

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 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**

Commission File Number 001-15811

MARKEL CORPORATION

(Exact name of registrant as specified in its charter)

A Virginia Corporation
IRS Employer Identification No. 54-1959284

4521 Highwoods Parkway, Glen Allen, Virginia 23060-6148
(Address of principal executive offices) (Zip code)

Registrant's telephone number, including area code: (804) 747-0136

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

Common Stock, no par value
New York Stock Exchange, Inc.
(title of each class and name of the exchange on which registered)

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 (§ 229.405 of this chapter) 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.

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 (as defined in Rule 12b-2 of the Act). Yes ☐ No ☒

The aggregate market value of the shares of the registrant's Common Stock held by non-affiliates as of June 30, 2018 was approximately \$14,686,000,000 .

The number of shares of the registrant's Common Stock outstanding at February 5, 2019 : 13,874,896 .

Documents Incorporated By Reference

The portions of the registrant's Proxy Statement for the Annual Meeting of Shareholders scheduled to be held on May 13, 2019, referred to in Part III.

Index and Cross References-Form 10-K Annual Report

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BUSINESS OVERVIEW

We are a diverse financial holding company serving a variety of niche markets. Our principal business markets and underwrites specialty insurance products. We believe that our specialty product focus and niche market strategy enable us to develop expertise and specialized market knowledge. We seek to differentiate ourselves from competitors by our expertise, service, continuity and other value-based considerations. We also own interests in various businesses that operate outside of the specialty insurance marketplace. Our financial goals are to earn consistent underwriting and operating profits and superior investment returns to build shareholder value.

Our business is comprised of the following types of operations:

- Underwriting - our underwriting operations are comprised of our risk-bearing insurance and reinsurance operations
- Investing - our investing activities are primarily related to our underwriting operations
- Market Ventures - our Market Ventures operations include our controlling interests in a diverse portfolio of businesses that operate outside of the specialty insurance marketplace
- Investment management - our investment management operations include investment fund managers that offer a variety of investment products, including insurance-linked securities, catastrophe bonds, insurance swaps and weather derivatives
- Program services - our program services business serves as a fronting platform that provides other insurance companies access to the United States (U.S.) property and casualty insurance market

Underwriting

Specialty Insurance and Reinsurance

The specialty insurance market differs significantly from the standard market. In the standard market, insurance rates and forms are highly regulated, products and coverages are largely uniform with relatively predictable exposures and companies tend to compete for customers on the basis of price. In contrast, the specialty market provides coverage for hard-to-place risks that generally do not fit the underwriting criteria of standard carriers.

Competition in the specialty insurance market tends to focus less on price than in the standard insurance market and more on other value-based considerations, such as availability, service and expertise. While specialty market exposures may have higher perceived insurance risks than their standard market counterparts, we seek to manage these risks to achieve higher financial returns. To reach our financial and operational goals, we must have extensive knowledge and expertise in our chosen markets. Many of our accounts are considered on an individual basis where customized forms and tailored solutions are employed.

By focusing on the distinctive risk characteristics of our insureds, we have been able to identify a variety of niche markets where we can add value with our specialty product offerings. Examples of niche insurance markets that we have targeted include wind and earthquake-exposed commercial properties, liability coverage for highly specialized professionals, equine-related risks, workers' compensation insurance for small businesses, classic cars and marine, energy and environmental-related activities. Our market strategy in each of these areas of specialization is tailored to the unique nature of the loss exposure, coverage and services required by insureds. In each of our niche markets, we assign teams of experienced underwriters and claims specialists who provide a full range of insurance services.

We also participate in the reinsurance market in certain classes of reinsurance product offerings. In the reinsurance market, our clients are other insurance companies, or cedents. We typically write our reinsurance products in the form of treaty reinsurance contracts, which are contractual arrangements that provide for automatic reinsuring of a type or category of risk underwritten by cedents. Generally, we participate on reinsurance treaties with a number of other reinsurers, each with an allocated portion of the treaty, with the terms and conditions of the treaty being substantially the same for each participating reinsurer. With treaty reinsurance contracts, we do not separately evaluate each of the individual risks assumed under the contracts and are largely dependent on the individual underwriting decisions made by the cedent. Accordingly, we review and analyze the cedent's risk management and underwriting practices in deciding whether to provide treaty reinsurance and in pricing of treaty reinsurance contracts.

Our reinsurance products are written on both a quota share and excess of loss basis. Quota share contracts require us to share the losses and expenses in an agreed proportion with the cedent. Excess of loss contracts require us to indemnify the cedent against all or a specified portion of losses and expenses in excess of a specified dollar or percentage amount. In both types of contracts, we may provide a ceding commission to the cedent.

We distinguish ourselves in the reinsurance market by the expertise of our underwriting teams, our access to global reinsurance markets, our ability to offer large lines and our ability to customize reinsurance solutions to fit our client's needs. Our specialty reinsurance product offerings include coverage for general casualty, professional liability, property, workers' compensation and credit and surety risks.

Markets

In the United States, we write business in the excess and surplus lines (E&S) and specialty admitted insurance and reinsurance markets. In 2017, the E&S market represented \$45 billion, or 7%, of the \$642 billion U.S. property and casualty industry. ⁽¹⁾ In 2017, we were the third largest E&S writer in the U.S. as measured by direct premium writings. ⁽¹⁾

Our E&S insurance operations are conducted through Evanston Insurance Company (Evanston), domiciled in Illinois. The majority of our specialty admitted insurance operations are conducted through Markel Insurance Company (MIC), domiciled in Illinois; Markel American Insurance Company (MAIC), domiciled in Virginia; FirstComp Insurance Company (FCIC), domiciled in Nebraska; and Essentia Insurance Company (Essentia), domiciled in Missouri. Beginning in 2017, our specialty admitted operations also include Suretec Insurance Company (SIC), Suretec Indemnity Company (SINC), State National Insurance Company, Inc. (SNIC) and National Specialty Insurance Company (NSIC), all of which are domiciled in Texas. Our U.S. reinsurance operations are conducted through Markel Global Reinsurance Company (Markel Global Re), a Delaware-domiciled reinsurance company.

We participate in the London insurance market primarily through Markel Capital Limited (Markel Capital) and Markel International Insurance Company Limited (MIICL). Markel Capital is the corporate capital provider for Markel Syndicate 3000, through which our Lloyd's of London (Lloyd's) operations are conducted. Markel Syndicate 3000 is managed by Markel Syndicate Management Limited (MSM). Markel Capital and MIICL are headquartered in London, England and have offices across the United Kingdom (U.K.), Europe, Canada, Latin America, Asia Pacific and the Middle East through which we are able to offer insurance and reinsurance. The London insurance market produced approximately \$67 billion of gross written premium in 2017. ⁽²⁾ In 2017, the U.K. non-life insurance market was the largest in Europe and fourth largest in the world. ⁽³⁾ In 2017, gross premium written through Lloyd's syndicates generated roughly 65% of the London market's international insurance business, ⁽²⁾ making Lloyd's the world's largest commercial surplus lines insurer and sixth largest reinsurer. ⁽⁴⁾ Corporate capital providers often provide a majority of a syndicate's capacity and also generally own or control the syndicate's managing agent. This structure permits the capital provider to exert greater influence on, and demand greater accountability for, underwriting results. In 2017, corporate capital providers accounted for approximately 90% of total underwriting capacity in Lloyd's. ⁽⁵⁾

In anticipation of the U.K.'s expected exit from the European Union in 2019, which could impact MIICL and Markel Syndicate 3000's ability to transact business in the remaining European Union member states and Switzerland, in 2018, we established Markel Insurance SE (MISE), a regulated insurance carrier located in Munich, Germany. From its offices in Germany, MISE can transact business in all remaining European Union member states and throughout the European Economic Area (EEA). MISE has established branches in Ireland, the Netherlands, Spain and the U.K. For further discussion regarding the U.K.'s expected exit from the European Union, see "Brexit Developments" under Management's Discussion & Analysis of Financial Condition and Results of Operations.

In Latin America, we provide reinsurance through MIICL, using our representative office in Bogota, Colombia and our service company in Buenos Aires, Argentina, and through Markel Resseguradora do Brasil S.A. (Markel Brazil Re), our reinsurance company in Rio de Janeiro, Brazil. MIICL is also able to offer reinsurance in a number of Latin American countries through offices outside of Latin America. We also provide insurance through Markel Seguradora do Brasil S.A. (Markel Brazil), our insurance company in Rio de Janeiro, Brazil.

(1) *Market Segment Report - U.S. Surplus Lines*, A.M. Best (September 14, 2018).

(2) *London Company Market Statistics Report*, International Underwriting Association (October 2018).

(3) *sigma*, Swiss Re Institute (March 2018).

(4) *Market Segment Report - Global Reinsurance*, A.M. Best (September 4, 2018).

(5) *Lloyd's Annual Report 2017*.

In Bermuda, we write business in the worldwide insurance and reinsurance markets. The Bermuda property and casualty insurance and reinsurance market produced \$66 billion of gross written premium in 2016 . ⁽¹⁾ We conduct our Bermuda operations through Markel Bermuda Limited (Markel Bermuda), which is registered as a Class 4 insurer and Class C long-term insurer under the insurance laws of Bermuda.

Our reinsurance operations, which include our operations based in the United States, the United Kingdom, Latin America and Bermuda, as described above, made us the 35th largest reinsurer in 2017 , as measured by worldwide gross reinsurance premium writings. ⁽²⁾

In 2018 , 21% of gross premium writings from our underwriting segments related to foreign risks (i.e., coverage for risks or cedents located outside of the U.S.), of which 39% were from the U.K. and 11% were from Canada. In 2017 , 21% of our premium writings related to foreign risks, of which 34% were from the U.K. and 12% were from Canada. In 2016 , 23% of our premium writings related to foreign risks, of which 32% were from the U.K. and 11% were from Canada. In each of these years, there was no other individual foreign country from which premium writings were material. Premium writings are attributed to individual countries based upon location of risk or cedent.

Most of our business is placed through insurance and reinsurance brokers. Some of our insurance business is also placed through managing general agents. We seek to develop and capitalize on relationships with insurance and reinsurance brokers, insurance and reinsurance companies, large global corporations and financial intermediaries to develop and underwrite business. A significant volume of premium for the property and casualty insurance and reinsurance industry is produced through a small number of large insurance and reinsurance brokers. During the years ended December 31, 2018 , 2017 and 2016 , the top three independent brokers accounted for 25% , 27% and 28% , respectively, of gross premiums written in our underwriting segments.

Competition

We compete with numerous domestic and international insurance companies and reinsurers, Lloyd's syndicates, risk retention groups, insurance buying groups, risk securitization programs, alternative capital sources and alternative self-insurance mechanisms. We also compete with new companies that continue to be formed to enter the insurance and reinsurance markets, particularly companies with new or "disruptive" technologies or business models. Competition may take the form of lower prices, broader coverages, greater product flexibility, higher coverage limits, higher quality services or higher ratings by independent rating agencies. In all of our markets, we compete by developing specialty products to satisfy well-defined market needs and by maintaining relationships with agents, brokers and insureds who rely on our expertise. This expertise is our principal means of competing. We offer a diverse portfolio of products, each with its own distinct competitive environment, which enables us to be responsive to changes in market conditions for individual product lines. With each of our products, we seek to compete with innovative ideas, appropriate pricing, expense control and quality service to policyholders, agents and brokers.

Few barriers exist to prevent insurers and reinsurers from entering our markets of the property and casualty industry. Market conditions and capital capacity influence the degree of competition at any point in time. Periods of intense competition, which typically include broader coverage terms, lower prices and excess underwriting capacity, are referred to as a "soft market." A favorable insurance market is commonly referred to as a "hard market" and is characterized by stricter coverage terms, higher prices and lower underwriting capacity. During soft markets, unfavorable conditions exist due in part to what many perceive as excessive amounts of capital in the industry. In an attempt to use their capital, many insurance companies seek to write additional premiums without appropriate regard for ultimate profitability, and standard insurance companies are more willing to write specialty coverages. The opposite is typically true during hard markets. Historically, the performance of the property and casualty reinsurance and insurance industries has tended to fluctuate in cyclical periods of price competition and excess underwriting capacity, followed by periods of high premium rates and shortages of underwriting capacity. This cyclical market pattern can be more pronounced in the specialty insurance and reinsurance markets in which we compete than the standard insurance market.

(1) *Bermuda Monetary Authority 2017 Annual Report.*

(2) *Market Segment Report - Global Reinsurance, A.M. Best (September 4, 2018) .*

We experienced soft insurance market conditions across most of our property product lines, as well as on our marine and energy line beginning in 2013 and continuing through 2017. Our large account business has also been subject to more pricing pressure and competition remains strong in the reinsurance market. Following the high level of natural catastrophes that occurred in the third and fourth quarters of 2017, in 2018, we experienced slightly more favorable rates, particularly on our catastrophe exposed and loss affected product lines. However, we also experienced rate decreases on other product lines and the market remains competitive.

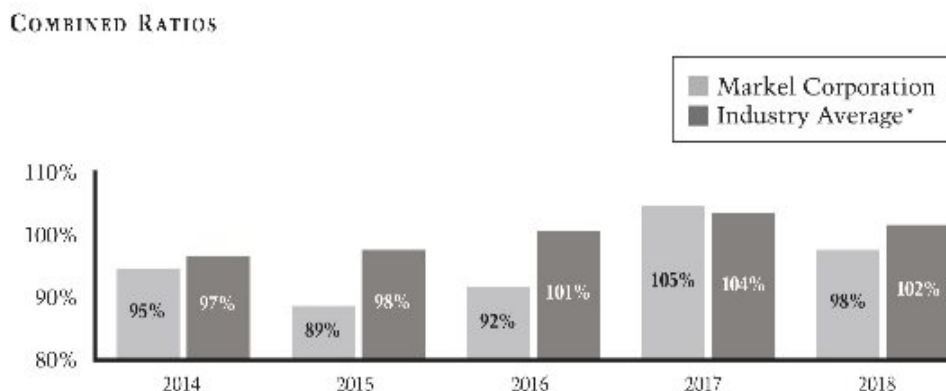
We routinely review the pricing of our major product lines and will continue to pursue price increases in 2019, when possible. However, when we believe the prevailing market price will not support our underwriting profit targets, the business is not written. As a result of our underwriting discipline, gross premium volume may vary when we alter our product offerings to maintain or improve underwriting profitability.

Underwriting Philosophy

By focusing on market niches where we have underwriting expertise, we seek to earn consistent underwriting profits, which are a key component of our strategy. The property and casualty insurance industry commonly defines underwriting profit or loss as earned premiums net of losses and loss adjustment expenses and underwriting, acquisition and insurance expenses. We believe that the ability to achieve consistent underwriting profits demonstrates knowledge and expertise, commitment to superior customer service and the ability to manage insurance risk. We use underwriting profit or loss as a basis for evaluating our underwriting performance.

The combined ratio is a measure of underwriting performance and represents the relationship of incurred losses, loss adjustment expenses and underwriting, acquisition and insurance expenses to earned premiums. A combined ratio less than 100% indicates an underwriting profit, while a combined ratio greater than 100% reflects an underwriting loss. In 2018, our combined ratio was 98%. See Management's Discussion & Analysis of Financial Condition and Results of Operations for further discussion of our underwriting results.

The following graph compares our combined ratio to the property and casualty industry's combined ratio for the past five years.



* Source: A.M. Best Company. Industry Average is estimated for 2018.

Underwriting Segments

Through December 31, 2017, we monitored and reported our ongoing underwriting operations in the following three segments: U.S. Insurance, International Insurance and Reinsurance. In conjunction with the continued growth and diversification of our business, beginning the first quarter of 2018 we changed the way we review our ongoing underwriting operations. In determining how to monitor our underwriting results, management considers many factors, including the nature of the insurance product sold, the type of account written and the type of customer served. Effective January 1, 2018, our chief operating decision maker allocates resources to and assesses the performance of our ongoing underwriting operations on a global basis in the following two segments: Insurance and Reinsurance. The Insurance segment includes all direct business and facultative placements written across the Company. The Reinsurance segment includes all treaty reinsurance written across the Company. Results for lines of business discontinued prior to, or in conjunction with, acquisitions, including development on asbestos and environmental loss reserves and the results attributable to the run-off of life and annuity reinsurance business, are monitored separately and are not included in a reportable segment.

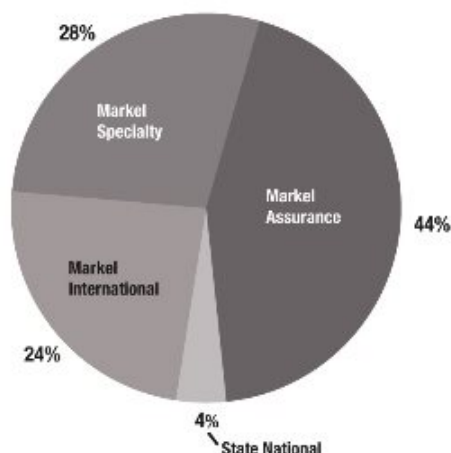
See note 20 of the notes to consolidated financial statements for additional segment reporting disclosures.

Markel Corporation
2018 Gross Premium Volume (\$5.8 billion)



Insurance Segment

Our Insurance segment includes both hard-to-place risks written outside of the standard market on an E&S basis and unique and hard-to-place risks that must be written on an admitted basis due to marketing and regulatory reasons. Business in this segment is primarily written through our Markel Assurance, Markel Specialty and Markel International divisions. As a result of the acquisition of State National Companies, Inc. (State National), effective November 2017, we created the State National division. The State National division's collateral protection underwriting business is included in the Insurance segment and its program services business is not included in a reportable segment.



Markel Assurance Division

The Markel Assurance division writes commercial and Fortune 1000 accounts for brokers located in the U.S., Bermuda, Ireland and the U.K. In the U.S. accounts are written on an E&S basis and on an admitted basis when a risk must remain with the admitted insurance company for marketing and regulatory reasons. The E&S market focuses on hard-to-place risks and loss exposures that generally cannot be written in the standard market. U.S. insurance regulations generally require an E&S account to be declined by admitted carriers before an E&S company may write the business. E&S eligibility allows our insurance subsidiaries to underwrite unique loss exposures with more flexible policy forms and unregulated premium rates. This typically results in coverages that are more restrictive and more expensive than coverages in the standard market. The Markel Assurance division also writes complex, Fortune 1000 accounts on an admitted and non-admitted basis. Our business that is written in the admitted market is likewise focused on risks that, although unique and hard-to-place, can still be written in the standard market.

Markel Assurance business is primarily written through wholesale brokers, retail brokers and surplus lines general agents who have limited quoting and binding authority. Admitted business produced by this division is written through MAIC, which is authorized to write business in all 50 states and the District of Columbia. Business written on a non-admitted basis and in the E&S market is primarily written through Evanston, which is authorized to write business in all 50 states and the District of Columbia, Guam, Puerto Rico and the U.S. Virgin Islands, as well as MIC, Markel Bermuda and MIICL.

Markel Specialty Division

The Markel Specialty division writes program insurance and other specialty coverages for well-defined niche markets, primarily on an admitted basis in the U.S. Our business written in the admitted market focuses on risks that, although unique and hard-to-place in the standard market, must remain with an admitted insurance company for marketing and regulatory reasons. Hard-to-place risks written in the admitted market cover insureds engaged in similar, but highly specialized, activities that require a total insurance program not otherwise available from standard insurers or insurance products that are overlooked by large admitted carriers. The admitted market is subject to more state regulation than the E&S market, particularly with regard to rate and form filing requirements, restrictions on the ability to exit lines of business, premium tax payments and membership in various state associations, such as state guaranty funds and assigned risk plans.

Business written in the Markel Specialty division is primarily written by retail insurance agents who have very limited or no underwriting authority. We also utilize managing general agents, who have broader underwriting authority, for certain of our product lines. Agents are carefully selected and agency business is controlled through regular audits and pre-approvals. Certain products and programs are marketed directly to consumers or distributed through wholesale producers. Personal lines coverages included in this segment are marketed directly to the consumer using direct mail, internet and telephone promotions, as well as relationships with various motorcycle and boat manufacturers, dealers and associations.

The majority of the business produced by this division is written either through MIC, MAIC, FCIC, Essentia, SIC and SINC. MIC, MAIC and Essentia are licensed to write property and casualty insurance in all 50 states and the District of Columbia. MAIC is also licensed to write property and casualty insurance in Puerto Rico. Essentia specializes in coverage for classic cars and boats. FCIC is currently licensed in 28 states and specializes in workers' compensation coverage. SIC and SINC specialize in surety coverages. SIC is currently licensed in all 50 states and the District of Columbia. SINC is currently licensed in California and Texas.

Markel International Division

The Markel International division writes business worldwide from our London-based platform and branch offices around the world. This includes Markel Syndicate 3000, through which our Lloyd's operations are conducted, and MIICL. Beginning in 2018, the Markel International division also includes business written through MISE, our regulated insurance company in Germany. The London insurance market is known for its ability to provide innovative, tailored coverage and capacity for unique and hard-to-place risks. Hard-to-place risks in the London market are generally distinguishable from standard risks due to the complexity or significant size of the risk. It is primarily a broker market, which means that insurance brokers bring most of the business to the market. Risks written in the Markel International division are written on either a direct basis or a subscription basis, the latter of which means that loss exposures brought into the market are typically insured by more than one insurance company or Lloyd's syndicate, often due to the high limits of insurance coverage required. When we write business in the subscription market, we prefer to participate as lead underwriter in order to control underwriting terms, policy conditions and claims handling.

