prior to 2006, he served as Executive Vice President, Operations, and Chief Financial Officer of RGA Canada from 2001, having joined the finance area in 1997 from KPMG LLP, where he provided audit and other services to a variety of clients in the financial services, manufacturing and retail sectors. Mr. Néemeh also serves as a director and officer of several RGA subsidiaries.

Jonathan Porter, 48, is Executive Vice President and Global Chief Risk Officer. He is also a member of the Company’s Executive Committee. Mr. Porter is responsible for the Company’s global enterprise risk management and corporate pricing oversight. Prior to his current role, Mr. Porter previously served in positions of Senior Vice President, Global Analytics and In-Force Management and Chief Pricing Actuary of International Markets. Before joining the Company in 2008, Mr. Porter worked for Manulife Financial as Chief Financial Officer, U.S. Life Insurance. Mr. Porter holds FSA and FCIA designations. Mr. Porter also serves as a director and officer of several RGA subsidiaries.

Corporate Governance

The Company has adopted a Principles of Ethical Business Conduct (the “Principles”), a Directors’ Code of Conduct (the “Directors’ Code”), and a Financial Management Code of Professional Conduct (the “Financial Management Code”). The Principles apply to all employees and officers of the Company and its subsidiaries. The Directors’ Code applies to directors of the Company and its subsidiaries. The Financial Management Code applies to the Company’s chief executive officer, chief financial officer, corporate controller, primary financial officers in each business unit, and all professionals in finance and finance-related departments. The Company intends to satisfy its disclosure obligations under Item 5.05 of Form 8-K by posting on its website information about amendments to, or waivers from a provision of the Financial Management Code that applies to the Company’s chief executive officer, chief financial officer, and corporate controller. Each of the three Codes described above is available on the Company’s website at www.rgare.com.

Also available on the Company’s website are the following other items: Corporate Governance Guidelines, Audit Committee Charter, Compensation Committee Charter, Nominating and Governance Committee Charter and Finance, Investment and Risk Management Committee Charter (collectively “Governance Documents”).

The Company will provide without charge upon written or oral request, a copy of any of the Codes of Conduct or Governance Documents. Requests should be directed to Investor Relations, Reinsurance Group of America, Incorporated, 16600 Swingley Ridge Road, Chesterfield, MO 63017, by electronic mail (investrelations@rgare.com) or by telephone (636-736-2068).

In accordance with the Securities Exchange Act of 1934, the Company’s board of directors has established a standing audit committee. The board of directors has determined, in its judgment, that all of the members of the audit committee are independent within the meaning of SEC regulations and the listing standards of the New York Stock Exchange (“NYSE”). The board of directors has determined, in its judgment, that all member of the Audit Committee (Messrs. Boot, Danahy and Gauthier and Ms. Guinn and McNeillage) are qualified as audit committee financial experts within the meaning of SEC regulations and the board has determined that each of them has accounting and related financial management expertise within the meaning of the listing standards of the NYSE. The audit committee charter provides that members of the audit committee may not simultaneously serve on the audit committee of more than two other public companies unless such member demonstrates that he or she has the ability to devote the time and attention that are required to serve on multiple audit committees.

Additional information with respect to Directors and Executive Officers of the Company is incorporated by reference to the Proxy Statement under the captions “Nominees and Continuing Directors”, “Board of Directors and Committees”, and “Section 16(a) Beneficial Ownership Reporting Compliance.”

Item 11. EXECUTIVE COMPENSATION

Information on this subject is found in the Proxy Statement under the captions “Compensation Discussion and Analysis”, “Executive Compensation,” “Compensation Committee Report” and “Director Compensation” and is incorporated herein by reference. The Proxy Statement will be filed pursuant to Regulation 14A within 120 days of the end of the Company’s fiscal year.

Item 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDERS MATTERS

Information of this subject is found in the Proxy Statement under the captions “Securities Ownership of Directors, Management and Certain Beneficial Owners”, and is incorporated herein by reference. The Proxy Statement will be filed pursuant to Regulations 14A within 120 days of the end of the Company’s fiscal year.

The following table summarizes information regarding securities authorized for issuance under equity compensation plans:

Plan Category	Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)	Weighted-average exercise price of outstanding options, warrants and rights (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c)
Equity compensation plans approved by security holders	2,671,971 ⁽¹⁾	\$82.65 ^{(2) (3)}	2,100,532 ⁽⁴⁾
Equity compensation plans not approved by security holders	—	—	—
Total	2,671,971 ⁽¹⁾	\$82.65 ^{(2) (3)}	2,100,532 ⁽⁴⁾

- (1) Includes the number of securities to be issued upon exercises under the following plans: Flexible Stock Plan - 2,633,313; and Phantom Stock Plan for Directors – 38,658.
- (2) Does not include 395,871 performance contingent units outstanding under the Flexible Stock Plan or 38,658 phantom units outstanding under the Phantom Stock Plan for Directors because those securities do not have an exercise price (i.e. a unit is a hypothetical share of Company common stock with a value equal to the fair market value of the common stock).
- (3) Reflects the blended weighted-average exercise price of outstanding options under the Flexible Stock Plan \$82.65.
- (4) Includes the number of securities remaining available for future issuance under the following plans: Flexible Stock Plan– 2,004,923; Flexible Stock Plan for Directors – 63,665; and Phantom Stock Plan for Directors – 31,944.