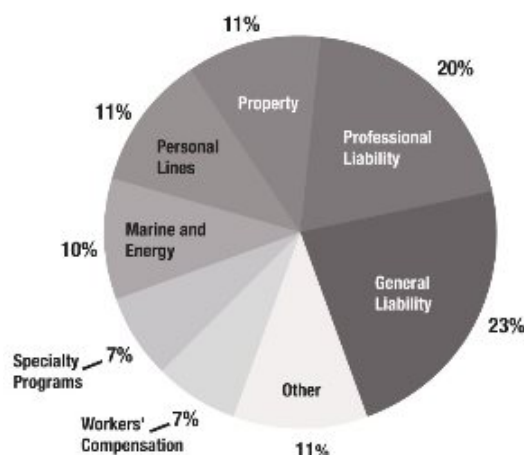
State National Division

The State National division writes collateral protection insurance (CPI), which insures personal automobiles and other vehicles held as collateral for loans made by credit unions, banks and specialty finance companies through its lender services product line on both an admitted and non-admitted basis. This business is primarily written on SNIC and NSIC, which are licensed to write property and casualty insurance in all 50 states and the District of Columbia.

Our Insurance segment reported gross premium volume of \$4.7 billion , earned premiums of \$3.8 billion and an underwriting profit of \$228.8 million in 2018 .

Insurance Segment

2018 Gross Premium Volume (\$4.7 billion)



Product offerings within the Insurance segment fall within the following major product groupings:

- General Liability
- Professional Liability
- Property
- Personal Lines
- Marine and Energy
- Specialty Programs
- Workers' Compensation
- Other Product Lines

General Liability product offerings include a variety of primary and excess liability coverages targeting apartments and office buildings, retail stores, contractors, consultants, construction professionals, financial service professionals, professional practices, social welfare organizations and medical products, as well as businesses in the life sciences, energy, medical, healthcare, pharmaceutical, recreational, transportation, heavy industrial and hospitality industries. Specific products include the following:

- excess and umbrella products, which provide coverage over approved underlying insurance carriers on either an occurrence or claims-made basis;
- products liability products, which provide coverage on either an occurrence or claims-made basis to manufacturers, distributors, importers and re-packagers of manufactured products;
- environmental products, which provide coverage on either an occurrence or claims-made basis and include environmental consultants' professional liability, contractors' pollution liability and site-specific environmental impairment liability coverages; and
- casualty facultative reinsurance written for individual casualty risks focusing on general liability, products liability, automobile liability and certain classes of miscellaneous professional liability and targeting classes which include low frequency, high severity general liability risks.

Professional liability coverages include unique solutions for highly specialized professions, including architects and engineers, lawyers, accountants, agents and brokers, service technicians and consultants. We offer claims-made medical malpractice coverage for doctors and dentists; claims-made professional liability coverage to individual healthcare providers such as therapists, pharmacists, physician assistants and nurse anesthetists; and coverages for medical facilities and other allied healthcare risks such as clinics, laboratories, medical spas, home health agencies, small hospitals, pharmacies and senior living facilities. Other professional liability coverages include errors and omissions, union liability, professional indemnity, intellectual property, executive liability for financial institutions and Fortune 1000 companies and management liability. Our management liability coverages, which can be bundled with other coverages or written on a standalone basis, include employment practices liability, directors and officers liability and fiduciary liability coverages. Additionally, we offer cyber liability products, which provide coverage primarily for data breach and privacy liability, data breach loss to insureds and electronic media coverage.

Property coverages consist principally of fire, allied lines (including windstorm, hail and water damage) and other specialized property coverages, including catastrophe-exposed property risks such as earthquake and wind on both a primary and excess basis. Catastrophe-exposed property risks are typically lower frequency and higher severity in nature than more standard property risks. Our property coverages are exposed to windstorm losses that, based on the seasonal nature of those events, are more likely to occur in the third and fourth quarters of the year. Our property risks range from small, single-location accounts to large, multi-state, multi-location, multi-national accounts on a worldwide basis. Other types of property products include:

- inland marine products, which provide a number of specialty coverages for risks such as motor truck cargo coverage for damage to third party cargo while in transit, warehouseman's legal liability coverage for damage to third party goods in storage, contractor's equipment coverage for first party property damage and builder's risk coverage;
- railroad-related products, which provide first party coverages for short-line and regional railroads, scenic and tourist railroads, commuter and light rail trains and railroad equipment; and
- specie coverage for fine art on exhibition and in private collections, securities, bullion, precious metals, cash in transit and jewelry.

Personal lines products provide first and third party coverages for classic cars, motorcycles and a variety of personal watercraft, including vintage boats, high performance boats and yachts and recreational vehicles, such as motorcycles, snowmobiles and ATVs. Based on the seasonal nature of much of our personal lines business, we generally will experience higher claims activity during the second and third quarters of the year. Additionally, property coverages are offered for mobile homes, dwellings and homeowners that do not qualify for standard homeowner's coverage. Other products offered include special event protection and pet health coverage.

Marine and energy products include a portfolio of coverages for cargo, energy, hull, liability, war and terrorism risks. The cargo product line is an international transit-based book providing coverage for many types of cargo. Energy coverage includes all aspects of oil and gas activities. Hull coverages consist of coverage for physical damage to ocean-going tonnage, yachts and mortgagees' interests. Liability coverage provides for a broad range of energy liabilities, as well as traditional marine exposures including charterers, terminal operators and ship repairers. War coverage includes protections for the hulls of ships and aircraft, and other related interests, against war and associated perils. Terrorism coverage provides for property damage and business interruption related to political violence including war and civil war.

Specialty programs business included in this segment is offered on a standalone or package basis and generally targets specialized commercial markets and customer groups. Targeted groups include youth and recreation oriented organizations and camps, child care operators, schools, social service organizations, museums and historic homes, performing arts organizations, senior living facilities and wineries. Other specialty programs business written in this segment includes:

- general agent programs that use managing general agents to offer single source admitted and non-admitted programs for a specific class or line of business;
- first and third party coverages for medical transport, small fishing ventures, charters, utility boats and boat rentals; and
- property and liability coverages for small to medium-sized commercial risks, including farms, zoos, animal theme parks, safari parks and animal boarding, breeding and training facilities.

Workers' compensation products provide wage replacement and medical benefits to employees injured in the course of employment and target main-street, service and artisan contractor businesses, retail stores and restaurants.

Other product lines within the Insurance segment include:

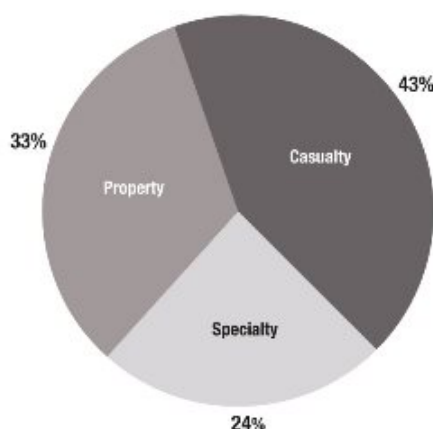
- surety products, which consist primarily of contract, commercial and court bonds;
- CPI, which provides coverage on automobiles or other vehicles held as collateral for loans made by credit unions, banks and specialty finance companies;
- coverages for equine-related risks, such as horse mortality, theft, infertility, transit and specified perils;
- crime coverage primarily targeting financial institutions and providing protection for bankers' blanket bond, computer crime and commercial fidelity;
- small business owners policies providing property and liability package coverage to small and medium sized businesses;
- accident and health coverage targeting affinity groups and schemes, high value and high risks accounts and sports groups;
- coverage for legal expenses including before the event products that protect commercial clients in the event of legal actions and after the event products covering a wide range of litigation; and
- short-term trade credit coverage for commercial risks, including insolvency and protracted default as well as political risks coverage in conjunction with commercial risks for currency inconvertibility, government action, import and export license cancellation, public buyer default and war.

Reinsurance Segment

Our Reinsurance segment includes property and casualty treaty reinsurance products offered to other insurance and reinsurance companies globally through the broker market. Our treaty reinsurance offerings include both quota share and excess of loss reinsurance and are typically written on a participation basis, which means each reinsurer shares proportionally in the business ceded under the reinsurance treaty written. Our reinsurance products may include features such as contractual provisions that require our cedent to share in a portion of losses resulting from ceded risks, may require payment of additional premium amounts if we incur greater losses than those projected at the time of the execution of the contract, may require reinstatement premium to restore the coverage after there has been a loss occurrence or may provide for experience refunds if the losses we incur are less than those projected at the time the contract is executed. Our reinsurance product offerings are underwritten by our Global Reinsurance division and our Markel International division. The Global Reinsurance division operates from platforms in the U.S., Bermuda and the U.K. Business written in the Global Reinsurance division is produced primarily through Markel Global Re, which is licensed or accredited to provide reinsurance in all 50 states and the District of Columbia. The Global Reinsurance division also writes business through Markel Bermuda and beginning in 2018, Markel Syndicate 3000. The Markel International division operates primarily from our London-based platform and business is produced primarily through MIICL. Markel International also conducts reinsurance operations from its platform in Latin America, which includes Markel Brazil Re.



Our Reinsurance segment reported gross premium volume of \$1.1 billion , earned premiums of \$928.6 million and an underwriting loss of \$118.3 million in 2018 .

Reinsurance Segment**2018 Gross Premium Volume (\$1.1 billion)**

Product offerings within the Reinsurance segment fall within the following major product groupings:

- Casualty
- Property
- Specialty

Our casualty treaty reinsurance programs are written on a quota share and excess of loss basis and include general liability, professional liability, workers' compensation, medical malpractice, environmental impairment liability and auto liability. General liability reinsurance includes umbrella and excess casualty products that are written worldwide. Our professional liability reinsurance programs are offered worldwide and consist of directors and officers liability, including publicly traded, private, and non-profit companies in both commercial and financial institution arenas; lawyers errors and omissions for small, medium and large-sized law firms; accountants errors and omissions for small and medium-sized firms; technology errors and omissions and cyber liability focusing on network security and privacy exposures. Auto reinsurance treaty products include commercial and non-standard personal auto exposures predominantly in the U.S. Our workers' compensation business includes standard and catastrophe-exposed workers' compensation business. Medical malpractice reinsurance products are offered in the United States and include coverage for physician, surgeon, hospital and long term care medical malpractice writers. Environmental treaty reinsurance provides coverage for pollution legal liability, contractors pollution and professional liability exposures on both a nationwide and regional basis within the U.S.

Property treaty products are offered on an excess of loss and quota share basis for catastrophe, per risk and retrocessional exposures worldwide. Our catastrophe exposures are generally written on an excess of loss basis and target both personal and commercial lines of business providing coverage for losses from natural disasters, including hurricanes, wind storms and earthquakes. We also reinsure individual property risks such as buildings, structures, equipment and contents and provide coverage for both personal lines and commercial property exposures. Our retrocessional products provide coverage for all types of underlying exposures and geographic zones. A significant portion of the property treaty business covers U.S. exposures, with the remainder coming from international property exposures. Our property products are exposed to windstorm losses that, based on the seasonal nature of those events, are more likely to occur in the third and fourth quarters of the year.

Specialty treaty reinsurance products offered in the Reinsurance segment include structured and whole turnover credit, political risk, mortgage and contract and commercial surety reinsurance programs covering worldwide exposures, public entity reinsurance products, aviation, whole account, accident and health coverage, marine and agriculture reinsurance products. Our mortgage products offer coverage for private mortgage insurers in the U.S., Australia and Europe. Our public entity reinsurance products offer customized programs for government risk pools, including counties, municipalities, schools, public housing authorities and special districts (e.g. water, sewer, parks) located in the U.S. Types of coverage for public entities include general liability, environmental impairment liability, cyber and errors and omissions. Our aviation business includes commercial airline hull and liability coverage as well as general aviation for risks worldwide. Our accident and health products cover personal accident, life, medical and workers' compensation coverage, predominately on a per-event basis. Marine reinsurance products include offshore and onshore marine and energy risks on a worldwide basis, including hull, cargo and liability. Agriculture reinsurance covers multi-peril crop insurance, hail and related exposures, for risks located in the U.S. and Canada.

Ceded Reinsurance

Within our underwriting operations, we purchase reinsurance and retrocessional reinsurance to manage our net retention on individual risks and overall exposure to losses, while providing us with the ability to offer policies with sufficient limits to meet policyholder needs. See "Program Services" section below for an overview of ceded reinsurance within our program services business, which is managed separately from our underwriting operations.

In reinsurance and retrocession transactions, an insurance or reinsurance company transfers, or cedes, all or part of its exposure in return for a portion of the premium. We purchase catastrophe reinsurance coverage for our catastrophe-exposed policies to ensure that our net retained catastrophe risk is within our corporate tolerances. Net retention of gross premium volume in our underwriting segments was 83% in 2018 and 84% in 2017. We do not purchase or sell finite reinsurance products or use other structures that would have the effect of discounting loss reserves.

Our ceded reinsurance and retrocessional contracts do not legally discharge us from our primary liability for the full amount of the policies, and we will be required to pay the loss and bear collection risk if the reinsurer fails to meet its obligations under the reinsurance agreement. We attempt to minimize credit exposure to reinsurers through adherence to internal ceded reinsurance guidelines. We manage our exposures so that no exposure to any one reinsurer is material to our ongoing business. To participate in our reinsurance program, prospective companies generally must: (i) maintain an A.M. Best Company (Best) or Standard & Poor's (S&P) rating of "A" (excellent) or better; (ii) maintain minimum capital and surplus of \$500 million and (iii) provide collateral for recoverables in excess of an individually established amount. In addition, certain foreign reinsurers for our U.S. insurance operations must provide collateral equal to 100% of recoverables, with the exception of reinsurers who have been granted certified or authorized status by an insurance company's state of domicile. Our credit exposure to Lloyd's syndicates is managed through individual and aggregate exposure thresholds.

When appropriate, we pursue reinsurance commutations that involve the termination of ceded reinsurance and retrocessional contracts. Our commutation strategy related to ceded reinsurance and retrocessional contracts is to reduce credit exposure and eliminate administrative expenses associated with the run-off of ceded reinsurance placed with certain reinsurers.

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The following table displays balances recoverable from our ten largest reinsurers by group from our underwriting operations at December 31, 2018. The contractual obligations under reinsurance and retrocessional contracts are typically with individual subsidiaries of the group or syndicates at Lloyd's and are not typically guaranteed by other group members or syndicates at Lloyd's. Reinsurance recoverable balances are shown before consideration of balances owed to reinsurers and any potential rights of offset, any collateral held by us and allowances for bad debts. These ten reinsurance groups represent approximately 61% of our \$2.7 billion reinsurance recoverables balance attributed to our underwriting operations, before considering allowances for bad debts.

Reinsurance Group	A.M. Best Rating	Reinsurance Recoverable
<i>(dollars in thousands)</i>		
Fairfax Financial Group	A	\$ 251,692
AXIS Capital Holdings Limited	A+	195,608
Munich Re Group	A+	193,690
Lloyd's of London	A	183,033
RenaissanceRe Holdings Ltd.	A+	159,469
Alleghany Corporation	A+	143,913
EXOR S.p.A	A	141,452
Liberty Mutual Holding Company	A	133,648
Swiss Re Group	A+	127,578
Everest Re Group	A+	107,353
Reinsurance recoverables for ten largest reinsurers		1,637,436
Total reinsurance recoverables		\$ 2,691,888

Reinsurance and retrocessional treaties are generally purchased on an annual or biennial basis and are subject to renegotiations at renewal. In most circumstances, the reinsurer remains responsible for all business produced before termination. Treaties typically contain provisions concerning ceding commissions, required reports to reinsurers, responsibility for taxes, arbitration in the event of a dispute and provisions that allow us to demand that a reinsurer post letters of credit or assets as security if a reinsurer becomes an unauthorized reinsurer under applicable regulations or if its rating falls below an acceptable level.

See note 15 of the notes to consolidated financial statements and Management's Discussion & Analysis of Financial Condition and Results of Operations for additional information about our ceded reinsurance programs and exposures.

Investments

Our business strategy recognizes the importance of both consistent underwriting and operating profits and superior investment returns to build shareholder value. We rely on sound underwriting practices to produce investable funds while minimizing underwriting risk. The majority of our investable assets come from premiums paid by policyholders. Policyholder funds are invested predominantly in high-quality government, municipal and corporate bonds that generally match the duration of our loss reserves. The balance, comprised of shareholder funds, is available to be invested in equity securities, which over the long run, have produced higher returns relative to fixed maturity investments. When purchasing equity securities, we seek to invest in profitable companies, with honest and talented management, that exhibit reinvestment opportunities and capital discipline, at reasonable prices. We intend to hold these investments over the long term. Substantially all of our investment portfolio is managed by company employees.

We evaluate our investment performance by analyzing net investment income and net investment gains (losses) as well as our taxable equivalent total investment return, which is a non-GAAP financial measure. Taxable equivalent total investment return includes items that impact net income, such as coupon interest on fixed maturities, dividends on equity securities and investment gains or losses, as well as changes in unrealized gains or losses on available-for-sale securities, which do not impact net income. Certain items that are included in net investment income have been excluded from the calculation of taxable equivalent total investment return, such as amortization and accretion of premiums and discounts on our fixed maturity portfolio, to provide a comparable basis for measuring our investment return against industry investment returns. The calculation of taxable equivalent total investment return also includes the current tax benefit associated with income on certain investments that is either taxed at a lower rate than the statutory income tax rate or is not fully included in U.S. taxable income.

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We believe the taxable equivalent total investment return is a better reflection of the economics of our decision to invest in certain asset classes. We do not lower the quality of our investment portfolio in order to enhance or maintain yields. We focus on long-term total investment return, understanding that the level of investment gains or losses and unrealized gains or losses on available-for-sale securities may vary from one period to the next.

The following table summarizes our investment performance.

<i>(dollars in thousands)</i>	Years Ended December 31,				
	2018	2017	2016	2015	2014
Net investment income	\$ 434,215	\$ 405,709	\$ 373,230	\$ 353,213	\$ 363,230
Net investment gains (losses) ⁽¹⁾	\$ (437,596)	\$ (5,303)	\$ 65,147	\$ 106,480	\$ 46,000
Change in net unrealized investment gains on available-for-sale securities	\$ (299,446)	\$ 1,125,440	\$ 342,111	\$ (457,584)	\$ 981,035
Investment yield ⁽²⁾	2.7%	2.6%	2.4%	2.3%	2.4%

⁽¹⁾ Effective January 1, 2018, we adopted ASU No. 2016-01. As a result, equity securities are no longer classified as available-for-sale with unrealized gains and losses recognized in other comprehensive income; rather, all changes in the fair value of equity securities are now recognized in net income. Prior periods have not been restated to conform to the current presentation. See note 1 of the notes to consolidated financial statements.

⁽²⁾ Investment yield reflects net investment income as a percentage of monthly average invested assets at amortized cost.

We believe our investment performance is best analyzed from the review of taxable equivalent total investment return over several years. The following table presents taxable equivalent total investment return before and after the effects of foreign currency movements.

Annual Taxable Equivalent Total Investment Returns

	Years Ended December 31,					Five-Year Annual Return	Ten-Year Annual Return
	2018	2017	2016	2015	2014		
Equities	(3.5)%	25.5%	13.5%	(2.5)%	18.6%	9.7%	14.9%
Fixed maturities ⁽¹⁾	1.3 %	3.4%	2.4%	1.6 %	6.5%	3.0%	4.3%
Total portfolio, before foreign currency effect	(0.7)%	9.2%	5.0%	0.5 %	8.9%	4.5%	6.4%
Total portfolio	(1.0)%	10.2%	4.4%	(0.7)%	7.4%	3.9%	6.3%
Invested assets, end of year (in millions)	\$ 19,238	\$ 20,570	\$ 19,059	\$ 18,181	\$ 18,638		

⁽¹⁾ Includes short-term investments, cash and cash equivalents and restricted cash and cash equivalents.

The following table reconciles investment yield to taxable equivalent total investment return.

	Years Ended December 31,				
	2018	2017	2016	2015	2014
Investment yield ⁽¹⁾	2.7 %	2.6 %	2.4 %	2.3 %	2.4 %
Adjustment of investment yield from amortized cost to fair value	(0.6)%	(0.5)%	(0.4)%	(0.4)%	(0.4)%
Net amortization of net premium on fixed maturities	0.4 %	0.4 %	0.4 %	0.5 %	0.6 %
Net investment gains (losses) and change in net unrealized investment gains on available-for-sale securities	(3.4)%	5.9 %	2.3 %	(2.0)%	5.9 %
Taxable equivalent effect for interest and dividends ⁽²⁾	0.1 %	0.4 %	0.4 %	0.4 %	0.4 %
Other ⁽³⁾	(0.2)%	1.4 %	(0.7)%	(1.5)%	(1.5)%
Taxable equivalent total investment return	(1.0)%	10.2 %	4.4 %	(0.7)%	7.4 %

⁽¹⁾ Investment yield reflects net investment income as a percentage of monthly average invested assets at amortized cost.