On January 24, 2019, RGA’s board of directors authorized a share repurchase program for up to \$400.0 million of RGA’s outstanding common stock. The authorization was effective immediately and does not have an expiration date. In connection with this new authorization, the board of directors terminated the stock repurchase authority granted in 2017.

Item 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

Information on this subject is found in the Proxy Statement under the captions “Certain Relationships and Related Person Transactions” and “Director Independence” and incorporated herein by reference. The Proxy Statement will be filed pursuant to Regulation 14A within 120 days of the end of the Company’s fiscal year.

Item 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

Information on this subject is found in the Proxy Statement under the caption “Ratification of Appointment of the Independent Auditor” and incorporated herein by reference. The Proxy Statement will be filed pursuant to Regulation 14A within 120 days of the end of the Company’s fiscal year.

Item 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES

(a) 1. Financial Statements

The following consolidated statements are included within Item 8 under the following captions:

Index	Page
Consolidated Balance Sheets	86
Consolidated Statements of Income	87
Consolidated Statements of Comprehensive Income	88
Consolidated Statements of Stockholders' Equity	89
Consolidated Statements of Cash Flows	90
Notes to Consolidated Financial Statements	91-158
Report of Independent Registered Public Accounting Firm	159

2. Schedules, Reinsurance Group of America, Incorporated and Subsidiaries

Schedule	Page
I Summary of Investments	166
II Condensed Financial Information of the Registrant	167-168
III Supplementary Insurance Information	169-170
IV Reinsurance	171
V Valuation and Qualifying Accounts	172

All other schedules specified in Regulation S-X are omitted for the reason that they are not required, are not applicable, or that equivalent information has been included in the consolidated financial statements, and notes thereto, appearing in Item 8.

3. Exhibits

See the Index to Exhibits on page 174.

Item 16. FORM 10-K SUMMARY

None.

REINSURANCE GROUP OF AMERICA, INCORPORATED
SCHEDULE I-SUMMARY OF INVESTMENTS-OTHER THAN
INVESTMENTS IN RELATED PARTIES
December 31, 2018
(in millions)

Type of Investment	Amortized Cost	Estimated Fair Value	Amount at Which Shown in the Balance Sheets ⁽¹⁾
Fixed maturity securities:			
United States government and government agencies and authorities	\$ 2,234	\$ 2,186	\$ 2,186
State and political subdivisions	721	752	752
Foreign governments ⁽²⁾	6,449	7,635	7,635
Public utilities	2,876	2,909	2,909
Mortgage-backed and asset-backed securities	5,472	5,437	5,437
All other corporate bonds	21,130	21,073	21,073
Total fixed maturity securities	<u>\$ 38,882</u>	<u>\$ 39,992</u>	<u>\$ 39,992</u>
Equity securities	\$ 108	\$ 82	\$ 82
Mortgage loans on real estate	4,966		4,966
Policy loans	1,345		1,345
Funds withheld at interest	5,762		5,762
Short-term investments	143		143
Other invested assets	1,915		1,915
Total investments	<u>\$ 53,121</u>		<u>\$ 54,205</u>

(1) Fixed maturity securities are classified as available-for-sale and carried at fair value.

(2) Includes fixed maturities directly issued by foreign governments, supranational and foreign government-sponsored enterprises.

REINSURANCE GROUP OF AMERICA, INCORPORATED
SCHEDULE II—CONDENSED FINANCIAL INFORMATION OF THE REGISTRANT
December 31,
(in thousands)

	2018	2017	2016
CONDENSED BALANCE SHEETS			
Assets:			
Fixed maturity securities available-for-sale, at fair value	\$ 595,303	\$ 710,303	
Short-term and other investments	42,906	54,517	
Cash and cash equivalents	20,641	15,176	
Investment in subsidiaries	11,033,195	12,043,911	
Loans to subsidiaries	1,010,000	1,010,000	
Other assets	239,643	234,707	
Total assets	<u>\$ 12,941,688</u>	<u>\$ 14,068,614</u>	
Liabilities and stockholders' equity:			
Long-term debt - unaffiliated ⁽¹⁾	\$ 2,777,756	\$ 2,775,579	
Long-term debt - affiliated ⁽²⁾	500,000	500,000	
Other liabilities	1,213,379	1,223,500	
Stockholders' equity	8,450,553	9,569,535	
Total liabilities and stockholders' equity	<u>\$ 12,941,688</u>	<u>\$ 14,068,614</u>	
CONDENSED STATEMENTS OF INCOME			
Interest / dividend income ⁽³⁾	\$ 575,833	\$ 131,067	\$ 602,830
Investment related gains (losses), net	(5,392)	(5,187)	203
Operating expenses	(35,912)	(20,517)	(20,742)
Interest expense	(181,364)	(177,417)	(168,924)
Income (loss) before income tax and undistributed earnings of subsidiaries	353,165	(72,054)	413,367
Income tax expense (benefit)	(37,294)	65,882	(23,911)
Net income (loss) before undistributed earnings of subsidiaries	390,459	(137,936)	437,278
Equity in undistributed earnings of subsidiaries	325,383	1,960,117	264,165
Net income	715,842	1,822,181	701,443
Other comprehensive income (loss)	21,455	(7,672)	5,531
Total comprehensive income	<u>\$ 737,297</u>	<u>\$ 1,814,509</u>	<u>\$ 706,974</u>

The condensed financial information of RGA (the "Parent Company") should be read in conjunction with the consolidated financial statements of RGA and its subsidiaries and the notes thereto (the "Consolidated Financial Statements"). These condensed unconsolidated financial statements reflect the results of operations, financial position and cash flows for RGA. Investments in subsidiaries are accounted for using the equity method of accounting.

(1) Long-term debt - unaffiliated consists of the following:

	2018	2017
\$400 million 6.45% Senior Notes due 2019	\$ 399,941	\$ 399,873
\$400 million 5.00% Senior Notes due 2021	399,466	399,245
\$400 million 4.70% Senior Notes due 2023	399,289	399,138
\$400 million 3.95% Senior Notes due 2026	399,987	399,987
\$400 million 6.20% Subordinated Debentures due 2042	400,000	400,000
\$400 million 5.75% Subordinated Debentures due 2056	400,000	400,000
\$400 million Variable Rate Junior Subordinated Debentures due 2065	398,674	398,670
Subtotal	2,797,357	2,796,913
Unamortized debt issue costs	(19,601)	(21,334)
Total	<u>\$ 2,777,756</u>	<u>\$ 2,775,579</u>

Repayments of long-term debt—unaffiliated due over the next five years total \$400,000 in 2019, \$400,000 in 2021 and \$400,000 in 2023.

(2) Long-term debt—affiliated in 2018 and 2017 and consists of \$500,000 of subordinated debt issued to various operating subsidiaries.

(3) Interest/dividend income includes \$450,000 and \$478,602 of cash dividends received from consolidated subsidiaries in 2018 and 2016, respectively. In 2017 there were no cash dividends received from consolidated subsidiaries.

REINSURANCE GROUP OF AMERICA, INCORPORATED
SCHEDULE II—CONDENSED FINANCIAL INFORMATION OF THE REGISTRANT (continued)
December 31,
(in thousands)

	2018	2017	2016
CONDENSED STATEMENTS OF CASH FLOWS			
Operating activities:			
Net income	\$ 715,842	\$ 1,822,181	\$ 701,443
Equity in earnings of subsidiaries	(325,383)	(1,960,117)	(264,165)
Other, net	36,754	57,677	(63,795)
Net cash (used in) provided by operating activities	427,213	(80,259)	373,483
Investing activities:			
Sales of fixed maturity securities available-for-sale	482,324	514,508	228,383
Purchases of fixed maturity securities available-for-sale	(383,392)	(75,000)	(984,397)
Repayments/issuances of loans to subsidiaries	—	40,000	20,000
Change in short-term investments	—	—	102,508
Change in other invested assets	44	125,506	(109,914)
Capital contributions to subsidiaries	(82,150)	(62,500)	(314,142)
Net cash (used in) provided by investing activities	16,826	542,514	(1,057,562)
Financing activities:			
Dividends to stockholders	(140,110)	(117,291)	(100,371)
Purchases of treasury stock	(299,679)	(43,508)	(122,916)
Exercise of stock options, net	3,459	7,292	15,321
Net change in cash collateral for loaned securities	(2,244)	(37,290)	105,093
Principal payments on debt	—	(300,000)	—
Proceeds from unaffiliated long-term debt issuance	—	—	799,984
Debt issuance costs	—	—	(8,766)
Net cash (used in) provided by financing activities	(438,574)	(490,797)	688,345
Net change in cash and cash equivalents	5,465	(28,542)	4,266
Cash and cash equivalents at beginning of year	15,176	43,718	39,452
Cash and cash equivalents at end of year	\$ 20,641	\$ 15,176	\$ 43,718
Supplementary information:			
Cash paid for interest	\$ 176,236	\$ 185,554	\$ 169,860
Cash paid for income taxes, net of refunds	\$ 93,000	\$ 8,248	\$ 1,500

REINSURANCE GROUP OF AMERICA, INCORPORATED
SCHEDULE III—SUPPLEMENTARY INSURANCE INFORMATION
(in thousands)