⁽²⁾ Adjustment to tax-exempt interest and dividend income to reflect a taxable equivalent basis.

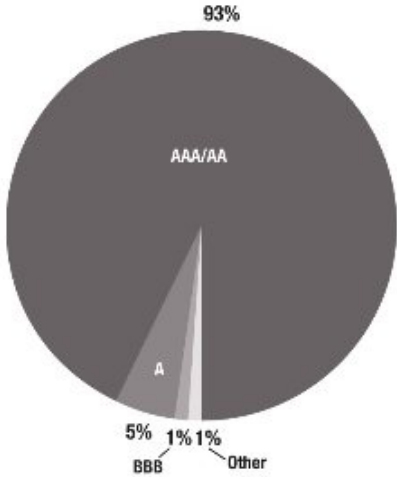
⁽³⁾ Adjustment to reflect the impact of changes in foreign currency exchange rates and time-weighting the inputs to the calculation of taxable equivalent total investment return.

We monitor our investment portfolio to ensure that credit risk does not exceed prudent levels. S&P and Moody's provide corporate and municipal debt ratings based on their assessments of the credit quality of an obligor with respect to a specific obligation. S&P's ratings range from "AAA" (capacity to pay interest and repay principal is extremely strong) to "D" (debt is in payment default). Securities with ratings of "BBB" or higher are referred to as investment grade securities. Debt rated "BB" and below is regarded by S&P as having predominantly speculative characteristics with respect to capacity to pay interest and repay principal. Moody's ratings range from "Aaa" to "C" with ratings of "Baa" or higher considered investment grade.

Our fixed maturity portfolio has an average rating of " AA ," with 98% rated " A " or better by at least one nationally recognized rating organization. Our policy is to invest in investment grade securities and to minimize investments in fixed maturities that are unrated or rated below investment grade. At December 31, 2018 , less than 1% of our fixed maturity portfolio was unrated or rated below investment grade. Our fixed maturity portfolio includes securities issued with financial guaranty insurance. We purchase fixed maturities based on our assessment of the credit quality of the underlying assets without regard to insurance.

The following chart presents our fixed maturity portfolio, at estimated fair value, by rating category at December 31, 2018 .

2018 Credit Quality of Fixed Maturity Portfolio (\$10.0 billion)



See "Market Risk Disclosures" in Management's Discussion & Analysis of Financial Condition and Results of Operations for additional information about investments.

Markel Ventures

Through our wholly owned subsidiary Markel Ventures, Inc. (Markel Ventures), we own interests in various businesses that operate outside of the specialty insurance marketplace. These businesses are viewed by management as separate and distinct from our insurance operations. Local management teams oversee the day-to-day operations of these companies, while strategic decisions, including investment and capital allocation decisions, are made by our senior management team.

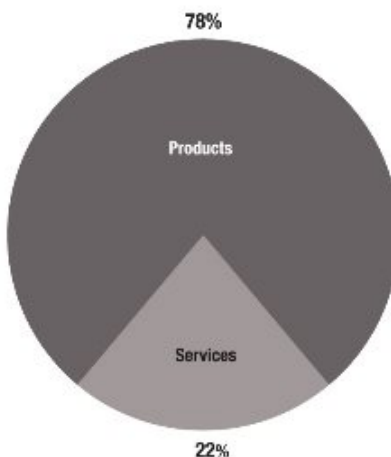
Our strategy in making these investments is similar to our strategy for purchasing equity securities. We seek to invest in profitable companies, with honest and talented management, that exhibit reinvestment opportunities and capital discipline, at reasonable prices. We intend to own the businesses acquired for a long period of time.

We monitor and report our Markel Ventures operations in our Markel Ventures segment. This segment includes a diverse portfolio of businesses from different industries that offer various types of products and services to businesses and consumers. See note 20 of the notes to consolidated financial statements for additional segment reporting disclosures.

In 2018, our Markel Ventures operations reported revenues of \$1.9 billion, net income to shareholders of \$35.3 million, operating income of \$77.5 million and earnings before interest, income taxes, depreciation and amortization (EBITDA) of \$169.9 million. We use Markel Ventures EBITDA as an operating performance measure in conjunction with revenues, operating income and net income. See "Markel Ventures" in Management's Discussion & Analysis of Financial Condition and Results of Operations for more information on EBITDA.

Markel Ventures Segment

2018 Operating Revenues (\$1.9 billion)



Our Markel Ventures products include:

- equipment used in baking systems and food processing;
- portable dredges;
- over-the-road car haulers and equipment;
- laminated oak and composite wood flooring used in the trucking industry;
- dormitory furniture, wall systems, medical casework and marine panels;
- storage and transportation equipment for specialty gas;
- ornamental plants;
- fashion handbags; and
- residential homes.

Our Markel Ventures services include:

- leasing and management of manufactured housing communities;
- behavioral healthcare;
- concierge health programs;
- retail intelligence; and
- management and technology consulting.

The majority of our businesses in this segment are headquartered across the United States, with subsidiaries of certain businesses located outside of the United States. This segment offers a wide range of products and services across many markets and encounters a variety of competitors that vary by product line, end market and geographic area. Each business within the segment has several main competitors and numerous smaller ones in most of their end markets and geographic areas. Examples of the end markets are as follows:

- U.S. consumer markets for residential construction, housing and healthcare;
- U.S. and international markets for food service, food production, automobile transporters, governments, miners, marine operators, truck trailers and inter-modal containers and industrial and specialty gas;
- U.S. and international retail markets; and
- U.S. based businesses in the banking, financial services, energy, utilities, governments, retail and consumer goods, healthcare, travel, and hospitality industries.

Investment Management

Our investment management operations are comprised of our Markel CATCo operations, and effective November 2018, the operations of Nephila Holdings Ltd.

Markel CATCo

Our Markel CATCo operations are conducted through Markel CATCo Investment Management Ltd. (MCIM). MCIM is an insurance-linked securities investment fund manager headquartered in Bermuda focused on building and managing highly diversified, collateralized retrocession and reinsurance portfolios covering global property catastrophe risks. MCIM serves as the insurance manager for Markel CATCo Re Ltd. (Markel CATCo Re), a Bermuda Class 3 reinsurance company, and as the investment manager for Markel CATCo Reinsurance Fund Ltd., a Bermuda exempted mutual fund company comprised of multiple segregated accounts (Markel CATCo Funds). MCIM also serves as the investment manager to CATCo Reinsurance Opportunities Fund Ltd. (CROF), a limited liability closed-end Bermuda exempted mutual fund company listed on a market operated by the London Stock Exchange and on the Bermuda Stock Exchange. CROF invests substantially all of its assets in Markel CATCo Reinsurance Fund Ltd.

Both Markel CATCo Re and the Markel CATCo Funds are unconsolidated subsidiaries of Markel Corporation. While the voting shares in Markel CATCo Re and Markel CATCo Funds are held by MCIM, the underwriting results of Markel CATCo Re are attributed to Markel CATCo Funds through the issuance of nonvoting preference shares. The performance of the Markel CATCo Funds is attributed to its nonvoting preference shares, which are held by third party investors, including CROF, and by us. As of December 31, 2018, MCIM's net assets under management were \$3.4 billion, a portion of which is attributable to our investments in the Markel CATCo Funds. As of December 31, 2018, the fair value of our investments in the Markel CATCo Funds and CROF totaled \$58.2 million, which is included in equity securities on our consolidated balance sheet.

MCIM receives management fees for its investment management services based on the net asset value of the accounts managed, as well as incentive fees based on the annual performance of the Markel CATCo Funds. Total revenues attributed to MCIM for the year ended December 31, 2018 were \$66.2 million, which are included in services and other revenues in our consolidated statement of income and comprehensive income. See note 16 and note 17 of the notes to consolidated financial statements for further details regarding our Markel CATCo operations.

For further details regarding recent developments within our Markel CATCo operations, see note 18 of the notes to consolidated financial statements.

Nephila

In November 2018, we completed the acquisition of all of the outstanding shares of Nephila Holdings Ltd. (together with its subsidiaries, Nephila). Through its subsidiaries, Nephila primarily serves as an insurance and investment fund manager headquartered in Bermuda that offers a broad range of investment products, including insurance-linked securities, catastrophe bonds, insurance swaps and weather derivatives.

Nephila serves as the investment manager to several Bermuda, Ireland and U.S. based private funds (the Nephila Funds). To provide access for the Nephila Funds to the insurance, reinsurance and weather markets, Nephila also acts as an insurance manager to certain Bermuda Class 3 and 3A reinsurance companies and as both a service company coverholder and agent with binding authority for Lloyd's Syndicate 2357 (Syndicate 2357) (collectively, the Nephila Reinsurers). The results of the Nephila Reinsurers are attributed to the Nephila Funds primarily through derivative transactions between these entities. Neither the Nephila Funds nor the Nephila Reinsurers are subsidiaries of Markel Corporation, and as such, these entities are not included in our consolidated financial statements. As of December 31, 2018, Nephila's net assets under management were \$11.6 billion .

Nephila receives management fees for its investment and insurance management services based on the net asset value of the accounts managed, and for certain funds, incentive fees based on the annual performance of the funds it manages. Total revenues attributed to Nephila from the acquisition date to December 31, 2018 were \$25.3 million , which are included in services and other revenues in our consolidated statements of income and other comprehensive income. See note 17 of the notes to consolidated financial statements for further details regarding our Nephila operations.

Program Services

In November 2017, we completed the acquisition of State National. Following the acquisition, our operations expanded to include a program services business, which is provided through our State National division. Our program services business generates fee income, in the form of ceding (program service) fees, by offering issuing carrier capacity to both specialty general agents and other producers who sell, control and administer books of insurance business that are supported by third parties that assume reinsurance risk, including Syndicate 2357. These reinsurers are domestic and foreign insurers and institutional risk investors (capacity providers) that want to access specific lines of U.S. property and casualty insurance business. Fronting refers to business in which we write insurance on behalf of a capacity provider and then cede the risk under these policies to the capacity provider in exchange for program services fees.

Through our program services business, we write a wide variety of insurance products, principally including general liability insurance, commercial liability insurance, commercial multi-peril insurance, property insurance and workers compensation insurance. Program services business written through our State National division is separately managed from our underwriting divisions, which write similar products, in order to protect our program services customers and eliminate internal competition for this business. Our program services business is primarily written through SNIC, NSIC and City National Insurance Company (CNIC), all of which are domiciled in Texas, and United Specialty Insurance Company (USIC) and Independent Specialty Insurance Company (ISIC), which are domiciled in Delaware. SNIC, NSIC, CNIC and ISIC are licensed to write property and casualty insurance in all 50 states and the District of Columbia. USIC is eligible to write business in all 50 states, the District of Columbia and the U.S. Virgin Islands. Many of our programs are arranged with the assistance of brokers that are seeking to provide customized insurance solutions for specialty insurance business that requires an A.M. Best "A" rated carrier. Our specialized business model relies on our producers or capacity providers to provide the infrastructure associated with providing policy administration, claims handling, cash handling, underwriting, or other traditional insurance company services. We believe there are relatively few active competitors in the fronting business. We compete primarily on the basis of price, customer service, geographic coverage, financial strength ratings, licenses, reputation, business model and experience.

Total revenues attributed to our program services business for the year ended December 31, 2018 were \$95.7 million . Our program services business generated \$2.1 billion of gross written premium volume for the year ended December 31, 2018 .

In our program services business, we generally enter into a 100% quota share reinsurance agreement whereby we cede to the capacity provider substantially all of our gross liability under all policies issued by and on behalf of us by the producer. The capacity provider is generally entitled to 100% of the net premiums received on policies reinsured, less the ceding fee to us, the commission paid to the producer and premium taxes on the policies. In connection with writing this business, we also enter into agency agreements with both the producer and the capacity provider whereby the producer and capacity provider are generally required to deal directly with each other to develop business structures and terms to implement and maintain the ongoing contractual relationship. In a number of cases, the producer and capacity provider for a program are part of the same organization or are otherwise affiliated. As a result of our contract design, substantially all of the underwriting risk and operational risk inherent in the arrangement is borne by the capacity provider. The capacity provider assumes and is liable for substantially all losses incurred in connection with the risks under the reinsurance agreement, including judgments and settlements. Our contracts with capacity providers do not legally discharge us from our primary liability for the full amount of the policies, and we will be required to pay the loss and bear collection risk if the capacity provider fails to meet its obligations under the reinsurance agreement. As a result, we remain exposed to the credit risk of capacity providers, or the risk that one of our capacity providers becomes insolvent or otherwise unable or unwilling to pay policyholder claims. We mitigate this credit risk generally by either selecting well capitalized, highly rated authorized capacity providers or requiring that the capacity provider post substantial collateral to secure the reinsured risks.

Although we reinsure substantially all of the risks inherent in our program services business, we have certain programs that contain limits on our reinsurers' obligations to us, including loss ratio caps, aggregate reinsurance limits or exclusion of the credit risk of producers. Under certain programs, including one program with Syndicate 2357, an unconsolidated affiliate, we also bear underwriting risk for annual aggregate agreement year losses in excess of a limit that we believe is highly unlikely to be exceeded. See note 17 of the notes to consolidated financial statements for further details regarding our program with Syndicate 2357.

The following table displays balances recoverable from our ten largest reinsurers by group for our program services business, based on gross reinsurance recoverable balances at December 31, 2018. The contractual obligations under reinsurance and retrocessional contracts are typically with individual subsidiaries of the group or syndicates at Lloyd's and are not typically guaranteed by other group members or syndicates at Lloyd's. Reinsurance recoverable balances are shown before consideration of balances owed to reinsurers and any potential rights of offset, and allowances for bad debts. These ten reinsurance groups represent 75% of our \$2.5 billion reinsurance recoverables balance attributed to our program services business, before considering allowances for bad debts.

Reinsurance Group	A.M. Best Rating	Gross Reinsurance Recoverable	Collateral Applied⁽¹⁾	Net Reinsurance Recoverable
<i>(dollars in thousands)</i>				
Fosun International Holdings Ltd.	A-	\$ 603,140	\$ 603,140	\$ —
Knight Insurance Company Ltd.	B++	406,783	406,783	—
Lloyd's of London ⁽²⁾	A	370,874	—	370,874
James River Group Holdings, Ltd.	A	170,808	170,808	—
Tokio Marine Holdings, Inc.	A+	123,664	815	122,849
Greenlight Capital Re, Ltd.	A-	54,892	54,892	—
SOMPO Holdings, Inc.	A+	47,204	—	47,204
Enstar Group Limited	A-	45,586	28,022	17,564
MS&AD Insurance Group Holdings, Inc.	A	39,472	39,472	—
Allianz SE	A+	37,688	—	37,688
Reinsurance recoverables for ten largest gross reinsurers		1,900,111	1,303,932	596,179
Total reinsurance recoverables		\$ 2,535,392	\$ 1,751,098	\$ 784,294

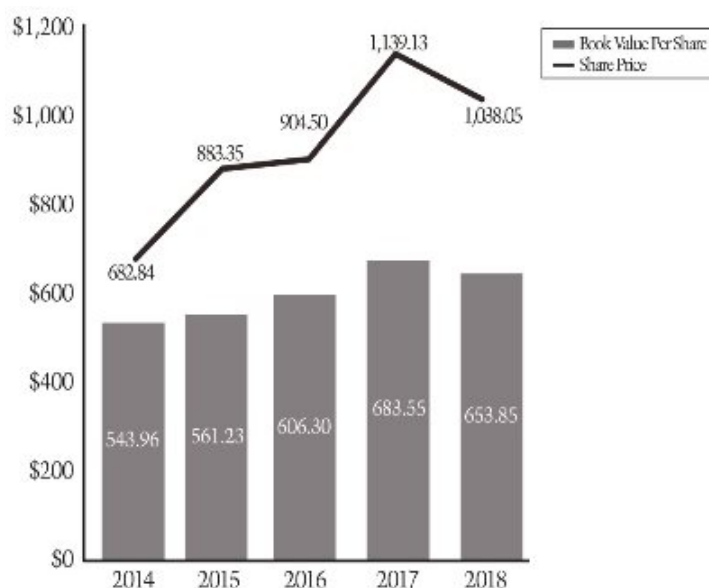
(1) Collateral is applied to each reinsurer, up to the amount of the gross recoverable, to determine the net recoverable for each reinsurer presented in this table. As of December 31, 2018, we were the beneficiary of letters of credit, trust accounts and funds withheld in the aggregate amount of \$1.6 billion collateralizing reinsurance recoverable balances from our top 10 reinsurers and \$2.2 billion for our total reinsurance recoverables balance.

(2) Net reinsurance recoverable from Lloyd's of London includes \$179.8 million attributable to Syndicate 2357, an unconsolidated affiliate.

Shareholder Value

Our financial goals are to earn consistent underwriting and operating profits and superior investment returns to build shareholder value. One of the ways we measure financial success is by our ability to grow book value per share at a high rate of return over a long period of time. To mitigate the effects of short-term volatility, we generally use five-year time periods to measure ourselves. Growth in book value per share is an important measure of our success because it includes all underwriting, operating and investing results. For the year ended December 31, 2018, book value per share decreased 4% primarily due to a \$233.5 million decrease in net unrealized gains on investments, net of taxes, and net loss to shareholders of \$128.2 million. For the year ended December 31, 2017, book value per share increased 13% primarily due to a \$763.0 million increase in net unrealized gains on investments, net of taxes, and net income to shareholders of \$395.3 million. Over the past five years, we have grown book value per share at a compound annual rate of 7% to \$653.85 per share. As we continue to expand our operations beyond underwriting and investing, we recognize that book value per share does not capture all of the economic value in our business, as a growing portion of our operations are not recorded at fair value or otherwise captured in book value. As a result, we also measure our financial success through the growth in the market price of a share of our stock, or total shareholder return, over a long period of time. For the year ended December 31, 2018, our share price decreased 9%. Over the past five years, our share price increased at a compound annual rate of 12%.

The following graph presents book value per share and share price for the past five years as of December 31.



Regulatory Environment

Our insurance subsidiaries are subject to regulation and supervision by the insurance regulatory authorities of the various jurisdictions in which they conduct business. This regulation is intended for the benefit of policyholders rather than shareholders or holders of debt securities. The jurisdictions of our principal insurance subsidiaries are the United States, the United Kingdom, Germany and Bermuda. Our Markel Ventures, investment fund management and other businesses also are subject to regulation and supervision by regulatory authorities of the various jurisdictions in which they conduct business.

United States Insurance Regulation

Overview. Our U.S. insurance subsidiaries are subject to varying degrees of regulation and supervision in the jurisdictions in which they do business. Each state has its own regulatory authority for insurance that is generally responsible for the direct regulation of the business of insurance conducted in that state. In addition, the National Association of Insurance Commissioners (NAIC), comprised of the insurance commissioners of each U.S. jurisdiction, develops or amends model statutes and regulations that in turn most states adopt. While the U.S. federal government and its regulatory agencies generally do not directly regulate the business of insurance, there have been recent federal initiatives that impact the business of insurance.

State Insurance Regulation. In the United States, authority for the regulation, supervision and administration of the business of insurance in each state is generally delegated to a state commissioner heading a regulatory body responsible for the business of insurance. Through this authority, state regulatory authorities have broad regulatory, supervisory and administrative powers relating to solvency standards; the licensing of insurers and their agents; the approval of forms and policies used; the nature of, and limitations on, insurers' investments; the form and content of annual statements and other reports on the financial condition of insurers; and the establishment of loss reserves. Our U.S. insurance subsidiaries that operate on an admitted basis are typically subject to regulatory rate and form review, while our U.S. excess and surplus lines insurance subsidiaries generally operate free of rate and form regulation.

Holding Company Statutes. In addition to regulatory supervision of our domestic insurance subsidiaries, we are subject to state statutes governing insurance holding company systems. Typically, such statutes require that we periodically file information with the appropriate state insurance commissioner, including information concerning our capital structure, ownership, financial condition, material transactions with affiliates and general business operations. In addition, these statutes also require approval of changes in control of an insurer or an insurance holding company. Generally, control for these purposes is defined as ownership or voting power of 10% or more of a company's voting shares. Additional requirements include group-level reporting, submission of an annual enterprise risk report by a regulated insurance company's ultimate controlling person and information regarding an insurer's non-insurer affiliates.

Risk Based Capital Requirements. The NAIC uses a risk based capital formula that is designed to measure the capital of an insurer taking into account the company's investments and products. These requirements provide a formula which, for property and casualty insurance companies, establishes capital thresholds for four categories of risk: asset risk, insurance risk, interest rate risk and business risk. At December 31, 2018, the capital and surplus of each of our U.S. insurance subsidiaries was above the minimum regulatory thresholds.

Own Risk and Solvency Assessment. We must submit an Own Risk and Solvency Assessment Summary Report (ORSA) annually to the Illinois Department of Insurance, our lead state insurance regulator. The ORSA is a confidential internal assessment of the material and relevant risks associated with an insurer's current business plan and the sufficiency of capital resources to support those risks.

Corporate Governance Annual Disclosure. We must submit a Corporate Governance Annual Disclosure (CGAD) annually to California, Delaware, Nebraska and Virginia. The CGAD has not been adopted by Illinois, our lead state insurance regulator. The CGAD describes the insurers or insurance group's corporate governance framework and structure.