	As of December 31,		
	Deferred Policy Acquisition Costs	Future Policy Benefits and Interest-Sensitive Contract Liabilities	Other Policy Claims and Benefits Payable
2018			
U.S. and Latin America:			
Traditional	\$ 1,824,874	\$ 11,727,505	\$ 1,948,335
Financial Solutions	420,154	19,420,906	20,855
Canada:			
Traditional	192,661	2,929,568	182,343
Financial Solutions	—	25,574	34,471
Europe, Middle East and Africa:			
Traditional	239,161	1,110,194	977,530
Financial Solutions	—	4,540,751	34,514
Asia Pacific:			
Traditional	702,439	1,738,199	2,436,473
Financial Solutions	18,481	1,043,375	2,365
Corporate and Other	—	753,854	5,869
Total	<u>\$ 3,397,770</u>	<u>\$ 43,289,926</u>	<u>\$ 5,642,755</u>
2017			
U.S. and Latin America:			
Traditional	\$ 1,818,572	\$ 11,343,921	\$ 1,814,018
Financial Solutions	405,623	15,127,529	17,876
Canada:			
Traditional	212,345	3,041,790	206,655
Financial Solutions	—	27,908	1,040
Europe, Middle East and Africa:			
Traditional	229,150	1,075,786	882,744
Financial Solutions	—	4,741,983	38,044
Asia Pacific:			
Traditional	552,947	1,611,633	2,017,920
Financial Solutions	21,187	1,118,012	6,885
Corporate and Other	—	502,321	6,892
Total	<u>\$ 3,239,824</u>	<u>\$ 38,590,883</u>	<u>\$ 4,992,074</u>

REINSURANCE GROUP OF AMERICA, INCORPORATED
SCHEDULE III—SUPPLEMENTARY INSURANCE INFORMATION (continued)
(in thousands)

	Year ended December 31,				
	Premium Income	Net Investment Income	Policyholder Benefits and Interest Credited	Amortization of DAC	Other Expenses ⁽¹⁾
2018					
U.S. and Latin America:					
Traditional	\$ 5,533,256	\$ 729,757	\$ 5,130,795	\$ 180,407	\$ 698,121
Financial Solutions	27,203	706,624	442,071	108,697	105,999
Canada:					
Traditional	1,024,021	199,412	847,828	13,097	251,171
Financial Solutions	43,372	1,334	36,808	—	2,204
Europe, Middle East and Africa:					
Traditional	1,423,199	66,242	1,233,458	26,915	179,113
Financial Solutions	195,333	133,855	116,492	—	37,007
Asia Pacific:					
Traditional	2,296,435	95,521	1,885,355	92,231	261,761
Financial Solutions	866	40,729	39,726	1,691	19,028
Corporate and Other	91	165,051	11,600	—	308,269
Total	<u>\$ 10,543,776</u>	<u>\$ 2,138,525</u>	<u>\$ 9,744,133</u>	<u>\$ 423,038</u>	<u>\$ 1,862,673</u>
2017					
U.S. and Latin America:					
Traditional	\$ 5,356,321	\$ 728,073	\$ 4,842,412	\$ 191,725	\$ 692,600
Financial Solutions	23,683	778,473	458,368	185,280	105,146
Canada:					
Traditional	901,976	189,018	757,912	12,426	212,964
Financial Solutions	38,229	5,115	29,639	—	2,656
Europe, Middle East and Africa:					
Traditional	1,301,640	55,511	1,096,211	20,570	174,808
Financial Solutions	163,720	123,258	153,874	—	33,683
Asia Pacific:					
Traditional	2,053,029	91,675	1,635,728	91,477	334,695
Financial Solutions	2,419	34,529	40,467	1,388	18,790
Corporate and Other	113	148,999	6,346	—	273,789
Total	<u>\$ 9,841,130</u>	<u>\$ 2,154,651</u>	<u>\$ 9,020,957</u>	<u>\$ 502,866</u>	<u>\$ 1,849,131</u>
2016					
U.S. and Latin America:					
Traditional	\$ 5,249,571	\$ 699,833	\$ 4,717,850	\$ 177,255	\$ 698,762
Financial Solutions	24,349	631,097	333,107	133,501	90,458
Canada:					
Traditional	928,642	178,927	707,428	10,621	265,250
Financial Solutions	38,701	2,692	36,275	—	2,718
Europe, Middle East and Africa:					
Traditional	1,140,062	50,301	999,005	33,795	132,290
Financial Solutions	180,271	125,282	178,014	—	24,497
Asia Pacific:					
Traditional	1,681,505	83,049	1,345,951	24,597	286,674
Financial Solutions	5,428	23,648	37,976	1,423	19,920
Corporate and Other	342	117,057	2,460	—	217,738
Total	<u>\$ 9,248,871</u>	<u>\$ 1,911,886</u>	<u>\$ 8,358,066</u>	<u>\$ 381,192</u>	<u>\$ 1,738,307</u>

(1) Includes policy acquisition costs and other insurance expenses, excluding amortization of DAC. Also includes other operating expenses, interest expense, and collateral finance and securitization expense.