Excess and Surplus Lines. The regulation of our U.S. insurance subsidiaries' excess and surplus lines insurance business differs significantly from the regulation of our admitted business. Our surplus lines subsidiaries are subject to the surplus lines regulation and reporting requirements of the jurisdictions in which they are eligible to write surplus lines insurance. Although the surplus lines business is generally less regulated than admitted business, regulations apply to surplus lines placements under the laws of every state.

Dividends. The laws of the domicile states of our U.S. insurance subsidiaries govern the amount of dividends that may be paid to our holding company, Markel Corporation. Generally, statutes in the domicile states of our insurance subsidiaries require prior approval for payment of extraordinary, as opposed to ordinary, dividends. At December 31, 2018, our U.S. insurance subsidiaries could pay up to \$466.0 million during the following 12 months under the ordinary dividend regulations.

Trade Practices. State insurance laws and regulations include numerous provisions governing trade practices and the marketplace activities of insurers, including provisions governing marketing and sales practices, data security, policyholder services, claims management, anti-fraud controls and complaint handling. State regulatory authorities generally enforce these provisions through periodic market conduct examinations.

Investment Regulation. Investments by our domestic insurance companies must comply with applicable laws and regulations that prescribe the kind, quality and concentration of investments. In general, these laws and regulations permit investments in federal, state and municipal obligations, corporate bonds, preferred and common equity securities, mortgage loans, real estate and certain other investments, subject to specified limits and certain other qualifications.

The Terrorism Risk Insurance Act. The Terrorism Risk Insurance Act of 2002, as amended (TRIA), has established a federal program that provides for a system of shared public and private compensation for certain insured losses resulting from acts of terrorism. The threshold for the program to go into effect (the triggering event) was \$160 million in losses for 2018 and increases to \$180 million for 2019 and \$200 million for 2020. Starting in January 2016, the amount that insurers must cover as a whole through co-payments and deductibles, which is known as the aggregate retention amount, was established at \$27.5 billion and rises by \$2 billion a year up to \$37.5 billion. TRIA is applicable to almost all commercial lines of property and casualty insurance but excludes commercial auto, burglary and theft, surety, professional liability and farm owners' multi-peril insurance. Insurers with direct commercial property and casualty insurance exposure in the United States are required to participate in the program and make available coverage for certified acts of terrorism. Federal participation will be triggered under TRIA when the Secretary of Treasury certifies an act of terrorism. The program is scheduled to expire in 2020.

Cybersecurity. The New York Department of Financial Services (NYDFS) has issued Cybersecurity Requirements for Financial Services Companies that require certain of our insurance operations to, among other things, establish and maintain a cybersecurity policy designed to protect consumers and ensure the safety and soundness of New York State's financial services industry. The regulation went into effect on March 1, 2017 and has transition periods ranging from 180 days to two years. In addition, the NAIC adopted the Insurance Data Security Model Law in October 2017. The purpose of the model law is to establish standards for data security and for the investigation and notification of insurance commissioners of cybersecurity events involving unauthorized access to, or the misuse of, certain nonpublic information. South Carolina adopted the model law effective January 1, 2019. It is not clear whether other state legislatures will begin adopting the model law, or in what form or when they will do so.

Consumer Privacy. California amended its existing Consumer Privacy Act of 2018 (Act) on September 23, 2018 to commence on January 1, 2020. The Act will require a business collecting personal information about a consumer to disclose the consumer's right to delete personal information in a form that is reasonably accessible to consumers and in accordance with a specified process. However, the Act is not applicable to a business collecting personal information pursuant to Federal law including the Gramm Leach Bliley Act.

Federal Regulation. The federal government and its regulatory agencies generally do not directly regulate the business of insurance. However, two federal government bodies, the Federal Insurance Office (FIO) and the Financial Stability Oversight Council (FSOC), each created under The Dodd Frank Wall Street Reform and Consumer Protection Act, may impact the regulation of insurance. Although the FIO is prohibited from directly regulating the business of insurance, it has authority to represent the United States in international insurance matters and has limited powers to preempt certain types of state insurance laws. The FIO also can recommend to the FSOC that it designate an insurer as an entity posing risks to the United States financial stability in the event of the insurer's material financial distress or failure. We have not been so designated.

United Kingdom Insurance Regulation

Under the Financial Services and Markets Act 2000 (FSMA), it is unlawful to carry on insurance business in the United Kingdom without permission to do so from the relevant regulators, currently the Prudential Regulation Authority (PRA) and the Financial Conduct Authority (FCA). An independent Financial Policy Committee at the Bank of England supervises the financial services sector at a macro level, responding to sectoral issues that could threaten economic and financial stability.

MIICL, MSM, our Lloyd's managing agent, and E.C. Insurance Company Limited (ECIC) are authorized by the PRA and regulated by both the PRA and the FCA. In addition, our United Kingdom insurance operations include FCA-authorized insurance intermediaries that produce insurance for MIICL, Syndicate 3000 and third party insurance carriers.

The PRA is a subsidiary of the Bank of England and is responsible for the prudential regulation and supervision of banks, building societies, credit unions, major investment firms and insurers, including the Society of Lloyd's and managing agents that participate in the Lloyd's market. The two primary statutory objectives of the PRA are to promote the safety and soundness of the firms it regulates and, specific to insurers, to contribute to securing an appropriate degree of protection for those who are, or may become, policyholders. A secondary objective of the PRA is to facilitate effective competition.

The FCA, which is separate from the Bank of England, is accountable to HM Treasury and ultimately the United Kingdom Parliament. The FCA supervises the day-to-day conduct of insurance firms and other authorized firms operating in the U.K., including those participating in the Lloyd's market and U.K. insurance intermediaries. The overarching strategic objective of the FCA is to ensure that the relevant markets function well. The FCA also has three operational objectives: securing an appropriate degree of protection for consumers, protecting and enhancing the integrity of the U.K. financial system, and promoting effective competition in the interests of consumers.

The PRA assesses the insurance firms it regulates on a continuous cycle, requiring firms to submit sufficient data of appropriate quality to support their judgments about key risks, through meetings of directors, officers and other employees with PRA supervisors. The PRA also oversees compliance with minimum solvency and capital requirements under the Solvency II Directive (Solvency II) and imposes dividend restrictions. Both the PRA and the FCA oversee compliance with risk assessment reviews, restrictions governing the appointment of key officers, restrictions governing controlling ownership interests and various other requirements. In addition, both the PRA and FCA have arrangements with Lloyd's for cooperation on supervision and enforcement of the Lloyd's market.

MSM is required to satisfy the solvency requirements of Lloyd's. In addition, our U.K. subsidiaries must comply with the United Kingdom Companies Act of 2006, which provides that dividends may only be paid out of profits available for that purpose.

At least annually, MIICL and ECIC each submit an ORSA to the PRA and MSM submits an ORSA to Lloyd's. The ORSA is a confidential internal assessment of the material risks associated with the current business plans for MIICL, MSM and ECIC and the sufficiency of capital resources in place to support those risks. In addition, to comply with Solvency II regulations, MIICL and ECIC must publish an annual solvency and financial condition report (SFCR).

On June 23, 2016, the U.K. voted to exit the European Union (E.U.) (Brexit). For discussion regarding Brexit, see "Brexit Developments" under Management's Discussion & Analysis of Financial Condition and Results of Operations and the Risk Factor titled "The exit of the United Kingdom from the European Union could have a material adverse effect on us."

Bermuda Insurance Regulation

The insurance and reinsurance industry in Bermuda is regulated by the Bermuda Monetary Authority (BMA). Markel Bermuda is licensed by the BMA to conduct insurance business as a Class 4 general business and Class C long-term business insurer under the Insurance Act 1978 of Bermuda and its related regulations (Bermuda Insurance Act). The term insurance business also includes reinsurance business. The Bermuda Insurance Act imposes on Markel Bermuda solvency and liquidity standards, restrictions on the reduction of statutory capital and auditing and reporting requirements. The Bermuda Insurance Act grants to the BMA powers to cancel insurance licenses, supervise, investigate and intervene in the affairs of Bermuda insurance and reinsurance companies and, in certain circumstances, share information with foreign regulators. Bermuda's prudential framework for the supervision of insurance and reinsurance companies and groups is deemed to be fully equivalent to the regulatory standards applied to European insurance and reinsurance companies and groups under Solvency II. As a result, Bermuda is considered by European member states as applying an equivalent statutory insurance regime in accordance with the requirements of Solvency II with respect to reinsurance, group solvency calculations and group supervision. The equivalence recognition applies to Bermuda's commercial Class 3A, Class 3B, Class 4, Class C, Class D and Class E insurers and reinsurers and groups.

As a Class 4 general business and Class C long-term business insurer, Markel Bermuda is required to prepare and file with the BMA statutory financial statements and additional audited GAAP financial statements that the BMA publishes with a copy of the declaration of compliance required to be filed under the Bermuda Insurance Act and the auditor's report. Markel Bermuda is subject to enhanced capital requirements (ECR) in addition to the minimum solvency and liquidity requirements prescribed by the Bermuda Insurance Act for all insurers. The ECR are determined by reference to a risk-based capital model that determines a control threshold for statutory capital and surplus by taking into account the risk characteristics of different aspects of the insurer's business. At December 31, 2018, Markel Bermuda satisfied both the ECR and the minimum solvency and liquidity requirements.

Markel Bermuda also must submit annually to the BMA a Commercial Insurer Solvency Self-Assessment (CISSA) and a Financial Condition Report (FCR). The CISSA is a confidential internal assessment of the material and relevant risks associated with an insurer's current business plan and the sufficiency of capital resources to support those risks. The FCR is an assessment of the insurer's business and performance, governance structure, risk profile, solvency valuation and capital management, and is available to the public upon written request.

Under the Bermuda Insurance Act, Markel Bermuda is prohibited from paying or declaring dividends during a fiscal year if it is in breach of its solvency margin or minimum liquidity ratio or if the declaration or payment of the dividend would cause a breach of those requirements. In the case of a breach by Markel Bermuda of its applicable ECR, it will not declare or pay dividends until the failure is rectified. If an insurer fails to meet its solvency margin or minimum liquidity ratio on the last day of any financial year, it is prohibited from declaring or paying any dividends during the next financial year without the prior approval of the BMA. Further, Markel Bermuda is prohibited from declaring or paying in any financial year dividends of more than 25% of its total statutory capital and surplus as set forth in its previous year's statutory balance sheet unless at least seven days before payment of those dividends it files with the BMA an affidavit stating that it will continue to meet its solvency margin and minimum liquidity ratio. Markel Bermuda must obtain the BMA's prior approval for a reduction by 15% or more of the total statutory capital as set forth in its previous year's financial statements. In addition, as a Class C long-term insurer, Markel Bermuda may not declare or pay a dividend to any person other than a policyholder unless the value of the assets in its long-term business fund, as certified by Markel Bermuda's approved actuary, exceeds the liabilities of its long-term business. The amount of the dividend cannot exceed the aggregate of that excess and any other funds legally available for the payment of the dividend. At December 31, 2018, Markel Bermuda could pay up to \$373.9 million in dividends during the following 12 months without making any additional filings with the BMA.

Other Insurance Jurisdictions

The European Union implemented Solvency II effective January 1, 2016. Solvency II replaces existing insurance directives and creates a pan-European, risk based solvency regime which affects all insurers and reinsurers throughout the E.U. The Solvency II regime is based on three pillars: financial requirements; governance and risk management requirements; and disclosure requirements. The European Commission has developed detailed rules that complement the high-level principles of Solvency II.

At present the United States is not recognized as Solvency II "equivalent." Therefore, MIICL has agreed on "other methods" with the PRA under the EU-US Covered Agreement which includes the provision to the PRA of certain specified information regarding Markel Corporation and its insurance companies.

In addition, as a global provider of specialty insurance and reinsurance, our insurance subsidiaries must comply with various regulatory requirements in jurisdictions where they conduct business in addition to the jurisdictions in which they are domiciled. For example, MIICL and our Lloyd's operations must comply with applicable Latin America regulatory requirements in connection with our Latin American reinsurance operations. In addition to the regulatory requirements imposed by the jurisdictions in which an insurer or reinsurer is licensed, a reinsurer's business operations are affected by regulatory requirements governing credit for reinsurance in other jurisdictions in which its ceding companies are located. In general, a ceding company that obtains reinsurance from a reinsurer that is licensed, accredited or approved by the jurisdiction in which the ceding company files statutory financial statements is permitted to reflect in its statutory financial statements a credit in an aggregate amount equal to the liability for unearned premiums and loss reserves and loss expense reserves ceded to the reinsurer. Many jurisdictions also permit ceding companies to take credit on their statutory financial statements for reinsurance obtained from unlicensed or non-admitted reinsurers if certain prescribed security arrangements are made. As an example, Markel Bermuda currently is not licensed, accredited or approved in every jurisdiction where its reinsurance customers are domiciled. As a result, Markel Bermuda may be required to provide a letter of credit or other security arrangement for its reinsurance customers domiciled in those jurisdictions. In most U.S. states Markel Bermuda has obtained approval of a trust arrangement that satisfies the credit for reinsurance requirements for Markel Bermuda's customers domiciled in those states.

The insurance and reinsurance industry in Brazil is regulated by the Conselho Nacional de Seguros Privados (CNSP) and supervised by the Superintendência de Seguros Privados (SUSEP) on behalf of the Ministry of Finance. Markel Brazil and Markel Brazil Re are each authorized by SUSEP as a local Brazilian insurance company and reinsurance company, respectively. Markel Brazil and Markel Brazil Re are required to submit monthly returns, audited annual returns and annual financial statements to SUSEP.

On June 23, 2016, the U.K. voted to exit the European Union (Brexit). For discussion regarding Brexit, see "Brexit Developments" under Management's Discussion & Analysis of Financial Condition and Results of Operations and the Risk Factor titled "The exit of the United Kingdom from the European Union could adversely affect us."

MISE is subject to both financial and non-financial supervision by the Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin), which has licensed it to carry on insurance and reinsurance business in defined classes. MISE is required to submit quarterly and annual financial statements to BaFin. MISE also must regularly submit an ORSA, a regular supervisory report and a SFCR, as well as tax returns and additional financial disclosures. MISE also operates or has branch offices in other E.U. and EEA countries. MISE's activities in each E.U. and EEA country are subject to regulatory supervision by the regulator in that country.

Global Supervisory College; Global Common Framework

The global insurance regulatory framework now also includes supervisory colleges. A supervisory college is a forum of the regulators having jurisdictional authority over an insurance holding company's worldwide insurance subsidiaries. The supervisory college meets with executive management to evaluate the insurance group on both a group-wide and legal-entity basis, particularly with respect to its financial data, business strategies, enterprise risk management and corporate governance. The Illinois Department of Insurance is our lead insurance regulator for purposes of conducting the supervisory college along with several other regulators.

The NAIC and state insurance regulators, as well as regulators in countries where we have operations, are currently working with the International Association of Insurance Supervisors (IAIS) to develop a global common framework (ComFrame) for the supervision of internationally active insurance groups (IAIGs). If adopted, ComFrame would require the designation of a group-wide supervisor (regulator) for each IAIG and would impose a group capital requirement that would be applied to an IAIG in addition to the current legal entity capital requirements imposed by state insurance regulators. In response to ComFrame, the NAIC revised the model Insurance Holding Company System Regulatory Act to allow state insurance regulators in the U.S. to be designated as group-wide supervisors for U.S. based IAIGs. Additionally, the NAIC is developing a group capital standard that would be applied to U.S. based insurance groups.

Other Regulation

Markel Ventures. Our Markel Ventures businesses are subject to a wide variety of U.S. federal, state, and local laws and regulations, as well as foreign laws and regulations applicable to their non-U.S. operations. Specifically, these laws and regulations cover the following areas: safety, health, employment, the environment, U.S. and international trade, anti-corruption, data privacy and security, government contracts as well as other specific regulatory areas applicable to the companies' operations.

Solicitors Regulation Authority. Markel Law LLP (ML), a wholly owned subsidiary, is a full service commercial law firm with offices in Manchester and Croydon, England. ML employs more than 50 lawyers who provide legal services to small and medium-sized enterprises in the U.K. ML is authorized and regulated by the Solicitors Regulation Authority (SRA). The SRA is an independent regulatory body of the Law Society of England and Wales which regulates the conduct of solicitors and law firms to protect consumers and to support the rule of law and the administration of justice. The SRA works within a statutory framework for regulation provided by the Solicitors Act 1974, the Administration of Justice Act 1985 and, primarily, by the Legal Services Act 2007.

Markel CATCo. MCIM is a Bermuda exempted company with limited liability. MCIM holds investment business and insurance management licenses, issued by the BMA under the Investment Business Act 2003 and the Insurance Act 1978, respectively, and is regulated by the BMA. MCIM is not registered as an investment company under the U.S. Investment Company Act of 1940, an investment adviser under the U.S. Investment Advisers Act of 1940 (as amended, the Advisers Act) or as a "commodity pool operator" or "commodity trading adviser" with the U.S. Commodity Futures Trading Commission (CFTC). However, MCIM is an "exempt reporting adviser" under the Advisers Act and as such is subject to regulation by the U.S. Securities and Exchange Commission (SEC) and certain requirements under the Advisers Act. In addition, as an exempt commodity pool operator, MCIM is subject to regulation by the CFTC and to certain requirements under the Commodity Exchange Act of 1936, as amended.

MCIM serves as the investment manager for Markel CATCo Reinsurance Fund Ltd., a Bermuda exempted mutual fund company comprised of multiple segregated accounts with limited liability under the Companies Act 1981 of Bermuda that is registered as a segregated accounts company under the Bermuda Segregated Accounts Companies Act 2000.

MCIM also serves as the investment manager for CROF, a limited liability closed-ended exempted mutual fund company of unlimited duration under the Companies Act 1981 of Bermuda. CROF's shares are listed on a market operated by the London Stock Exchange and on the Bermuda Stock Exchange.

Markel CATCo Re is also registered as a segregated accounts company under the Bermuda Segregated Accounts Companies Act 2000 and is licensed as a Bermuda Class 3 reinsurance company subject to regulation and supervision of the BMA. Under the Bermuda Insurance Act, and related regulations and policies of the BMA, Markel CATCo Re is subject to, among other things, capital, surplus and liquidity requirements, solvency standards, restrictions on dividends and distributions and certain periodic examinations of the company and its financial condition. In addition, Markel CATCo Re must obtain prior approval of ownership and transfer of shares and maintain a principal office and appoint and maintain a principal representative in Bermuda. The BMA also requires that Markel CATCo Re contract for local services, such as corporate secretary, insurance manager and registered representative, at market rates.

Nephila. Two of Nephila's subsidiaries, Nephila Capital Ltd. (Nephila Capital), a Bermuda exempted company with limited liability, and Nephila Advisors LLC (Nephila Advisors), a Delaware limited liability company, are registered with the SEC as investment advisers under the Advisers Act. In addition, Nephila Capital is registered as a "commodity pool operator" and Nephila Advisors is registered as a "commodity trading advisor," each with the U.S. CFTC. Nephila Capital is also a registered insurance manager under the Bermuda Insurance Act.

Nephila serves as the investment manager to the Nephila Funds, which are subject to regulation in the U.S., U.K., Bermuda and Ireland.

With the exception of Syndicate 2357, the Nephila Reinsurers are subject to regulation and supervision of the BMA. Under the Bermuda Insurance Act, and related regulations and policies of the BMA, each reinsurance company is subject to, among other things, capital, surplus and liquidity requirements, solvency standards, restrictions on dividends and distributions and certain periodic examinations of the company and its financial condition. In addition, each reinsurance company must obtain prior approval of ownership and transfer of shares and maintain a principal office and appoint and maintain a principal representative in Bermuda. The BMA also requires that each reinsurance company contract for local services, such as corporate secretary, insurance manager and registered representative, at market rates.

Syndicate 2357 is subject to regulation and supervision of the PRA, FCA and Lloyd's. Through its subsidiary, Nautical Management Ltd. (Nautical), Nephila acts as the service company coverholder for Syndicate 2357. Nautical is a Bermuda exempted company with limited liability that is licensed as an insurance agent and insurance manager under the Bermuda Insurance Act. A third party acts as the registered Lloyd's managing agent of Syndicate 2357. The managing agent is authorized by the PRA and Lloyd's and regulated by the PRA, the FCA and Lloyd's. The managing agent is responsible for Syndicate 2357's compliance with applicable PRA, FCA and Lloyd's rules and requirements. However, the managing agent has delegated its authority for binding risks into Syndicate 2357 to a subsidiary of Nephila.

Ratings

Financial stability and strength are important purchase considerations of policyholders, cedents and insurance agents and brokers. Because an insurance premium paid today purchases coverage for losses that might not be paid for many years, the financial viability of the insurer is of critical concern. Various independent rating agencies provide information and assign ratings to assist buyers in their search for financially sound insurers. Rating agencies periodically re-evaluate assigned ratings based upon changes in the insurer's operating results, financial condition or other significant factors influencing the insurer's business. Changes in assigned ratings could have an adverse impact on an insurer's ability to write new business.

Best assigns financial strength ratings (FSRs) to property and casualty insurance companies based on quantitative criteria such as profitability, leverage and liquidity, as well as qualitative assessments such as the spread of risk, the adequacy and soundness of ceded reinsurance, the quality and estimated market value of assets, the adequacy of loss reserves and surplus and the competence, experience and integrity of management. Best's FSRs range from "A++" (superior) to "F" (in liquidation).

Seventeen of our twenty insurance subsidiaries are rated by Best. All seventeen of our insurance subsidiaries rated by Best have been assigned an FSR of "A" (excellent). Our Lloyd's syndicate is part of a group rating for the Lloyd's overall market, which has been assigned an FSR of "A" (excellent) by Best.

Ten of our twenty insurance subsidiaries are rated by S&P. All ten of our insurance subsidiaries rated by S&P have been assigned an FSR of "A" (strong). Our Lloyd's syndicate is part of a group rating for the Lloyd's overall market, which has been assigned an FSR of "A+" (strong) by S&P.

Five of our twenty insurance subsidiaries are rated by Moody's Corporation (Moody's). All five insurance subsidiaries rated by Moody's have been assigned an FSR of "A2" (good).

Risk Factors

A wide range of factors could materially affect our future prospects and performance. The matters addressed under "Safe Harbor and Cautionary Statement," "Critical Accounting Estimates" and "Market Risk Disclosures" in Management's Discussion and Analysis of Financial Condition and Results of Operations and other information included or incorporated in this report describe many of the significant risks that could affect our operations and financial results. We are also subject to the following risks.

We may experience losses or disruptions from catastrophes. As a company with significant property and casualty insurance underwriting operations, we may experience losses from man-made or natural catastrophes. Catastrophes include, but are not limited to, windstorms, hurricanes, earthquakes, tornadoes, hail, severe winter weather and fires and may include events related to terrorism and political unrest. While we employ catastrophe modeling tools in our underwriting process, we cannot predict how severe a particular catastrophe will be before it occurs. The extent of losses from catastrophes is a function of the total amount of losses incurred, the number of insureds affected, the frequency and severity of the events, the effectiveness of our catastrophe risk management program and the adequacy of our reinsurance coverage. Most catastrophes occur over a small geographic area; however, some catastrophes may produce significant damage in large, heavily populated areas. In addition, catastrophes may have a material adverse effect on the investment management and incentive fees earned by our investment management businesses and returns on our investments in insurance-linked securities. Catastrophes also may result in significant disruptions in our insurance and other operations, as well as loss of income and assets. If climate change results in an increase in the frequency and severity of weather-related catastrophes, we may experience additional catastrophe-related losses or disruptions, which may be material.

Our results may be affected because actual insured or reinsured losses differ from our loss reserves. Significant periods of time often elapse between the occurrence of an insured or reinsured loss, the reporting of the loss to us and our payment of that loss. To recognize liabilities for unpaid losses, we establish reserves as balance sheet liabilities representing estimates of amounts needed to pay reported and unreported losses and the related loss adjustment expenses. The process of estimating loss reserves is a difficult and complex exercise involving many variables and subjective judgments. This process may become more difficult if we experience a period of rising inflation. As part of the reserving process, we review historical data and consider the impact of such factors as:

- trends in claim frequency and severity,
- changes in operations,
- emerging economic and social trends,
- trends in insurance rates,
- inflation or deflation, and
- changes in the regulatory and litigation environments.

This process assumes that past experience, adjusted for the effects of current developments and anticipated trends, is an appropriate basis for predicting future events. There is no precise method, however, for evaluating the impact of any specific factor on the adequacy of reserves, and actual results will differ from original estimates. As part of the reserving process, we regularly review our loss reserves and make adjustments as necessary. Future increases in loss reserves will result in additional charges to earnings, which may be material.

In addition, reinsurance reserves are subject to greater uncertainty than insurance reserves primarily because a reinsurer relies on (i) the original underwriting decisions made by ceding companies and (ii) information and data from ceding companies. As a result, we are subject to the risk that our ceding companies may not have adequately evaluated the risks reinsured by us and the premiums ceded may not adequately compensate us for the risks we assume. In addition, reinsurance reserves may be less reliable than insurance reserves because there is generally a longer lapse of time from the occurrence of the event to the reporting of the loss or benefit to the reinsurer and ultimate resolution or settlement of the loss.

Changes in the assumptions and estimates used in establishing reserves for our life and annuity reinsurance book could result in material increases in our estimated loss reserves for such business. Our run-off life and annuity reinsurance book exposes us to mortality risk, which is the risk that the level of death claims may differ from that which we assumed in establishing the reserves for our life and annuity reinsurance contracts. Some of our life and annuity reinsurance contracts expose us to longevity risk, which is the risk that an insured person will live longer than expected when the reserves were established, or morbidity risk, which is the risk that an insured person will become critically ill or disabled. Our reserving process for the life and annuity reinsurance book is designed with the objective of establishing appropriate reserves for the risks we assumed. Among other things, these processes rely heavily on analysis of mortality, longevity and morbidity trends, lapse rates, interest rates and expenses. As of December 31, 2018, our reserves for life and annuity benefits totaled \$1.0 billion .

We expect mortality, morbidity, longevity, 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 mortality, longevity, morbidity or lapse rates that we used in establishing the reserves for a reinsurance agreement will negatively affect our net income because the reserves we originally set for the risks we assumed may not be sufficient to cover the future claims and expense payments. 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. Fluctuations in interest rates will impact the performance of our investments. If there are changes to any of the above factors to the point where a reserve deficiency exists, a charge to earnings will be recorded, which may have a material adverse effect on our results of operations and financial condition.

Our ability to make payments on debt or other obligations depends on the receipt of funds from our subsidiaries. We are a holding company, and as a result, our cash flow and our ability to service our debt depend upon the earnings of our subsidiaries and on the distribution of earnings, loans or other payments by our subsidiaries to us. In addition, payment of dividends by our insurance subsidiaries, which account for a significant portion of our operating cash flows, may require prior regulatory notice or approval or may be restricted by capital requirements imposed by regulatory authorities. In addition, our reinsurance contracts typically allow the cedent, upon a reduction in an insurance company's capital in excess of specified amounts, to terminate its contract on terms disadvantageous to us or to exercise other remedies that may adversely affect us. Those contract provisions may have the effect of limiting distributions by our insurance subsidiaries to us.

Our investment results may be impacted by changes in interest rates, U.S. and international monetary and fiscal policies as well as broader economic conditions. We receive premiums from customers for insuring their risks. We invest these funds until they are needed to pay policyholder claims or until they are recognized as profits. Fluctuations in the value of our investment portfolio can occur as a result of changes in interest rates and U.S. and international monetary and fiscal policies as well as broader economic conditions (including, for example, equity market conditions and significant inflation or deflation). Our investment results may be materially impacted by one or more of these factors.

Competition in the insurance and reinsurance markets could reduce our underwriting profits. Insurance and reinsurance markets are highly competitive. We compete on an international and regional basis with major U.S., Bermuda, European, and other international insurers and reinsurers and with underwriting syndicates, some of which have greater financial, marketing, and management resources than we do. Recent industry consolidation, including business combinations among insurance and other financial services companies, has resulted in larger competitors with even greater financial resources. We also compete with new companies that continue to be formed to enter the insurance and reinsurance markets, particularly companies with new or "disruptive" technologies or business models. In addition, capital market participants have created alternative products that are intended to compete with reinsurance products. Increased competition could result in fewer submissions, lower premium rates, and less favorable policy terms and conditions, which could reduce our underwriting profits and have a material adverse effect on our results of operations and financial condition.

The historical cyclicity in the property and casualty insurance industry could have a material adverse effect on our ability to improve or maintain underwriting profits or to grow or maintain premium volume. The insurance and reinsurance markets have historically been cyclical, characterized by extended periods of intense price competition due to excessive underwriting capacity as well as brief periods when shortages of capacity permitted more favorable rate levels. Among our competitive strengths have been our specialty product focus and our niche market strategy. These strengths also make us vulnerable in periods of intense competition to actions by other insurance companies who seek to write additional premiums without appropriate regard for underwriting profitability. During soft markets, it could be very difficult for us to grow or maintain premium volume levels without sacrificing underwriting profits. If we are not successful in maintaining rates or achieving rate increases, it may be difficult for us to improve or maintain underwriting profits or to grow or maintain premium volume levels.

We invest a significant portion of our invested assets in equity securities, which may result in significant variability in our investment results and net income and may have a material adverse effect on shareholders' equity. Additionally, our equity investment portfolio is concentrated, and declines in the value of these significant investments could have a material adverse effect on our financial results. Equity securities were 63% of our shareholders' equity at both December 31, 2018 and 2017. Equity securities have historically produced higher returns than fixed maturities over long periods of time; however, investing in equity securities may result in significant variability in investment returns from one period to the next. In volatile financial markets, we could experience significant declines in the fair value of our equity investment portfolio, which would result in a material decrease in net income and shareholders' equity. Our equity portfolio is concentrated in particular issuers and industries and, as a result, a decline in the fair value of these concentrated investments also could result in a material decrease in net income and shareholders' equity. A material decrease in shareholders' equity may have a material adverse effect on our ability to carry out our business plans.

General economic, market or industry conditions could lead to investment losses, adverse effects on our businesses and limit our access to the capital markets. General economic and market conditions and industry specific conditions, including extended economic recessions or expansions; prolonged periods of slow economic growth; inflation or deflation; fluctuations and volatility in foreign currency exchange rates, commodity and energy prices and interest rates; volatility in the credit and capital markets; and other factors, could lead to substantial realized and unrealized investment losses in future periods, declines in demand for or increased claims made under our insurance products or limited or no access to the capital markets, any of which could have a material adverse effect on our results of operations, financial condition, debt and financial strength ratings or our insurance subsidiaries' capital.

We rely on the purchase of reinsurance and bear collection risk if the reinsurer fails to meet its obligations under the reinsurance agreement. Our underwriting operations purchase reinsurance and retrocessional reinsurance to manage our net retention on individual risks and overall exposure to losses, while providing us with the ability to offer policies with sufficient limits to meet policyholder needs. Our program services business reinsures substantially all of its underwriting and operating risks in connection with its fronting arrangements.

The ceding of insurance does not legally discharge us from our primary liability for the full amount of the policies. Reliance on reinsurance may create credit risk as a result of the reinsurer's inability or unwillingness to pay reinsurance claims when due. We generally select well capitalized and highly rated reinsurers and in certain instances we require reinsurers to post substantial collateral to secure the reinsured risks. Deterioration in the credit quality of existing reinsurers or disputes over the terms of reinsurance could result in charges to earnings, which may have a material adverse effect on our results of operations and financial condition. In addition, collateral may not be sufficient to cover our liability, and we may not be able to cause the reinsurer to deliver additional collateral.

As of December 31, 2018, we were the beneficiary of letters of credit, trust accounts and funds withheld in the aggregate amount of \$3.2 billion, collateralizing \$5.2 billion in reinsurance recoverables. The remaining unsecured reinsurance recoverables are ceded to highly-rated, well capitalized reinsurers. Our reinsurance recoverables are based on estimates, and our actual liabilities may exceed the amount we are able to recover from our reinsurers or any collateral securing the liabilities. The failure of a reinsurer to meet its obligations to us, whether due to insolvency, dispute or other unwillingness or inability to pay, or due to our inability to access sufficient collateral to cover our liabilities, could have a material adverse effect on our results of operations and financial condition.

The availability and cost of reinsurance are determined by market conditions beyond our control. There is no guarantee that our desired amounts of reinsurance or retrocessional reinsurance will be available in the marketplace in the future.

Our insurance subsidiaries are subject to extensive supervision and regulation that may have a material adverse effect on our ability to implement and achieve our business objectives. Our insurance subsidiaries are subject to extensive supervision and regulation by the regulatory authorities in the various jurisdictions in which they conduct business, including state, national and international insurance regulators. This supervision and regulation is intended for the benefit of policyholders rather than shareholders or holders of debt securities. Regulatory authorities have broad regulatory, supervisory and administrative powers relating to, among other things, data protection and data privacy, solvency standards, licensing, coverage requirements, policy rates and forms and the form and content of financial reports. Regulatory and legislative authorities continue to implement enhanced or new regulatory requirements intended to prevent future financial crises or otherwise assure the stability of financial institutions. Regulatory authorities also may seek to exercise their supervisory or enforcement authority in new or more extensive ways, such as imposing increased capital requirements. These actions, if they occur, could affect the competitive market and the way we conduct our business and manage our capital and could result in lower revenues and higher costs. As a result, such actions could have a material adverse effect on our results of operations and financial condition.

The legal and regulatory requirements applicable to our businesses are extensive. Failure to comply could have a material adverse effect on us. Each of our businesses is highly dependent on the ability to engage on a daily basis in a large number of financial and operational activities, including among others insurance underwriting, claim processing, investment activities, the management of third party capital and providing products and services to businesses and consumers, many of which are highly complex. These activities are subject to internal guidelines and policies, as well as legal and regulatory standards, including, among others, those related to privacy, anti-corruption, anti-bribery and global finance and investments and insurance matters. Our continued expansion into new businesses and markets has brought about additional requirements. While we believe that we have adopted appropriate risk management and compliance programs, compliance risks will continue to exist, particularly as we become subject to new rules and regulations. Failure to comply with, or to obtain, appropriate authorizations or exemptions under any applicable laws and regulations could result in restrictions on our ability to do business or undertake activities that are regulated in one or more of the jurisdictions in which we conduct business. Any such failure could also subject us to fines, penalties, equitable relief and changes to our business practices. In addition, a failure to comply could result in defaults under our senior unsecured debt agreements or credit facilities or damage our businesses or our reputation. Compliance with applicable laws and regulations is time consuming and personnel-intensive, and changes in these laws and regulations could materially increase our direct and indirect compliance costs and other expenses of doing business, and have a material adverse effect on our results of operations and financial condition.

The amount of capital that our insurance subsidiaries have and must hold to maintain their financial strength and credit ratings and meet other requirements can vary significantly from time to time and is sensitive to a number of factors outside of our control. Capital requirements for our insurance subsidiaries are prescribed by the applicable insurance regulators and the NAIC, while rating agencies establish requirements that inform ratings for our insurance subsidiaries and senior debt securities. Projecting surplus and the related capital requirements is complex and requires making assumptions regarding how our business will perform within the broader macroeconomic environment. Insurance regulators and rating agencies evaluate company capital through financial models that calculate minimum capitalization requirements based on risk-based capital formulas for property and casualty insurance groups and their subsidiaries. In any particular year, capital levels and risk-based capital requirements may increase or decrease depending on a variety of factors including the amount of income or losses generated by our insurance subsidiaries, the amount of additional capital our insurance subsidiaries must hold to support business growth, the value of certain fixed maturities and equity securities in our investment portfolio, changes in interest rates and foreign currency exchange rates, as well as changes to the regulatory and rating agency models used to determine our required capital. In addition, the NAIC is developing a group capital calculation for U.S. based global insurance groups. While still in its early stage, and even though it is not intended to be a prescribed capital requirement, this calculation could have an impact on the amount of group capital we are required to hold and how it is allocated.

Information technology systems that we use could fail or suffer a security breach, which could have a material adverse effect on us or result in the loss of sensitive information. Our businesses are dependent upon the operational effectiveness and security of our enterprise systems and those maintained by third parties. Among other things, we rely on these systems to interact with producers, insureds, customers, clients, and other third parties, to perform actuarial and other modeling functions, to underwrite business, to prepare policies and process premiums, to process claims and make claims payments, to prepare internal and external financial statements and information, as well as to engage in a wide variety of other business activities. A significant failure of our enterprise systems, or those of third parties upon which we may rely, whether because of a natural disaster, network outage or a cyber-attack on our systems, could compromise our personal, confidential and proprietary information as well as that of our customers and business partners, impede or interrupt our business operations and could result in other negative consequences, including remediation costs, loss of revenue, additional regulatory scrutiny and fines, litigation and monetary and reputational damages. Although we have implemented controls and take protective actions to reduce the risk of an enterprise failure and protect against a security breach, such measures may be insufficient to prevent, or mitigate the effects of, a natural disaster, network outage or a cyber-attack on our systems that could result in liability to us, cause our data to be corrupted or stolen and cause us to commit resources, management time and money to prevent or correct those failures.

In addition, we are subject to numerous data privacy laws and regulations enacted in the jurisdictions in which we do business. A misuse or mishandling of confidential or proprietary information being sent to or received from a client, employee or third party could damage our businesses or our reputation or result in significant monetary damages, regulatory enforcement actions, fines and criminal prosecution in one or more jurisdictions. For example, under the European General Data Protection Regulation there are significant new punishments for non-compliance which could result in a penalty of up to 4% of a firm's global annual revenue. In addition, a violation of data privacy laws and regulations could result in defaults under our outstanding indebtedness or credit facilities. Those monetary damages, penalties, regulatory or legal actions or defaults, or the damage to our businesses or reputation, could have a material adverse effect on our results of operations and financial condition. Third parties to whom we outsource certain functions are also subject to these risks, and their failure to adhere to these laws and regulations also could damage our businesses or reputation, could have a material adverse effect on our results of operations and financial condition.

Further, we routinely transmit, receive and store personal, confidential and proprietary information by email and other electronic means. Although we attempt to protect this confidential and proprietary information, we may be unable to do so in all cases, especially with customers, business partners and other third parties who may not have or use appropriate controls to protect confidential information.

While we maintain cyber risk insurance providing first party and third party coverages, such insurance may not cover all costs associated with the consequences of personal and confidential and proprietary information being compromised. A material cyber security breach could have a material adverse effect on our results of operations and financial condition.

We may not find suitable acquisition candidates or new ventures. As part of our growth strategy, we continue to evaluate possible acquisition transactions on an ongoing basis, and at any given time we may be engaged in discussions with respect to possible acquisitions and new ventures. We may not be able to identify suitable acquisition targets or ventures, any such transactions may not be financed or completed on acceptable terms and our future acquisitions or ventures may not be successful.

The integration of acquired companies may not be as successful as we anticipate. We have recently engaged in a number of acquisitions in an effort to achieve profitable growth in our underwriting operations and to create additional value on a diversified basis in our Market Ventures and other operations. Acquisitions present operational, strategic and financial risks, as well as risks associated with liabilities arising from the previous operations of the acquired companies. All of these risks are magnified in the case of a large acquisition. Assimilation of the operations and personnel of acquired companies may prove more difficult than anticipated, which may result in failure to achieve financial objectives associated with the acquisition or diversion of management attention. In addition, integration of formerly privately-held companies into the management and internal control and financial reporting systems of a publicly-held company presents additional risks.

Impairment in the value of our goodwill or other intangible assets could have a material adverse effect on our operating results and financial condition. As of December 31, 2018, goodwill and intangible assets totaled \$4.0 billion and represented 44% of shareholders' equity. We record goodwill and intangible assets at fair value upon the acquisition of a business. Goodwill represents the excess of amounts paid for acquiring businesses over the fair value of the net assets acquired. Goodwill and indefinite-lived intangible assets are evaluated for impairment annually, or more frequently if conditions warrant, by comparing the carrying value of a reporting unit to its estimated fair value for goodwill and by comparing the carrying value of the asset to its fair value for indefinite-lived intangible assets. Intangible assets with definite lives are reviewed for impairment when events or circumstances indicate that their carrying value may not be recoverable. Declines in operating results, divestitures, sustained market declines and other factors that impact the fair value of a reporting unit could result in an impairment of goodwill or intangible assets and, in turn, a charge to net income. Such a charge could have a material adverse effect on our results of operations or financial condition.

For example, in 2018 and 2017 we recorded \$1.1 billion and \$1.3 billion, respectively, of goodwill and intangible assets in connection with the acquisitions of Nephila and Brahmin in 2018 and SureTec, Costa Farms and State National in 2017. Developments that adversely affect the future cash flows or earnings of an acquired business may cause the goodwill or intangible assets recorded for it to be impaired. For example, in 2018 we reduced the carrying value of the goodwill and intangible assets of the MCIM reporting unit, acquired in 2015, to zero, which resulted in a combined goodwill and intangible assets impairment charge of \$179.0 million.

The failure of any of the loss limitation methods we employ could have a material adverse effect on us. We seek to limit our loss exposure in a variety of ways, including adhering to maximum limitations on policies written in defined geographical zones, limiting program size for each client, establishing per risk and per occurrence limitations for each event, employing coverage restrictions and following prudent underwriting guidelines for each program written. We also seek to limit our loss exposure through geographic diversification. Underwriting is a matter of judgment, involving assumptions about matters that are inherently unpredictable and beyond our control, and for which historical experience and probability analysis may not provide sufficient guidance. One or more future events could result in claims that substantially exceed our expectations, which could have a material adverse effect on our financial condition and our results of operations, possibly to the extent of eroding away our shareholders' equity. In addition, we seek to limit loss exposures by policy terms, exclusion from coverage and choice of legal forum. Disputes relating to coverage and choice of legal forum also arise. As a result, various provisions of our policies, such as choice of forum, limitations or exclusions from coverage may not be enforceable in the manner we intend and some or all of our loss limitation methods may prove ineffective.