REINSURANCE GROUP OF AMERICA, INCORPORATED
SCHEDULE IV—REINSURANCE
(in millions)

As of or for the Year ended December 31,					
	Gross Amount	Ceded to Other Companies	Assumed from Other Companies	Net Amounts	Percentage of Amount Assumed to Net
2018					
Life insurance in force	\$ 1,363	\$ 186,172	\$ 3,329,181	\$ 3,144,372	105.9%
Premiums					
U.S. and Latin America:					
Traditional	\$ 31.6	\$ 593.7	\$ 6,095.4	5,533.3	110.2%
Financial Solutions	4.7	—	22.5	27.2	82.7
Canada:					
Traditional	—	46.9	1,070.9	1,024.0	104.6
Financial Solutions	—	—	43.4	43.4	100.0
Europe, Middle East and Africa:					
Traditional	26.0	25.9	1,423.1	1,423.2	100.0
Financial Solutions	0.2	143.7	338.8	195.3	173.5
Asia Pacific:					
Traditional	—	49.8	2,346.2	2,296.4	102.2
Financial Solutions	—	—	0.9	0.9	100.0
Corporate and Other	—	—	0.1	0.1	100.0
Total	<u>\$ 62.5</u>	<u>\$ 860.0</u>	<u>\$ 11,341.3</u>	<u>\$ 10,543.8</u>	107.6
2017					
Life insurance in force	\$ 1,462	\$ 205,529	\$ 3,297,275	\$ 3,093,208	106.6%
Premiums					
U.S. and Latin America:					
Traditional	\$ 30.5	\$ 610.4	\$ 5,936.2	\$ 5,356.3	110.8%
Financial Solutions	4.3	—	19.4	23.7	81.9
Canada:					
Traditional	—	38.1	940.1	902.0	104.2
Financial Solutions	—	—	38.2	38.2	100.0
Europe, Middle East and Africa:					
Traditional	26.6	34.9	1,310.0	1,301.7	100.6
Financial Solutions	0.2	125.0	288.5	163.7	176.2
Asia Pacific:					
Traditional	—	54.5	2,107.5	2,053.0	102.7
Financial Solutions	—	—	2.4	2.4	100.0
Corporate and Other	—	—	0.1	0.1	100.0
Total	<u>\$ 61.6</u>	<u>\$ 862.9</u>	<u>\$ 10,642.4</u>	<u>\$ 9,841.1</u>	108.1
2016					
Life insurance in force	\$ 1,576	\$ 214,727	\$ 3,062,525	\$ 2,849,374	107.5%
Premiums					
U.S. and Latin America:					
Traditional	\$ 31.6	\$ 616.0	\$ 5,834.0	\$ 5,249.6	111.1%
Financial Solutions	1.6	40.2	63.0	24.4	258.2
Canada:					
Traditional	—	36.5	965.1	928.6	103.9
Financial Solutions	—	—	38.7	38.7	100.0
Europe, Middle East and Africa:					
Traditional	24.1	30.9	1,146.9	1,140.1	100.6
Financial Solutions	0.3	84.4	264.4	180.3	146.6
Asia Pacific:					
Traditional	—	50.3	1,731.8	1,681.5	103.0
Financial Solutions	—	—	5.4	5.4	100.0
Corporate and Other	—	—	0.3	0.3	100.0
Total	<u>\$ 57.6</u>	<u>\$ 858.3</u>	<u>\$ 10,049.6</u>	<u>\$ 9,248.9</u>	108.7

REINSURANCE GROUP OF AMERICA, INCORPORATED
SCHEDULE V—VALUATION AND QUALIFYING ACCOUNTS
(in millions)

Description	Balance at Beginning of Period	Additions		Deductions	Balance at End of Period
		Charged to Costs and Expenses	Charged to Other Accounts		
2018					
Valuation allowance for deferred income taxes	\$ 226.9	\$ (33.7)	\$ (12.1)	\$ —	\$ 181.1
Valuation allowance for mortgage loans	9.4	1.9	—	—	11.3
2017					
Valuation allowance for deferred income taxes	\$ 133.4	\$ 88.5	\$ 10.6	\$ 5.6	\$ 226.9
Valuation allowance for mortgage loans	7.7	1.7	—	—	9.4
2016					
Valuation allowance for deferred income taxes	\$ 127.1	\$ 11.0	\$ (4.7)	\$ —	\$ 133.4
Valuation allowance for mortgage loans	6.8	0.9	—	—	7.7

SIGNATURES

Pursuant to the requirements of Section 13 or 15 (d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

Reinsurance Group of America, Incorporated.