The effects of emerging claim and coverage issues on our business are uncertain. As industry practices and legal, judicial, social and other environmental conditions change, unexpected and unintended issues related to claims and coverage may emerge. These issues may have a material adverse effect on our business by either broadening coverage beyond our underwriting intent or by increasing the number or size of claims. In some instances, these changes may not become apparent until after we have issued insurance or reinsurance contracts that are affected by the changes. As a result, the full extent of liability under our insurance or reinsurance contracts may not be known for many years after a contract is issued.

The loss of one or more key executives or an inability to attract and retain qualified personnel could have a material adverse effect on us. Our success depends on our ability to retain the services of our existing key executives and to attract and retain additional qualified personnel in the future. The loss of the services of any of our key executives or the inability to hire and retain other highly qualified personnel in the future could have a material adverse effect on our ability to conduct or grow our business.

We have substantial international operations and investments, which expose us to increased political, operational and economic risks. A substantial portion of our revenues and income is derived from our operations and investments outside the U.S., including from the U.K., Bermuda, Europe, Canada, Latin America, Asia Pacific and the Middle East. Our international operations and investments expose us to increased political, operational and economic risks. Deterioration or volatility in foreign and international financial markets or general economic and political conditions could adversely affect our operating results, financial condition and liquidity. Concerns about the economic conditions, capital markets, political and economic stability and solvency of certain countries have contributed to global market volatility. Political changes in the jurisdictions where we operate and elsewhere, some of which may be disruptive, can also interfere with our customers and our activities in a particular location. Our international operations also may be subject to a number of additional risks, particularly in emerging economies, including restrictions such as price controls, capital controls, currency exchange limits, ownership limits and other restrictive or anti-competitive governmental actions or requirements, which could have a material adverse effect on our businesses.

Changes in regulations and interpretations relating to the Tax Cuts and Jobs Act could have a material adverse effect on us. On December 22, 2017, the U.S. enacted the Tax Cuts and Jobs Act (TCJA), which made significant modifications to U.S. federal income tax law, most of which were effective January 1, 2018. The U.S. Treasury Department and the Internal Revenue Service continue to issue guidance and interpretations of how provisions of the TCJA will be applied or otherwise administered. Changes in regulations and interpretations relating to the TCJA could have a material adverse effect on our results of operation and financial condition.

Our insurance companies and senior debt are rated by various rating agencies, and a downgrade or potential downgrade in one or more of these ratings could have a material adverse effect on us. Financial strength ratings are an important factor in establishing the competitive position of insurance and reinsurance companies. Our senior debt ratings also affect the availability and cost of capital. Certain of our insurance and reinsurance company subsidiaries and our senior debt securities are rated by various rating agencies. Our financial strength and debt ratings are subject to periodic review, and are subject to revision or withdrawal at any time. The financial strength ratings of our insurance subsidiaries are significantly influenced by their statutory surplus amounts and leverage and capital adequacy ratios and other financial metrics. Rating agencies may implement changes to their ratings methodologies or internal models that have the effect of increasing or decreasing the amount of capital our insurance subsidiaries must hold or restrict how the company may deploy its capital in order to maintain its current ratings. For example, for certain of our insurance subsidiaries, rating agencies may take into account in their calculations the collateral provided to us by reinsurers. A change in this practice could adversely impact our ratings. We cannot be sure that we will be able to retain our current or any future ratings. If our ratings are reduced from their current levels by one or more rating agencies, our competitive position in our target markets within the insurance industry could suffer and it would be more difficult for us to market our products. A ratings downgrade could result in a substantial loss of business as policyholders and ceding company clients move to other companies with higher claims-paying and financial strength ratings. In addition a downgrade could trigger contract provisions that allow cedents to terminate their reinsurance contracts on terms disadvantageous to us or require us to collateralize our obligations through trusts or letters of credit. A ratings downgrade could also have a material adverse effect on our liquidity, including the availability of our letter of credit facilities, and limit our access to capital markets, increase our cost of borrowing or issuing debt and require us to post collateral.

We may require additional capital in the future, which may not be available or may only be available on unfavorable terms. To the extent that cash flows generated by our operations are insufficient to fund future operating requirements, or that our capital position is adversely impacted by a decline in the fair value of our investment portfolio, losses from catastrophe events or otherwise, we may need to raise additional funds through financings or curtail our growth. We also may be required to liquidate fixed maturities or equity securities, which may result in realized investment losses. Any further sources of liquidity, including capacity needed for letters of credit, if available at all, may be on terms that are unfavorable to us. Our access to additional sources of liquidity, and our ability to renew our revolving credit facility, which matures on August 1, 2019, will depend on a variety of factors, such as market conditions, the general availability of credit, the availability of credit to the industries in which we operate, our results of operations, financial condition, credit ratings and credit capacity, as well as pending litigation or regulatory investigations. Our ability to borrow under our revolving credit facility and letter of credit facilities is contingent on our compliance with the covenants and other requirements under those facilities. Similarly, our access to capital may be impaired if regulatory authorities or rating agencies take negative actions against us. Our inability to obtain adequate capital when needed could have a negative impact on our ability to invest in, or take advantage of opportunities to expand, our businesses, such as possible acquisitions or the creation of new ventures, and inhibit our ability to refinance our existing indebtedness on terms acceptable to us. Any of these effects could have a material adverse effect on our results of operations and financial condition.

Our failure to comply with covenants and other requirements under our revolving credit facility, senior debt and other indebtedness could have a material adverse effect on us. The agreements and indentures relating to our revolving credit facility, senior debt and other indebtedness, including letter of credit facilities used by certain of our insurance subsidiaries, contain covenants and other requirements. If we fail to comply with those covenants or requirements, the lenders, noteholders or counterparties under those agreements and indentures could declare a default and demand immediate repayment of all amounts owed to them. In addition, where applicable, our lenders may cancel their commitments to lend or issue letters of credit or require us to pledge additional or a different type of collateral. A default under one debt agreement may also put us at risk of a cross-default under other debt agreements or other arrangements. Any of these effects could have a material adverse effect on our results of operations and financial condition.

We depend on a few brokers for a large portion of our revenues and the loss of business provided by any one of them could have a material adverse effect on us. We market our insurance and reinsurance worldwide through insurance and reinsurance brokers. For the year ended December 31, 2018, our top three independent brokers represented 25% of the gross premiums written by our underwriting operations. Loss of all or a substantial portion of the business provided by one or more of these brokers could have a material adverse effect on our business.

Employee error and misconduct may be difficult to detect and prevent and may result in significant losses. There have been a number of cases involving misconduct by employees in a broad range of industries in recent years, and we run the risk of misconduct by our employees. Instances of fraud, illegal acts, errors, failure to document transactions properly or to obtain proper internal authorization, or failure to comply with regulatory requirements or our internal policies may result in losses. It is not always possible to deter or prevent employee errors or misconduct, and the controls that we have in place to prevent and detect this activity may not be effective in all cases.

We are subject to laws and regulations relating to economic and trade sanctions and bribery and corruption, the violation of which could have a material adverse effect on us. We are required to comply with the economic and trade sanctions and embargo programs administered by the United States Department of the Treasury's Office of Foreign Assets Control and similar multi-national bodies and governmental agencies worldwide, as well as applicable anti-corruption laws and anti-bribery and regulations of the United States, the United Kingdom and other jurisdictions where we operate. A violation of a sanction, embargo program, or anti-corruption law, could subject us, and individual employees, to a regulatory enforcement action as well as significant civil and criminal penalties. In addition, a violation could result in defaults under our outstanding indebtedness or credit facilities or damage our businesses or our reputation. Those penalties or defaults, or damage to our businesses or reputation, could have a material adverse effect on our results of operations and financial condition. In some cases the requirements and limitations applicable to the global operations of U.S. companies and their affiliates are more restrictive than, and may even conflict with, those applicable to non-U.S. companies and their affiliates, which also could have a material adverse effect on our results of operations and financial condition.

Losses from legal and regulatory actions may have a material adverse effect on us. We are involved in various legal actions, including at times multi-party or class action litigation, some of which involve claims for substantial or indeterminate amounts. We are also involved from time to time in various regulatory actions, investigations and inquiries, including market conduct exams by insurance regulatory authorities. An unfavorable outcome in one or more of these matters could have a material adverse effect on our results of operations and financial condition. If any regulatory authority takes action against us or we enter into an agreement to settle a matter, we may incur sanctions or be required to pay substantial fines or implement remedial measures that could prove costly or disruptive to our businesses and operations. Even if an unfavorable outcome does not materialize, these matters could have an adverse impact on our reputation and result in substantial expense and disruption. See note 18 of the notes to consolidated financial statements and "Legal Proceedings."

Regulators may challenge our use of fronting arrangements in states in which our capacity providers are not licensed. Our program services business enters into fronting arrangements with general agents and domestic and foreign insurers that want to access specific U.S. property and casualty insurance business in states in which the capacity providers are not licensed or are not authorized to write particular lines of insurance. Some state insurance regulators may object to these fronting arrangements. In certain states, an insurance commissioner has the authority to prohibit an authorized insurer from acting as an issuing carrier for an unauthorized insurer. In addition, insurance departments in states in which there is no such statutory or regulatory prohibition, could deem the assuming insurer to be transacting insurance business without a license and the issuing carrier to be aiding and abetting the unauthorized sale of insurance.

If regulators in any of the states where we conduct our fronting business were to prohibit or limit those arrangements, we would be prevented or limited from conducting that business for which a capacity provider is not authorized in those states, unless and until the capacity provider is able to obtain the necessary licenses. This could have a material adverse effect on our results of operations and financial condition.

We may be exposed to risk in connection with our management of third party capital. Some of our operating subsidiaries may owe certain legal duties and obligations to third party investors. A failure to fulfill any such duties or obligations could result in significant liabilities, penalties or other losses, and harm our businesses and results of operations. In addition, third party investors may decide not to renew their interests in the funds we manage, which could materially impact the financial condition of those funds, and could, in turn, have a material adverse effect on our results of operations and financial condition. Moreover, we may not be able to maintain or raise additional third party capital for the funds we manage or for potential new funds and therefore we may forego existing or potential fee income and other income generating opportunities. For example, catastrophe losses in 2017 and 2018 may materially adversely impact our ability to maintain or raise capital at our investment management operations.

Recent developments at our Markel CATCo operations could have a material adverse effect on us. The U.S. Department of Justice, U.S. Securities and Exchange Commission and Bermuda Monetary Authority are conducting inquiries into loss reserves recorded in late 2017 and early 2018 at Markel CATCo Re (the Markel CATCo Inquiries). Subsequently, a putative class action suit was filed by David Bergen naming Markel Corporation and certain present or former officers as defendants (the Bergen Suit). The Bergen Suit alleges violations of the federal securities laws relating to the matters that are the subject of the Markel CATCo Inquiries. In addition, as a result of matters uncovered in an internal review initiated in response to the Markel CATCo Inquiries, two senior MCIM executives are no longer with MCIM (the MCIM Executive Departures). The performance of MCIM depended heavily on the financial and managerial experience of those two senior executives. Following their departure, the two senior MCIM executives each filed suit against MCIM and Markel Corporation alleging, among other claims, breach of contract, defamation and invasion of privacy (the MCIM Executive Suits). See "Legal Proceedings" for more information regarding the Markel CATCo Inquiries, Bergen Suit and MCIM Executive Suits. Further, investors in the Markel CATCo Funds have been offered an additional opportunity to have some or all of their respective investments in the Markel CATCo Funds redeemed (the Special Redemption).

In light of the Markel CATCo Inquiries, and taking into consideration the MCIM Executive Departures and the Special Redemption, management concluded that MCIM's ability to maintain or raise capital for the Markel CATCo Funds has been adversely impacted. As a result, in the fourth quarter of 2018, the carrying value of the goodwill and intangible assets of the MCIM reporting unit was reduced to zero, which resulted in an impairment charge of \$179.0 million.

The Markel CATCo Inquiries, Bergen Suit, MCIM Executive Departures and MCIM Executive Suits, as well as other related matters of which we are currently unaware, could result in additional claims, litigation, investigations, enforcement actions or proceedings. For example, additional litigation may be filed by investors in the Markel CATCo Funds. We also could become subject to increased regulatory scrutiny, investigations or proceedings in any of the jurisdictions where we operate. If any regulatory authority takes action against us or we enter into an agreement to settle a matter, we may incur sanctions or be required to pay substantial fines or implement remedial measures that could prove costly or disruptive to our businesses and operations.

An unfavorable outcome in one or more of these matters, and others we cannot anticipate, could have a material adverse effect on our results of operations and financial condition. In addition, we may take further steps to support our Markel CATCo operations, including steps to mitigate potential risks or liabilities that may arise from the Markel CATCo Inquiries and related developments, and some of those steps may have a material impact on our results of operations or financial condition. Even if an unfavorable outcome does not materialize, these matters, and actions we may take in response, could have an adverse impact on our reputation and result in substantial expense and disruption.

The exit of the United Kingdom from the European Union could have a material adverse effect on us. On June 23, 2016, the U.K. voted to exit the E.U. (Brexit). Unless the date is extended, the U.K. will automatically exit the E.U. on March 29, 2019. The effects of Brexit will depend in part on agreements, if any, the U.K. makes to retain access to E.U. markets. For almost two years the U.K. and E.U. have been negotiating the future terms of the U.K.'s relationship with the E.U., including the terms of trade between the U.K. and the E.U. All Brexit terms must be ratified by the U.K. Parliament and the legislative bodies of the 27 E.U. member states. The likelihood of the U.K. Parliament ratifying an agreement in its current form appears to be low. This significantly increases the chance that the U.K. will leave the E.U. without an agreement regarding the U.K.'s relationship with the E.U.

Brexit could impair or end the ability of both MIICL and Syndicate 3000 to transact business in E.U. countries from our U.K. offices and MIICL's ability to maintain its current branches in E.U. member states and in Switzerland. Without a Brexit agreement, U.K. based insurers may be prohibited from administering policies for, or paying claims to, EEA policyholders post Brexit. In order to provide certainty for its EEA policyholders, MIICL has commenced the transfer of its legacy EEA exposures, claims and policies to MISE. However, this transfer must be approved by the U.K. High Court. While we expect this transfer to be approved by March 29, 2019, there is no assurance when or whether this approval ultimately will be granted or on what terms and conditions. If we do not obtain this approval by the date Brexit occurs, our obligations to EEA policyholders may conflict with what we are permitted to do by EEA regulators or under EEA regulations.

Lloyd's also has commenced its transfer of legacy EEA exposures. However, Lloyd's does not expect to obtain this approval by March 29, 2019, and there is no assurance the approval ultimately will be granted or on what terms and conditions. Lloyd's has stated that it intends to continue to pay valid EEA claims even in the absence of U.K. High Court approval. In that situation, Syndicate 3000 may have little or no ability to act contrary to Lloyd's direction, and this may put Syndicate 3000 in conflict with EEA regulators or in breach of EEA regulations in what will be an uncertain regulatory environment.

The U.K.'s exit from the E.U., and negotiations leading up to that exit, could continue to contribute to instability in global financial markets, including foreign currency markets, and adversely affect European and worldwide economic or market conditions. Significant uncertainties remain related to the political, monetary and economic impacts of Brexit, including related tax, accounting and financial reporting implications. Brexit could also lead to legal and regulatory uncertainty and potentially a large number of new and divergent national laws and regulations, including new tax rules, as the U.K. determines which E.U. laws to replace or replicate. These impacts, combined with the legal and regulatory uncertainty, may adversely affect our operations and also may result in increased claims arising from the impact on our policyholders. For example, in the absence of a Brexit agreement or a waiver for cross border data transfers, many U.K. and E.U. companies, including our U.K. and E.U. based operations, may not be able to comply with E.U. data privacy laws immediately upon the Brexit effective date.

Any of these effects of Brexit, and others we cannot anticipate, could have a material adverse effect on our results of operations and financial condition.

Associates

At December 31, 2018 , we had approximately 17,400 employees, of whom approximately 12,800 were employed within our Market Ventures operations.

SELECTED FINANCIAL DATA (dollars in millions, except per share data) ⁽¹⁾

	2018	2017	2016
Results of Operations			
Earned premiums	\$ 4,712	\$ 4,248	\$ 3,866
Net investment income	434	406	373
Products revenues	1,498	951	885
Services and other revenues	635	462	422
Total operating revenues	6,841	6,062	5,612
Net income (loss) to shareholders ⁽²⁾	(128)	395	456
Comprehensive income (loss) to shareholders	(376)	1,175	667
Diluted net income (loss) per share	\$ (9.55)	\$ 25.81	\$ 31.27
Financial Position			
Total investments, cash and cash equivalents and restricted cash and cash equivalents (invested assets)	\$ 19,238	\$ 20,570	\$ 19,059
Total assets	33,306	32,805	25,875
Unpaid losses and loss adjustment expenses	14,276	13,584	10,116
Senior long-term debt and other debt	3,010	3,099	2,575
Shareholders' equity	9,081	9,504	8,461
Common shares outstanding (at year end, in thousands)	13,888	13,904	13,955
OPERATING PERFORMANCE MEASURES ^(1,3)			
Operating Data			
Book value per common share outstanding	\$ 653.85	\$ 683.55	\$ 606.30
Growth (decline) in book value per share	(4)%	13%	8%
5-Year CAGR in book value per share ⁽⁴⁾	7 %	11%	11%
Closing stock price	\$ 1,038.05	\$ 1,139.13	\$ 904.50
5-Year CAGR in closing stock price ⁽⁴⁾	12 %	21%	17%
Ratio Analysis			
U.S. GAAP combined ratio ⁽⁵⁾	98 %	105%	92%
Investment yield ⁽⁶⁾	3 %	3%	2%
Taxable equivalent total investment return ⁽⁷⁾	(1)%	10%	4%
Investment leverage ⁽⁸⁾	2.1	2.2	2.3
Debt to capital	25 %	25%	23%

⁽¹⁾ Reflects the acquisition of Alterra Capital Holdings Limited effective May 1, 2013, which included the issuance of equity totaling \$2.3 billion.

⁽²⁾ In accordance with the provisions of Financial Accounting Standards Board Accounting Standards Update (ASU) No. 2016-01, beginning January 1, 2018, all changes in the fair value of equity securities are recognized in net income. See further discussion of the impacts of adopting ASU No. 2016-01 in note 1 of the notes to consolidated financial statements.

⁽³⁾ Operating Performance Measures provide a basis for management to evaluate our performance. The method we use to compute these measures may differ from the methods used by other companies. See further discussion of management's evaluation of these measures in Management's Discussion & Analysis of Financial Condition and Results of Operations.

⁽⁴⁾ CAGR—compound annual growth rate.

⁽⁵⁾ The U.S. GAAP combined ratio measures the relationship of incurred losses, loss adjustment expenses and underwriting, acquisition and insurance expenses to earned premiums.

⁽⁶⁾ Investment yield reflects net investment income as a percentage of monthly average invested assets at amortized cost.

⁽⁷⁾ See "Investing Results" in Management's Discussion & Analysis of Financial Condition and Results of Operations for detail regarding the calculation of taxable equivalent total investment return.

⁽⁸⁾ Investment leverage represents total invested assets divided by shareholders' equity.

2015	2014	2013	2012	2011	2010	2009	5-Year CAGR (3)	10-Year CAGR (3)
\$ 3,824	\$ 3,841	\$ 3,232	\$ 2,147	\$ 1,979	\$ 1,731	\$ 1,816	8%	9%
353	363	317	282	264	273	260	6%	4%
872	681	550	367	215	156	83	22%	34%
215	203	161	172	136	30	7	32%	91%
5,370	5,134	4,323	3,000	2,630	2,225	2,069	10%	13%
583	321	281	253	142	267	202		
233	936	459	504	252	431	591		
\$ 41.74	\$ 22.27	\$ 22.48	\$ 25.89	\$ 14.60	\$ 27.27	\$ 20.52		

\$ 18,181	\$ 18,638	\$ 17,612	\$ 9,333	\$ 8,728	\$ 8,224	\$ 7,849	2%	11%
24,939	25,198	23,956	12,557	11,532	10,826	10,242	7%	13%
10,252	10,404	10,262	5,371	5,399	5,398	5,427	7%	10%
2,239	2,251	2,256	1,493	1,294	1,016	964		
7,834	7,595	6,674	3,889	3,388	3,172	2,774	6%	15%
13,959	13,962	13,986	9,629	9,621	9,718	9,819		

\$ 561.23	\$ 543.96	\$ 477.16	\$ 403.85	\$ 352.10	\$ 326.36	\$ 282.55	7%	11%
3 %	14%	18%	15 %	8 %	16%	27 %		
11 %	14%	17%	9 %	9 %	13%	11 %		
\$ 883.35	\$ 682.84	\$ 580.35	\$ 433.42	\$ 414.67	\$ 378.13	\$ 340.00	12%	13%
18 %	15%	14%	(2)%	(3)%	4%	(1)%		

89 %	95%	97%	97 %	102 %	97%	95 %		
2 %	2%	3%	4 %	4 %	4%	4 %		
(1)%	7%	7%	9 %	7 %	8%	13 %		
2.3	2.5	2.6	2.4	2.6	2.6	2.8		
22 %	23%	25%	28 %	28 %	24%	26 %		

MANAGEMENT'S REPORT ON INTERNAL CONTROL OVER FINANCIAL REPORTING



Management is responsible for establishing and maintaining adequate internal control over financial reporting, as defined in Rule 13a-15(f) under the Securities Exchange Act of 1934. Our 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.