By: /s/ Anna Manning
Anna Manning
President and Chief Executive Officer

Date: February 27, 2019

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed by the following persons on behalf of the registrant and in the capacities indicated on February 27, 2019.

<u>Signatures</u>		<u>Title</u>
<u>/s/ J. Cliff Eason</u>	February 27, 2019*	Chairman of the Board and Director
J. Cliff Eason		
<u>/s/ Anna Manning</u>	February 27, 2019	President, Chief Executive Officer and Director (Principal Executive Officer)
Anna Manning		
<u>/s/ Arnoud W.A. Boot</u>	February 27, 2019*	Director
Arnoud W.A. Boot		
<u>/s/ John F. Danahy</u>	February 27, 2019*	Director
John F. Danahy		
<u>/s/ Christine R. Detrick</u>	February 27, 2019*	Director
Christine R. Detrick		
<u>/s/ John J. Gauthier</u>	February 27, 2019*	Director
John J. Gauthier		
<u>/s/ Patricia L. Guinn</u>	February 27, 2019*	Director
Patricia L. Guinn		
<u>/s/ Alan C. Henderson</u>	February 27, 2019*	Director
Alan C. Henderson		
<u>/s/ Hazel M. McNeilage</u>	February 27, 2019*	Director
Hazel M. McNeilage		
<u>/s/ Frederick J. Sievert</u>	February 27, 2019*	Director
Frederick J. Sievert		
<u>/s/ Stanley B. Tulin</u>	February 27, 2019*	Director
Stanley B. Tulin		
<u>/s/ Steven C. Van Wyk</u>	February 27, 2019*	Director
Steven C. Van Wyk		
<u>/s/ Todd C. Larson</u>	February 27, 2019	Senior Executive Vice President and Chief Financial Officer (Principal Financial and Accounting Officer)
Todd C. Larson		

*	<u>By: /s/ Todd C. Larson</u>	February 27, 2019	
	Todd C. Larson	Attorney-in-fact	

Index to Exhibits

<u>Exhibit Number</u>	<u>Description</u>
3.1	Amended and Restated Articles of Incorporation, as amended by Amendment of Articles of Incorporation, effective as of May 23, 2018, incorporated by reference to Exhibit 3.1 to Quarterly Report on Form 10-Q for the period ended June 30, 2018, filed on August 3, 2018 (File No. 1-11848)
3.2	Amended and Restated Bylaws, effective as of May 23, 2018, incorporated by reference to Exhibit 3.2 to Current Report on Form 8-K filed on May 24, 2018 (File No. 1-11848)
4.1	Form of stock certificate for RGA's common stock, incorporated by reference to Exhibit 4 to RGA's Registration Statement on Form 8-A filed on November 17, 2008 (File No. 1-11848)
4.2	Form of Senior Indenture between RGA and The Bank of New York, as Trustee, incorporated by reference to Exhibit 4.1 to Registration Statement on Form S-3, filed on February 9, 2001, as amended (File No. 333-55304) (the "Original S-3")
4.3	Third Supplemental Senior Indenture, dated as of November 6, 2009, between RGA and The Bank of New York Mellon Trust Company, N.A., as successor trustee to The Bank of New York, incorporated by reference to Exhibit 4.2 to Current Report on Form 8-K filed on November 9, 2009 (File No. 1-11848)
4.4	Fourth Supplemental Senior Indenture, dated as of May 27, 2011, between RGA and The Bank of New York Mellon Trust Company, N.A., as successor trustee to The Bank of New York, incorporated by reference to Exhibit 4.2 to Current Report on Form 8-K filed on May 31, 2011 (File No. 1-11848)
4.5	Indenture, dated as of August 21, 2012, between RGA and The Bank of New York Mellon Trust Company, N.A., as Trustee, incorporated by reference to Exhibit 4.1 to Current Report on Form 8-K filed on August 21, 2012 (File No. 1-11848)
4.6	First Supplemental Indenture, dated as of August 21, 2012, between RGA and The Bank of New York Mellon Trust Company, N.A., as Trustee, incorporated by reference to Exhibit 4.2 to Current Report on Form 8-K filed on August 21, 2012 (File No. 1-11848)
4.7	Second Supplemental Indenture, dated as of September 24, 2013, between RGA and The Bank of New York Trust Company, N.A., as Trustee, incorporated by reference to Exhibit 4.2 to Current Report on Form 8-K filed on September 24, 2013 (File No. 1-11848)
4.8	Third Supplemental Indenture, dated as of June 8, 2016, between RGA and The Bank of New York Mellon Trust Company, N.A., as Trustee, incorporated by reference to Exhibit 4.2 to Current Report on Form 8-K filed on June 8, 2016 (File No. 1-11848)
4.9	Fourth Supplemental Indenture, dated as of June 8, 2016, between the Company and The Bank of New York Mellon Trust Company, N.A., as Trustee, incorporated by reference to Exhibit 4.3 to Current Report on Form 8-K filed on June 8, 2016 (File No. 1-11848)
4.10	Form of Junior Subordinated Indenture between RGA and The Bank of New York, as Trustee, incorporated by reference to Exhibit 4.3 of the Original S-3 (File No. 333-55304)
4.11	Form of Second Supplemental Junior Subordinated Indenture between RGA and The Bank of New York, as Trustee, incorporated by reference to Exhibit 4.2 to Current Report on Form 8-K filed on December 9, 2005 (File No. 1-11848)