Management does not expect that its internal control over financial reporting will prevent all error and all fraud. A control system, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. Internal control over financial reporting is a process that involves human diligence and compliance and is subject to lapses in judgment and breakdowns resulting from human failures. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected. The design of any system of internal control over financial reporting also is based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions.

Under the supervision and with the participation of management, including the Principal Executive Officer and the Principal Financial Officer, we evaluated the effectiveness of our internal control over financial reporting 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. Based on our evaluation, we have concluded that we maintained effective internal control over financial reporting as of December 31, 2018.

KPMG LLP, our independent registered public accounting firm, has issued an attestation report on the effectiveness of the Company's internal control over financial reporting as of December 31, 2018, which is included herein.

A handwritten signature in dark ink, appearing to read "Tom S. Gayner".

Thomas S. Gayner
Co-Chief Executive Officer

(Co-Principal Executive Officer)

A handwritten signature in dark ink, appearing to read "Richard R. Whitt, III".

Richard R. Whitt, III
Co-Chief Executive Officer

(Co-Principal Executive Officer)

A handwritten signature in dark ink, appearing to read "Jeremy A. Noble".

Jeremy A. Noble
Senior Vice President and Chief Financial
Officer

(Principal Financial Officer)

February 28, 2019

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM



To the Shareholders and Board of Directors
Markel Corporation:

Opinion on Internal Control Over Financial Reporting

We have audited Markel Corporation and subsidiaries' (the Company) internal control over financial reporting 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. 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 the Committee of Sponsoring Organizations of the Treadway Commission.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2018 and 2017 , and the related consolidated statements of income (loss) and comprehensive income (loss), changes in equity, and cash flows for each of the years in the three-year period ended December 31, 2018 , and related notes (collectively, the consolidated financial statements), and our report dated February 28, 2019 expressed an unqualified opinion on those consolidated financial statements.

Basis for 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 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 of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included 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.

KPMG LLP

Richmond, Virginia
February 28, 2019

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM



To the Shareholders and Board of Directors
Markel Corporation:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Markel Corporation and subsidiaries (the Company) as of December 31, 2018 and 2017, the related consolidated statements of income (loss) and comprehensive income (loss), changes in equity, and cash flows for each of the years in the three-year period ended December 31, 2018, and the related notes (collectively, the consolidated financial statements). In our opinion, the consolidated 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 years in the three-year period ended December 31, 2018, in conformity with U.S. generally accepted accounting principles.

We also have 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 criteria established in *Internal Control—Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission, and our report dated February 28, 2019 expressed an unqualified opinion on the effectiveness of the Company's internal control over financial reporting.

Change in Accounting Principle

As discussed in Note 1 to the consolidated financial statements, the Company adopted Accounting Standards Update No. 2016-01, *Financial Instruments—Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities* on January 1, 2018.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements 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 consolidated 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 consolidated 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 regarding the amounts and disclosures in the consolidated 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 consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

KPMG LLP

We have served as the Company's auditor since 1980.

Richmond, Virginia
February 28, 2019

MARKEL CORPORATION AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS

	December 31,	
	2018	2017
	<i>(dollars in thousands)</i>	
ASSETS		
Investments, at estimated fair value:		
Fixed maturities, available-for-sale (amortized cost of \$9,950,773 in 2018 and \$9,551,153 in 2017)	\$ 10,043,188	\$ 9,940,670
Equity securities, available-for-sale (cost of \$2,667,661 in 2017)	—	5,967,847
Equity securities (cost of \$2,971,856 in 2018)	5,720,945	—
Short-term investments, available-for-sale (estimated fair value approximates cost)	1,077,696	2,160,974
Total Investments	16,841,829	18,069,491
Cash and cash equivalents	2,014,168	2,198,459
Restricted cash and cash equivalents	382,264	302,387
Receivables	1,692,526	1,567,453
Reinsurance recoverables	5,221,947	4,745,390
Deferred policy acquisition costs	474,513	465,569
Prepaid reinsurance premiums	1,331,022	1,099,757
Goodwill	2,237,975	1,777,464
Intangible assets	1,726,196	1,355,681
Other assets	1,383,823	1,223,365
Total Assets	\$ 33,306,263	\$ 32,805,016
LIABILITIES AND EQUITY		
Unpaid losses and loss adjustment expenses	\$ 14,276,479	\$ 13,584,281
Life and annuity benefits	1,001,453	1,072,112
Unearned premiums	3,611,028	3,308,779
Payables to insurance and reinsurance companies	337,326	324,304
Senior long-term debt and other debt (estimated fair value of \$3,030,000 in 2018 and \$3,351,000 in 2017)	3,009,577	3,099,230
Other liabilities	1,796,036	1,748,460
Total Liabilities	24,031,899	23,137,166
Redeemable noncontrolling interests	174,062	166,269
Commitments and contingencies		
Shareholders' equity:		
Common stock	3,392,993	3,381,834
Retained earnings	5,782,310	3,776,743
Accumulated other comprehensive income (loss)	(94,650)	2,345,571
Total Shareholders' Equity	9,080,653	9,504,148
Noncontrolling interests	19,649	(2,567)
Total Equity	9,100,302	9,501,581
Total Liabilities and Equity	\$ 33,306,263	\$ 32,805,016

See accompanying notes to consolidated financial statements.

MARKEL CORPORATION AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF INCOME (LOSS) AND COMPREHENSIVE INCOME (LOSS)

	Years Ended December 31,		
	2018	2017	2016
<i>(dollars in thousands, except per share data)</i>			
OPERATING REVENUES			
Earned premiums	\$ 4,712,060	\$ 4,247,978	\$ 3,865,870
Net investment income	434,215	405,709	373,230
Net investment gains (losses):			
Other-than-temporary impairment losses	—	(7,589)	(18,355)
Net realized investment gains (losses), excluding other-than-temporary impairment losses	(11,974)	47,174	66,711
Change in fair value of equity securities	(425,622)	(44,888)	16,791
Net investment gains (losses)	(437,596)	(5,303)	65,147
Products revenues	1,497,523	951,012	885,473
Services and other revenues	635,083	462,263	422,306
Total Operating Revenues	6,841,285	6,061,659	5,612,026
OPERATING EXPENSES			
Losses and loss adjustment expenses	2,820,715	2,865,761	2,050,744
Underwriting, acquisition and insurance expenses	1,777,511	1,589,464	1,497,125
Products expenses	1,413,248	850,449	755,591
Services and other expenses	474,924	458,621	416,141
Amortization of intangible assets	115,930	80,758	68,533
Impairment of goodwill and intangible assets	199,198	—	18,723
Total Operating Expenses	6,801,526	5,845,053	4,806,857
Operating Income	39,759	216,606	805,169
Interest expense	154,212	132,451	129,896
Net foreign exchange losses (gains)	(106,598)	(3,140)	1,253
Loss on early extinguishment of debt	—	—	44,100
Income (Loss) Before Income Taxes	(7,855)	87,295	629,920
Income tax expense (benefit)	122,498	(313,463)	169,477
Net Income (Loss)	\$ (130,353)	\$ 400,758	\$ 460,443
Net income (loss) attributable to noncontrolling interests	(2,173)	5,489	4,754
Net Income (Loss) to Shareholders	\$ (128,180)	\$ 395,269	\$ 455,689
OTHER COMPREHENSIVE INCOME (LOSS)			
Change in net unrealized gains on available-for-sale investments, net of taxes:			
Net holding gains (losses) arising during the period	\$ (241,325)	\$ 787,339	\$ 275,661
Change in unrealized other-than-temporary impairment losses on fixed maturities arising during the period	—	—	35
Reclassification adjustments for net gains (losses) included in net income (loss)	7,849	(24,296)	(33,528)
Change in net unrealized gains on available-for-sale investments, net of taxes	(233,476)	763,043	242,168
Change in foreign currency translation adjustments, net of taxes	(16,495)	10,449	(11,704)
Change in net actuarial pension loss, net of taxes	2,341	6,259	(19,100)
Total Other Comprehensive Income (Loss)	(247,630)	779,751	211,364
Comprehensive Income (Loss)	\$ (377,983)	\$ 1,180,509	\$ 671,807
Comprehensive income (loss) attributable to noncontrolling interests	(2,213)	5,535	4,760
Comprehensive Income (Loss) to Shareholders	\$ (375,770)	\$ 1,174,974	\$ 667,047
NET INCOME (LOSS) PER SHARE			
Basic	\$ (9.55)	\$ 25.89	\$ 31.41
Diluted	\$ (9.55)	\$ 25.81	\$ 31.27

See accompanying notes to consolidated financial statements.

MARKEL CORPORATION AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CHANGES IN EQUITY

<i>(in thousands)</i>	Common Shares	Common Stock	Retained Earnings	Accumulated Other Comprehensive Income (Loss)	Total Shareholders' Equity	Noncontrolling Interests	Total Equity	Redeemable Noncontrolling Interests
December 31, 2015	13,959	\$ 3,342,357	\$ 3,137,285	\$ 1,354,508	\$ 7,834,150	\$ 6,459	\$ 7,840,609	\$ 62,958
Net income			455,689	—	455,689	99	455,788	4,655
Other comprehensive income			—	211,358	211,358	—	211,358	6
Comprehensive Income					667,047	99	667,146	4,661
Issuance of common stock	54	4,623	—	—	4,623	—	4,623	—
Repurchase of common stock	(58)	—	(51,142)	—	(51,142)	—	(51,142)	—
Restricted stock awards expensed	—	21,336	—	—	21,336	—	21,336	—
Adjustment of redeemable noncontrolling interests	—	—	(15,472)	—	(15,472)	—	(15,472)	15,472
Purchase of noncontrolling interest	—	350	—	—	350	—	350	(3,517)
Other	—	—	35	—	35	(74)	(39)	(5,896)
December 31, 2016	13,955	3,368,666	3,526,395	1,565,866	8,460,927	6,484	8,467,411	73,678
Net income (loss)			395,269	—	395,269	(895)	394,374	6,384
Other comprehensive income			—	779,705	779,705	—	779,705	46
Comprehensive Income (Loss)					1,174,974	(895)	1,174,079	6,430
Issuance of common stock	58	552	—	—	552	—	552	—
Repurchase of common stock	(109)	—	(110,838)	—	(110,838)	—	(110,838)	—
Restricted stock awards expensed	—	15,881	—	—	15,881	—	15,881	—
Acquisition of Costa Farms	—	—	—	—	—	—	—	66,600
Adjustment of redeemable noncontrolling interests	—	—	(33,738)	—	(33,738)	—	(33,738)	33,738
Purchase of noncontrolling interest	—	(2,955)	—	—	(2,955)	(8,330)	(11,285)	(6,179)
Other	—	(310)	(345)	—	(655)	174	(481)	(7,998)
December 31, 2017	13,904	3,381,834	3,776,743	2,345,571	9,504,148	(2,567)	9,501,581	166,269
Cumulative effect of adoption of ASU No. 2014-09, net of taxes			325	—	325	—	325	—
Cumulative effect of adoption of ASU No. 2016-01, net of taxes			2,595,484	(2,595,484)	—	—	—	—
Cumulative effect of adoption of ASU No. 2018-02			(402,853)	402,853	—	—	—	—
January 1, 2018	13,904	3,381,834	5,969,699	152,940	9,504,473	(2,567)	9,501,906	166,269
Net loss			(128,180)	—	(128,180)	(1,175)	(129,355)	(998)
Other comprehensive loss			—	(247,590)	(247,590)	—	(247,590)	(40)
Comprehensive Loss					(375,770)	(1,175)	(376,945)	(1,038)
Issuance of common stock	32	2	—	—	2	—	2	—
Repurchase of common stock	(48)	—	(54,007)	—	(54,007)	—	(54,007)	—
Restricted stock awards expensed	—	16,191	—	—	16,191	—	16,191	—
Acquisition of Brahmin	—	—	—	—	—	—	—	19,670
Acquisition of Nephila	—	—	—	—	—	23,392	23,392	—
Adjustment of redeemable noncontrolling interests	—	—	(4,828)	—	(4,828)	—	(4,828)	4,828
Purchase of noncontrolling interest	—	(4,986)	—	—	(4,986)	—	(4,986)	(7,104)
Other	—	(48)	(374)	—	(422)	(1)	(423)	(8,563)
December 31, 2018	13,888	\$ 3,392,993	\$ 5,782,310	\$ (94,650)	\$ 9,080,653	\$ 19,649	\$ 9,100,302	\$ 174,062

See accompanying notes to consolidated financial statements.

MARKEL CORPORATION AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS

	Years Ended December 31,		
	2018	2017	2016
	<i>(dollars in thousands)</i>		
OPERATING ACTIVITIES			
Net income (loss)	\$ (130,353)	\$ 400,758	\$ 460,443
Adjustments to reconcile net income (loss) to net cash provided by operating activities:			
Deferred income tax expense (benefit)	2,729	(324,090)	63,358
Depreciation and amortization	227,846	203,871	194,147
Net investment losses (gains)	437,596	5,303	(65,147)
Loss on early extinguishment of debt	—	—	44,100
Net foreign exchange losses (gains)	(106,598)	(3,140)	1,253
Impairment of goodwill and intangible assets	199,198	—	18,723
Increase in receivables	(27,961)	(38,259)	(163,123)
Increase in deferred policy acquisition costs	(15,585)	(67,923)	(41,619)
Increase (decrease) in unpaid losses and loss adjustment expenses, net	298,796	619,305	(9,429)
Decrease in life and annuity benefits	(50,541)	(55,647)	(54,580)
Increase in unearned premiums, net	62,879	197,706	134,593
Increase (decrease) in payables to insurance and reinsurance companies	(4,313)	(40,761)	11,582
Increase (decrease) in income taxes payable	53,730	(35,968)	(16,484)
Increase (decrease) in accrued expenses	(23,756)	(71,669)	67,994
Increase (decrease) in other liabilities	(5,637)	45,051	(90,571)
Other	(25,173)	23,992	(20,617)
Net Cash Provided By Operating Activities	892,857	858,529	534,623
INVESTING ACTIVITIES			
Proceeds from sales of fixed maturities and equity securities	419,199	577,650	365,822
Proceeds from maturities, calls and prepayments of fixed maturities	551,808	1,129,895	963,165
Cost of fixed maturities and equity securities purchased	(1,545,913)	(1,176,281)	(2,205,939)
Net change in short-term investments	1,101,636	234,743	(689,194)
Additions to property and equipment	(106,593)	(74,652)	(63,674)
Acquisitions, net of cash acquired	(1,175,211)	(1,431,712)	(7,527)
Other	(42,165)	(4,100)	(1,134)
Net Cash Used By Investing Activities	(797,239)	(744,457)	(1,638,481)
FINANCING ACTIVITIES			
Additions to senior long-term debt and other debt	206,949	664,657	559,300
Repayment of senior long-term debt and other debt	(289,199)	(259,972)	(278,363)
Premiums and fees related to early extinguishment of debt	—	—	(43,691)
Repurchases of common stock	(54,007)	(110,838)	(51,142)
Payment of contingent consideration	(15,914)	(5,018)	(14,219)
Purchase of noncontrolling interests	(13,523)	(18,334)	(3,167)
Distributions to noncontrolling interests	(9,164)	(7,899)	(5,949)
Other	(4,127)	(6,281)	(10,750)
Net Cash Provided (Used) By Financing Activities	(178,985)	256,315	152,019
Effect of foreign currency rate changes on cash, cash equivalents, restricted cash and restricted cash equivalents	(21,047)	45,295	(33,138)
Increase (decrease) in cash, cash equivalents, restricted cash and restricted cash equivalents	(104,414)	415,682	(984,977)
Cash, cash equivalents, restricted cash and restricted cash equivalents at beginning of year	2,500,846	2,085,164	3,070,141
CASH, CASH EQUIVALENTS, RESTRICTED CASH AND RESTRICTED CASH EQUIVALENTS AT END OF YEAR	\$ 2,396,432	\$ 2,500,846	\$ 2,085,164

See accompanying notes to consolidated financial statements.

MARKEL CORPORATION AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1 . Summary of Significant Accounting Policies

Markel Corporation is a diverse financial holding company serving a variety of niche markets. Markel Corporation's principal business markets and underwrites specialty insurance products. Through its wholly owned subsidiary, Markel Ventures, Inc. (Markel Ventures), Markel Corporation also owns interests in various businesses that operate outside of the specialty insurance marketplace.

a) Basis of Presentation. The accompanying consolidated financial statements have been prepared in accordance with United States (U.S.) generally accepted accounting principles (GAAP) and include the accounts of Markel Corporation and its consolidated subsidiaries, as well as any variable interest entities (VIEs) that meet the requirements for consolidation (the Company). All significant intercompany balances and transactions have been eliminated in consolidation. The Company consolidates the results of its Markel Ventures subsidiaries on a one-month lag, with the exception of significant transactions or events that occur during the intervening period. Certain prior year amounts have been reclassified to conform to the current presentation.

b) Use of Estimates. The preparation of financial statements in accordance with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues and expenses and the disclosure of contingent assets and liabilities. Management periodically reviews its estimates and assumptions. Quarterly reviews include evaluating the adequacy of reserves for unpaid losses and loss adjustment expenses, life and annuity reinsurance benefit reserves and litigation contingencies. Estimates and assumptions for goodwill and intangible assets are reviewed in conjunction with an acquisition, and goodwill and indefinite-lived intangible assets are reassessed at least annually for impairment. Actual results may differ materially from the estimates and assumptions used in preparing the consolidated financial statements.

c) Investments. Available-for-sale investments and equity securities are recorded at estimated fair value. Unrealized gains and losses on available-for-sale investments, net of income taxes, are included in accumulated other comprehensive income in shareholders' equity. The Company completes a detailed analysis each quarter to assess whether the decline in the fair value of any available-for-sale investment below its cost basis is deemed other-than-temporary.

Premiums and discounts are amortized or accreted over the lives of the related fixed maturities as an adjustment to the yield using the effective interest method. Dividend and interest income are recognized when earned. Realized investment gains or losses are included in earnings. Realized gains or losses from sales of available-for-sale investments are derived using the first-in, first-out method on the trade date.

Effective January 1, 2018, the Company adopted Financial Accounting Standards Board (FASB) Accounting Standards Update (ASU) No. 2016-01, *Financial Instruments (Topic 825): Recognition and Measurement of Financial Assets and Financial Liabilities*. Upon adoption of the ASU, equity securities are no longer classified as available-for-sale and unrealized gains and losses on equity securities, net of income taxes, are included in earnings. In accordance with the provisions of the ASU, prior periods have not been restated to conform to the new presentation. See note 1(w) for further discussion of the impact of prospectively adopting this standard.

Investments accounted for under the equity method of accounting are recorded at cost within other assets on the consolidated balance sheets and subsequently increased or decreased by the Company's proportionate share of the net income or loss of the investee. The Company records its proportionate share of net income or loss of the investee in net investment income. The Company records its proportionate share of other comprehensive income or loss of the investee as a component of other comprehensive income. Dividends or other equity distributions in excess of the Company's cumulative equity in earnings of the investee are recorded as a reduction of the investment. The Company reviews equity method investments for impairment when events or circumstances indicate that a decline in the fair value of the investment below its carrying value is other-than-temporary.

d) Cash and Cash Equivalents. The Company considers all investments with original maturities of 90 days or less to be cash equivalents. The carrying value of the Company's cash and cash equivalents approximates fair value.

- e) **Restricted Cash and Cash Equivalents.** Cash and cash equivalents that are restricted as to withdrawal or use are recorded as restricted cash and cash equivalents. The carrying value of the Company's restricted cash and cash equivalents approximates fair value.
- f) **Receivables.** Receivables include amounts receivable from agents, brokers and insureds, which represent premiums that are both currently due and amounts not yet due on insurance and reinsurance policies. Premiums for insurance policies are generally due at inception. Premiums for reinsurance policies generally become due over the period of coverage based on the policy terms. The Company monitors the credit risk associated with premiums receivable, taking into consideration the fact that in certain instances credit risk may be reduced by the Company's right to offset loss obligations or unearned premiums against premiums receivable. Amounts deemed uncollectible are charged to net income in the period they are determined. Changes in the estimate of reinsurance premiums written will result in an adjustment to premiums receivable in the period they are determined. Receivables also include amounts receivable from contracts with customers, which represent the Company's unconditional right to consideration for satisfying the performance obligations outlined in the contract.
- g) **Reinsurance Recoverables.** Amounts recoverable from reinsurers are estimated in a manner consistent with the claim liability associated with the reinsured business. Allowances are established for amounts deemed uncollectible and reinsurance recoverables are recorded net of these allowances. The Company evaluates the financial condition of its reinsurers and monitors concentration risk to minimize its exposure to significant losses from individual reinsurers.
- h) **Deferred Policy Acquisition Costs.** Costs directly related to the acquisition of insurance premiums are deferred and amortized over the related policy period, generally one year. The Company only defers acquisition costs incurred that are related directly to the successful acquisition of new or renewal insurance contracts, including commissions to agents and brokers and premium taxes. Commissions received related to reinsurance premiums ceded are netted against broker commissions in determining acquisition costs eligible for deferral. To the extent that future policy revenues on existing policies are not adequate to cover related costs and expenses, deferred policy acquisition costs are charged to earnings. The Company does not consider anticipated investment income in determining whether a premium deficiency exists.
- i) **Goodwill and Intangible Assets.** Goodwill and intangible assets are recorded as a result of business acquisitions. Goodwill represents the excess of the amount paid to acquire a business over the net fair value of assets acquired and liabilities assumed at the date of acquisition. Indefinite-lived and other intangible assets are recorded at fair value as of the acquisition date. The determination of the fair value of certain assets acquired and liabilities assumed involves significant judgment and the use of valuation models and other estimates, which require assumptions that are inherently subjective. Goodwill and indefinite-lived intangible assets are tested for impairment at least annually. The Company completes an annual test during the fourth quarter of each year based upon the results of operations through September 30. Intangible assets with definite lives are amortized using the straight-line method over their estimated useful lives, generally five to 20 years, and are reviewed for impairment when events or circumstances indicate that their carrying value may not be recoverable.
- j) **Property and Equipment.** Property and equipment are stated at cost less accumulated depreciation and amortization. Depreciation and amortization of property and equipment are calculated using the straight-line method over the estimated useful lives (generally, the lower of the life of the lease or the estimated useful life for leasehold improvements, ten to 40 years for buildings, seven to 40 years for land improvements, three to ten years for furniture and equipment and three to 25 years for other property and equipment).
- k) **Redeemable Noncontrolling Interests.** The Company owns controlling interests in various companies through its Markel Ventures operations. In some cases, the Company has the option to acquire the remaining equity interests, and the remaining equity interests have the option to sell their interests to the Company, in the future. The redemption value of the remaining equity interests is generally based on the respective company's earnings in specified periods preceding the redemption date. The redeemable noncontrolling interests generally become redeemable through 2023.