- 10.1 Credit Agreement, dated as of August 21, 2018, by and among RGA, the lenders named therein, U.S. Bank National Association, as Administrative Agent, Swing Line Lender and L/C Issuer, Bank of America, N.A.; JPMorgan Chase Bank, N.A.; and Wells Fargo Bank, National Association as Joint Syndication Agents and Barclays Bank PLC; HSBC Bank USA, National Association; KeyBank National Association; Mizuho Bank, Ltd.; MUFG Bank, Ltd.; Royal Bank of Canada; and Sumitomo Mitsui Banking Corporation as Co-Documentation Agents, incorporated by reference to Exhibit 10.1 to Current Report on Form 8-K filed on August 22, 2018 (File No. 1-11848)
- 10.2 Letter of Credit Reimbursement Agreement, dated as of May 17, 2017, by and between RGA and Crédit Agricole Corporate and Investment Bank, incorporated by reference to Exhibit 10.1 of Current Report on Form 8-K filed May 19, 2017 (File No. 1-11848)
- 10.3 RGA Annual Bonus Plan, effective May 21, 2008, as amended and restated, incorporated by reference to Exhibit 10.5 to Annual Report on Form 10-K for the fiscal year ended December 31, 2012, filed on March 1, 2013 (file No. 1-11848)*
- 10.4 RGA Flexible Stock Plan as amended and restated effective July 1, 1998 and as further amended by Amendment on March 16, 2000, Second Amendment on May 28, 2003, Third Amendment on May 26, 2004, Fourth Amendment on May 23, 2007, Fifth Amendment on May 21, 2008, Sixth Amendment on May 8, 2011, Seventh Amendment on May 18, 2011, and Eighth Amendment on May 15, 2013, incorporated by reference to Exhibit 10.1 to Quarterly Report on Form 10-Q for the period ended June 30, 2013, filed on August 5, 2013 (File No. 1-11848)*
- 10.5 Form of RGA Flexible Stock Plan Non-Qualified Stock Option Agreement, incorporated by reference to Exhibit 10.1 to Current Report on Form 8-K filed on September 10, 2004 (File No. 1-11848)*
- 10.6 Form of RGA Flexible Stock Plan Performance Contingent Share Agreement, incorporated by reference to Exhibit 10.2 to Quarterly Report on Form 10-Q for the period ended March 31, 2012, filed on May 7, 2012 (File No. 1-11848) *
- 10.7 Form of RGA Flexible Stock Plan Stock Appreciation Right Award Agreement, incorporated by reference to Exhibit 10.1 to Current Report on Form 8-K filed on February 25, 2011 (File No. 1-11848)*
- 10.8 Form of RGA Flexible Stock Plan Stock Appreciation Right Award Agreement, incorporated by reference to Exhibit 10.1 to Quarterly Report on Form 10-Q for the period ended March 31, 2012, filed on May 7, 2012 (File No. 1-11848)*
- 10.9 RGA Flexible Stock Plan, as amended and restated effective May 23, 2017, incorporated by reference to Exhibit 10.9 to Annual Report on Form 10-K for the fiscal year ended December 31, 2017, filed on February 27, 2018 (File No. 1-11848)*
- 10.10 Form of Performance Contingent Share Agreement under RGA Flexible Stock Plan, as amended and restated effective May 23, 2017, incorporated by reference to Exhibit 10.1 to Quarterly Report on Form 10-Q for the period ended March 31, 2018, filed on May 4, 2018 (File No. 1-11848)*
- 10.11 Form of Stock Appreciation Right Award Agreement under RGA Flexible Stock Plan, as amended and restated effective May 23, 2017, incorporated by reference to Exhibit 10.2 to Quarterly Report on Form 10-Q for the period ended March 31, 2018, filed on May 4, 2018 (File No. 1-11848)*
- 10.12 Form of Non-Qualified Stock Option Agreement under RGA Flexible Stock Plan, as amended and restated effective May 23, 2017, incorporated by reference to Exhibit 10.1 to Quarterly Report on Form 10-Q for the period ended June 30, 2018, filed on August 3, 2018 (File No. 1-11848)*
- 10.13 RGA Flexible Stock Plan for Directors, as amended and restated effective May 28, 2003, incorporated by reference to Proxy Statement on Schedule 14A for the annual meeting of shareholders on May 28, 2003, filed on April 10, 2003 (File No. 1-11848)*

10.14	RGA Flexible Stock Plan for Directors, as amended and restated effective May 23, 2017, incorporated by reference to Exhibit 10.11 to Annual Report on Form 10-K for the fiscal year ended December 31, 2017, filed on February 27, 2018 (File No. 1-11848)*
10.15	RGA Phantom Stock Plan for Directors, as amended effective January 1, 2003, incorporated by reference to Proxy Statement on Schedule 14A for the annual meeting of shareholders on May 28, 2003, filed on April 10, 2003*
10.16	RGA Phantom Stock Plan for Directors, as amended and restated effective January 1, 2016, incorporated by reference to Exhibit 10.1 to Quarterly Report on Form 10-Q for the period ended September 30, 2015 (File No. 1-11848), filed on November 4, 2015*
10.17	RGA Phantom Stock Plan for Directors, as amended and restated effective May 23, 2017, incorporated by reference to Exhibit 10.14 to Annual Report on Form 10-K for the fiscal year ended December 31, 2017, filed on February 27, 2018 (File No. 1-11848)*
10.18	Offer Letter, dated October 29, 2015, between RGA and Anna Manning, incorporated by reference to Exhibit 10.1 to Current Report on Form 8-K filed on November 24, 2015 (File No. 1-11848)*
10.19	Form of Stock Appreciation Right Award Agreement, effective December 1, 2015, between RGA and Anna Manning, incorporated by reference to Exhibit 10.2 to Current Report on Form 8-K filed on November 24, 2015 (File No. 1-11848)*
10.20	Form of Stock Appreciation Right Award Agreement, effective December 1, 2015, between RGA and Alain Néemeh, incorporated by reference to Exhibit 10.3 to Current Report on Form 8-K filed on November 24, 2015 (File No. 1-11848)*
10.21	RGA Reinsurance Company Augmented Benefit Plan, as amended, incorporated by reference to Exhibit 10.20 to Annual Report on Form 10-K for the fiscal year ended December 31, 2017, filed on February 27, 2018 (File No. 1-11848)*
10.22	RGA Reinsurance Company Executive Deferred Savings Plan, as amended, incorporated by reference to Exhibit 10.21 to Annual Report on Form 10-K for the fiscal year ended December 31, 2017, filed on February 27, 2018 (File No. 1-11848)*
10.23	Canadian Supplemental Executive Retirement Plan for Executive Employees of RGA Life Reinsurance Company of Canada, as amended and restated as of August 1, 2015, incorporated by reference to Exhibit 10.22 to Annual Report on Form 10-K for the fiscal year ended December 31, 2017, filed on February 27, 2018 (File No. 1-11848)*
10.24	Directors' Compensation Summary Sheet, incorporated by reference to Exhibit 10.23 to Annual Report on Form 10-K for the fiscal year ended December 31, 2017, filed on February 27, 2018 (File No. 1-11848)*
10.25	Form of Directors' Indemnification Agreement, incorporated by reference to Exhibit 10.24 to Annual Report on Form 10-K for the fiscal year ended December 31, 2017, filed on February 27, 2018 (File No. 1-11848)*
21.1	Subsidiaries of RGA
23.1	Consent of Deloitte & Touche LLP
24.1	Powers of Attorney for Messrs. Boot, Danahy, Eason, Gauthier, Henderson, Sievert, Tulin and Van Wyk and Meses. Detrick, Guinn and McNeillage

31.1	Certification of Chief Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to section 302 of the Sarbanes-Oxley Act of 2002
31.2	Certification of Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to section 302 of the Sarbanes-Oxley Act of 2002
32.1	Certification of Chief Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to section 906 of the Sarbanes-Oxley Act of 2002
32.2	Certification of Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to section 906 of the Sarbanes-Oxley Act of 2002
101.INS	XBRL Instance Document
101.SCH	XBRL Taxonomy Extension Schema Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.LAB	XBRL Taxonomy Extension Label Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document

* Represents a management contract or compensatory plan or arrangement required to be filed as an exhibit to this form pursuant to Item 15 of this Report.

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Shareholder Information

Transfer Agent:

Computershare

P.O. Box 505000

Louisville, KY 40233

T 866-204-0209

<http://www.computershare.com/investor>

Independent Auditors:

Deloitte and Touche LLP

Annual Report on Form 10-K:

Reinsurance Group of America, Incorporated files with the Securities and Exchange Commission an Annual Report (Form 10-K).

Shareholders may obtain a copy of the Form 10-K without charge by writing to:

Jeff Hopson

Senior Vice President – Investor Relations

Reinsurance Group of America, Incorporated

16600 Swingley Ridge Road

Chesterfield, Missouri 63017-1706

U.S.A.

Shareholders may contact us through our internet site at <http://www.rgare.com> or may email us at investrelations@rgare.com

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Reinsurance Group of America, Incorporated®

16600 Swingley Ridge Road
Chesterfield, Missouri 63017-1706 U.S.A.

www.rgare.com