The Company recognizes changes in the redemption value that exceed the carrying value of redeemable noncontrolling interests to retained earnings as if the balance sheet date were also the redemption date. Changes in the redemption value also result in an adjustment to net income to shareholders in the calculation of basic and diluted net income per share.

l) Income Taxes. The Company records deferred income taxes to reflect the net tax effect of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and their tax bases. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in years in which those temporary differences are expected to be recovered or settled. Deferred tax assets are reduced by a valuation allowance when management believes it is more likely than not that some, or all, of the deferred tax assets will not be realized. The Company recognizes the tax benefit from an uncertain tax position taken or expected to be taken in income tax returns only if it is more likely than not that the tax position will be sustained upon examination by tax authorities, based on the technical merits of the position. Tax positions that meet the more likely than not threshold are then measured using a probability weighted approach, whereby the largest amount of tax benefit that is greater than 50% likely of being realized upon ultimate settlement is recognized. The Company recognizes interest and penalties related to uncertain tax positions in income tax expense.

m) Unpaid Losses and Loss Adjustment Expenses. Unpaid losses and loss adjustment expenses on the Company's property and casualty insurance business are based on evaluations of reported claims and estimates for losses and loss adjustment expenses incurred but not reported. Estimates for losses and loss adjustment expenses incurred but not reported are based on reserve development studies, among other things. Recorded reserves are estimates, and the ultimate liability may be greater or less than the estimates.

n) Life and Annuity Benefits. The Company has a run-off block of life and annuity reinsurance contracts that subject the Company to mortality, longevity and morbidity risks. The assumptions used to determine policy benefit reserves are generally locked-in for the life of the contract unless an unlocking event occurs. To the extent existing policy reserves, together with the present value of future gross premiums and expected investment income earned thereon, are not adequate to cover the present value of future benefits, settlement and maintenance costs, the locked-in assumptions are revised to current best estimate assumptions and a charge to earnings for life and annuity benefits is recognized at that time. Because of the assumptions and estimates used in establishing reserves for life and annuity benefit obligations and the long-term nature of these reinsurance contracts, the ultimate liability may be greater or less than the estimates. Results attributable to the run-off of life and annuity reinsurance business are included in services and other revenues and services and other expenses in the Company's consolidated statements of income and comprehensive income.

o) Revenue Recognition.

Property and Casualty Premiums

Insurance premiums written are generally recorded at the inception of a policy and earned on a pro rata basis over the policy period, typically one year. The cost of reinsurance ceded is initially recorded as prepaid reinsurance premiums and is amortized over the reinsurance contract period in proportion to the amount of insurance protection provided. Premiums ceded are netted against premiums written. For multi-year contracts where insurance premiums are payable in annual installments, written premiums are recorded at the inception of the contract based on management's best estimate of total premiums to be received. For contracts where the cedent has the ability to unilaterally commute or cancel coverage within the term of the policy, premiums are generally recorded on an annual basis or up to the contract cancellation point. The remaining premiums are estimated and included as written at each successive anniversary date within the multi-year term.

Assumed reinsurance premiums are recorded at the inception of each contract based upon contract terms and information received from cedents and brokers and are earned on a pro rata basis over the coverage period, or for multi-year contracts, in proportion with the underlying risk exposure to the extent there is variability in the exposure through the coverage period. Changes in reinsurance premium estimates are expected and may result in significant adjustments in any period. These estimates change over time as additional information regarding changes in underlying exposures is obtained. Any subsequent differences arising on such estimates are recorded as premiums written in the period they are determined and are earned on a pro rata basis over the coverage period. The Company uses the periodic method to account for assumed reinsurance from foreign reinsurers. The Company's foreign reinsurers provide sufficient information to record foreign assumed business in the same manner as the Company records assumed business from U.S. reinsurers.

Certain contracts that the Company writes provide for reinstatement of coverage. Reinstatement premiums are the premiums for the restoration of the insurance or reinsurance limit of a contract to its full amount after a loss occurrence by the insured or reinsured. The Company accrues for reinstatement premiums resulting from losses recorded. Such accruals are based upon contractual terms and management judgment is involved with respect to the amount of losses recorded. Changes in estimates of losses recorded on contracts with reinstatement premium features will result in changes in reinstatement premiums based on contractual terms. Reinstatement premiums are recognized at the time losses are recorded and are generally earned on a pro rata basis over the coverage period.

Products, Services and Other Revenues

Effective January 1, 2018, the Company adopted ASU No. 2014-09, *Revenue from Contracts with Customers (Topic 606)*, and related amendments, which created a new comprehensive revenue recognition standard, FASB Accounting Standards Codification (ASC) 606, *Revenue from Contracts with Customers*, that serves as a single source of revenue guidance for all contracts with customers to transfer goods or services or contracts for the transfer of nonfinancial assets, unless those contracts are within the scope of other standards, such as insurance contracts. ASC 606 is not applicable to the Company's insurance premium revenues or revenues from its investment portfolio but is applicable to most of the Company's other revenues, as described below. See note 1(w) for further discussion of the impact of adopting this standard.

Other revenues primarily relate to the Company's Market Ventures operations and consist of revenues from the sale of products and services. Revenues are recognized when, or as, control of the promised goods or services is transferred to the Company's customers, in an amount that reflects the consideration the Company expects to be entitled to in exchange for those goods or services. All contracts with customers either have an original expected length of one year or less or the Company recognizes revenue at the amount for which it has a right to invoice for the products delivered or services performed. Certain customers may receive volume rebates or credits for products and services, which are accounted for as variable consideration. The Company estimates these amounts based on the expected amount to be provided to the customer and reduces revenues recognized by a corresponding amount. The Company does not expect significant changes to its estimates of variable consideration over the term of the contracts.

Payment terms for products and services vary by the type of product or service offered and the location of the customer, and payment is typically received at or shortly after the point of sale. For certain products, the Company requires partial payment in the form of a deposit before the products are delivered to the customer, which is included in other liabilities on the Company's consolidated balance sheet.

Products revenues are primarily generated from the sale of equipment used in baking systems, portable dredges, over-the-road transportation equipment, flooring for the trucking industry, ornamental plants and residential homes. Most of the Company's product revenues are recognized when the products are shipped to the customer or the products arrive at the agreed upon destination with the end customer. Some of the Company's contracts include multiple performance obligations. For such arrangements, revenues are allocated to each performance obligation based on the relative standalone selling price, which is derived from amounts stated in the contract.

Services revenues are primarily generated by delivering healthcare services, retail intelligence, consulting services and investment management services. Service revenues are generally recognized over the term of the contracts based on hours incurred or as services are provided.

Investment management fee income is recognized over the period in which investment management services are provided and is calculated and recognized monthly based on the net asset value of the accounts managed. For certain accounts, the Company is also entitled to participate, on a fixed-percentage basis, in any net income generated in excess of an agreed-upon threshold as established by the underlying investment management agreements. In general, net income is calculated at the end of each calendar year and incentive fees are payable annually. Incentive fee income is recognized at the conclusion of the contractual performance period, when the uncertainty related to performance has been resolved.

Program services fees received in exchange for providing access to the U.S. property and casualty insurance market are based on the gross premiums written on behalf of general agent and capacity provider clients. Program services fees are earned in a manner consistent with the recognition of the gross premiums earned on the underlying insurance policies, generally on a pro rata basis over the terms of the underlying policies reinsured.

p) Program Services. In connection with its program services business, the Company enters into contractual agreements with both producing general agents and reinsurers, whereby the general agents and reinsurers are typically obligated to each other for payment of insurance amounts, including premiums, commissions and losses. To the extent these funds are not the obligation of the Company and are settled directly between the general agent and the reinsurer, no receivables or payables are recorded for these amounts. All obligations of the Company's insurance subsidiaries owed to or on behalf of their policyholders are recorded by the Company and, to the extent appropriate, offsetting reinsurance recoverables are recorded.

q) Stock-based Compensation. Stock-based compensation expense is generally recognized as part of underwriting, acquisition and insurance expenses over the requisite service period. Stock-based compensation expense, net of taxes, was \$13.0 million in 2018, \$11.9 million in 2017 and \$14.3 million in 2016. See note 12.

r) Foreign Currency Transactions. The U.S. Dollar is the Company's reporting currency and the primary functional currency of its foreign underwriting operations. The functional currencies of the Company's other foreign operations are the currencies of the primary economic environments in which the majority of their business is transacted.

Foreign currency transaction gains and losses are the result of exchange rate changes on transactions denominated in currencies other than the functional currency at each foreign entity. Monetary assets and liabilities are remeasured to the functional currency at current exchange rates, with resulting gains and losses included in net foreign exchange losses (gains) within net income. Non-monetary assets and liabilities are remeasured to the functional currency at historic exchange rates. Available-for-sale securities are recorded at fair value with resulting gains and losses, including the portion attributable to movements in exchange rates, included in the change in net unrealized gains on available-for-sale investments, net of taxes within other comprehensive income. While we attempt to naturally hedge our exposure to foreign currency fluctuations by matching assets and liabilities in the same currencies, there is a financial statement mismatch between the gains or losses recorded in net income related to insurance reserves denominated in non-functional currencies and the gains or losses recorded in other comprehensive income related to the available-for-sale securities held in non-functional currencies supporting the reserves.

Assets and liabilities of foreign operations denominated in a functional currency other than the U.S. Dollar are translated into the U.S. Dollar at current exchange rates, with resulting gains or losses included, net of taxes, in the change in foreign currency translation adjustments within other comprehensive income.

Historically, the Company also designated certain additional currencies, including the British Pound Sterling, the Euro, and the Canadian Dollar, as functional currencies within its foreign underwriting operations that were deemed to contain distinct and separable operations in those foreign economic environments. However, over time the Company's foreign underwriting operations have evolved and are now managed on a global basis. Effective January 1, 2018, management reassessed its functional currency determination as required by ASC 830, *Foreign Currency Matters*, and concluded that its foreign underwriting operations have evolved to function as an extension, or integral component, of the Company's global underwriting operations, and are no longer deemed to contain distinct and separable operations. As a result, more foreign currency denominated transactions are designated as non-functional, with related remeasurement gains and losses included in net income. The change in the Company's functional currency determination has been applied on a prospective basis in accordance with ASC 830. Therefore, any translation gains and losses that were previously recorded in accumulated other comprehensive income through December 31, 2017 remain unchanged as of December 31, 2018.

s) Derivative Financial Instruments. Derivative instruments, including derivative instruments resulting from hedging activities, are measured at fair value and recognized as either assets or liabilities on the consolidated balance sheets. The changes in fair value of derivatives are recognized in earnings.

t) Comprehensive Income. Comprehensive income represents all changes in equity that result from recognized transactions and other economic events during the period. Other comprehensive income refers to revenues, expenses, gains and losses that under U.S. GAAP are included in comprehensive income but excluded from net income, such as unrealized gains or losses on available-for-sale investments, foreign currency translation adjustments and changes in net actuarial pension loss.

u) Net Income Per Share. Basic net income per share is computed by dividing adjusted net income to shareholders by the weighted average number of common shares outstanding during the year. Diluted net income per share is computed by dividing adjusted net income to shareholders by the weighted average number of common shares and dilutive potential common shares outstanding during the year. See note 12 (b).

v) Variable Interest Entities. The Company determines whether it has relationships with entities defined as VIEs in accordance with ASC 810, *Consolidation*. Under this guidance, a VIE is consolidated by the variable interest holder that is determined to be the primary beneficiary.

An entity in which the Company holds a variable interest is a VIE if any of the following conditions exist: (a) the total equity investment at risk is not sufficient to permit the entity to finance its activities without additional subordinated financial support, (b) as a group, the holders of equity investment at risk lack either the direct or indirect ability through voting rights or similar rights to make decisions about an entity's activities that most significantly impact the entity's economic performance or the obligation to absorb the expected losses or right to receive the expected residual returns, or (c) the voting rights of some investors are disproportionate to their obligation to absorb the expected losses of the entity, their rights to receive the expected residual returns of the entity, or both and substantially all of the entity's activities either involve or are conducted on behalf of an investor with disproportionately few voting rights.

The primary beneficiary is defined as the variable interest holder that is determined to have the controlling financial interest as a result of having both (a) the power to direct the activities of a VIE that most significantly impact the economic performance of the VIE and (b) the obligation to absorb losses or right to receive benefits from the VIE that could potentially be significant to the VIE.

The Company determines whether an entity is a VIE at the inception of its variable interest in the entity and upon the occurrence of certain reconsideration events. The Company continually reassesses whether it is the primary beneficiary of VIEs in which it holds a variable interest.

w) Recent Accounting Pronouncements.

Effective January 1, 2018, the Company adopted ASU No. 2014-09, *Revenue from Contracts with Customers (Topic 606)* and several other ASUs that were issued as amendments to ASU No. 2014-09, which apply to all contracts with customers to transfer goods or services or for the transfer of nonfinancial assets, unless those contracts are within the scope of other standards. ASU No. 2014-09's core principle is that a company recognizes revenue when it transfers promised goods or services to customers in an amount that reflects the consideration to which the company expects to be entitled in exchange for those goods or services. In adopting this standard, the Company is required to use more judgment and make more estimates than under the previous guidance, including identifying performance obligations in the contract, estimating the amount of variable consideration to include in the transaction price and allocating the transaction price to each separate performance obligation. The Company adopted ASU No. 2014-09 using the modified retrospective method. Prior periods were not restated and the cumulative-effect of applying the new standard to all open contracts at January 1, 2018 was \$0.3 million, and is included as an adjustment to 2018 beginning retained earnings. The Company's other revenues for the year ended December 31, 2018 and its receivables, other assets and other liabilities as of December 31, 2018 were not materially different from the amounts that would have been recognized under the previous guidance. ASU No. 2014-09 also requires expanded revenue disclosures which are included in note 21.

Effective January 1, 2018, the Company adopted ASU No. 2016-01, *Financial Instruments (Topic 825): Recognition and Measurement of Financial Assets and Financial Liabilities*. As a result of adoption of this ASU, equity instruments that do not result in consolidation and are not accounted for under the equity method are measured at fair value and any changes in fair value are recognized in net income. Previously, the Company's equity securities were classified as available-for-sale and changes in fair value were recorded in other comprehensive income. Upon adoption of this ASU, cumulative net unrealized gains on equity securities of \$2.6 billion, net of deferred income taxes of \$684.4 million, were reclassified from accumulated other comprehensive income into retained earnings. Prior periods have not been restated to conform to the current presentation. See note 3(f) for details regarding the change in net unrealized gains on equity securities included in net income for the year ended December 31, 2018 and included in other comprehensive income for the years ended December 31, 2017 and 2016.

Effective January 1, 2018, the Company early adopted ASU No. 2018-02, *Income Statement - Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income*. The ASU provides an option to reclassify tax effects remaining in accumulated other comprehensive income as a result of the Tax Cuts and Jobs Act (TCJA) to retained earnings. Upon enactment of the TCJA, the U.S. corporate tax rate was reduced from 35% to 21% and the Company's U.S. deferred tax balances were remeasured to the lower enacted U.S. corporate tax rate. U.S. GAAP requires the effects of changes in tax rates and laws on deferred tax balances to be recorded as a component of income tax expense in the period of enactment, even if the assets and liabilities relate to items of accumulated other comprehensive income. As a result of adopting the ASU, the Company reclassified \$402.9 million of previously recognized deferred taxes from accumulated other comprehensive income into retained earnings as of January 1, 2018.

The following ASUs relate to topics relevant to the Company's operations and were adopted effective January 1, 2018. These ASUs did not have a material impact on the Company's financial position, results of operations or cash flows:

- ASU No. 2016-16, *Income Taxes (Topic 740): Intra-entity Transfers of Assets Other Than Inventory*
- ASU No. 2017-07, *Compensation - Retirement Benefits (Topic 715): Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost*
- ASU No. 2017-09, *Stock Compensation (Topic 718): Scope of Modification Accounting*

In February 2016, the FASB issued ASU No. 2016-02, *Leases (Topic 842)*. The ASU requires lessees to record most leases on their balance sheets as a lease liability with a corresponding right-of-use asset, but continue to recognize the related leasing expense within net income. The FASB subsequently issued ASUs with improvements to the guidance, including ASU No. 2018-11, *Leases (Topic 842): Targeted Improvements*, which provides entities with an additional transition method to apply the new standard. Under the new optional transition method, an entity initially applies ASC 842 at the adoption date and recognizes a cumulative-effect adjustment to the opening balance of retained earnings in the period of adoption. The ASUs become effective for the Company during the first quarter of 2019 and will be applied using a modified retrospective approach. The Company intends to elect the new transition method permitted by ASU No. 2018-11. Short-term leases will not be recorded on the balance sheet. The Company has elected the package of practical expedients permitted under the transition guidance within the new standard which, among other things, allows companies to carry forward their historical lease classification. The Company's future minimum lease payments for noncancelable operating leases, which represent minimum annual rental commitments excluding taxes, insurance and other operating costs, and which will be subject to this new guidance, totaled \$305.9 million at December 31, 2018. The Company is finalizing its evaluation of the impacts that the adoption of this accounting guidance will have on the consolidated financial statements. The Company estimates a right-of-use asset and a lease liability of approximately \$250 million and \$275 million, respectively, will be recognized in the consolidated balance sheet upon adoption. Adoption of this standard will not have a material impact on the Company's results of operations and will not impact the Company's cash flows.

In June 2016, the FASB issued ASU No. 2016-13, *Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments*. The ASU replaces the current incurred loss model used to measure impairment losses with an expected loss model for trade, reinsurance, and other receivables as well as financial instruments measured at amortized cost. For available-for-sale fixed maturities, which are measured at fair value, the ASU requires entities to record impairments as an allowance, rather than a reduction of the amortized cost, as is currently required under the other-than-temporary impairment model. ASU No. 2016-13 becomes effective for the Company during the first quarter of 2020 and will be applied using a modified retrospective approach through a cumulative-effect adjustment to retained earnings as of the beginning of the first reporting period in which the guidance is effective. The Company is currently evaluating ASU No. 2016-13 to determine the potential impact that adopting this standard will have on its consolidated financial statements. Application of the new expected loss model for measuring impairment losses will not impact the Company's investment portfolio, none of which is measured at amortized cost, but will impact the Company's other financial assets, including its reinsurance recoverables. Upon adoption of this ASU, any impairment losses on the Company's available-for-sale fixed maturities will be recorded as an allowance, subject to reversal, rather than as a reduction in amortized cost.

In August 2018, the FASB issued ASU No. 2018-12, *Financial Services-Insurance (Topic 944): Targeted Improvements to the Accounting for Long-Duration Contracts*. The ASU requires insurance entities with long duration contracts to: (1) review and, if there is a change, update the assumptions used to measure cash flows at least annually, as well as update the discount rate assumption at each reporting date; (2) measure all market risk benefits associated with deposit (or account balance) contracts at fair value; and (3) disclose liability rollforwards and information about significant inputs, judgments, assumptions and methods used in measurement, including changes thereto and the effect of those changes on measurement. ASU No. 2018-12 becomes effective for the Company during the first quarter of 2021. The ASU will, among other things, impact the discount rate used in estimating reserves for the Company's life and annuity reinsurance portfolio, which is in runoff. Currently, the discount rate assumption is locked-in for the life of the contracts, unless there is a loss recognition event. The Company is currently evaluating ASU No. 2018-12 to determine the impact that adopting this standard will have on its consolidated financial statements.

In August 2018, the FASB issued ASU No. 2018-15, *Intangibles-Goodwill and Other- Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract*. The ASU aligns the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software and hosting arrangements that include an internal-use software license. The ASU requires an entity to expense the capitalized implementation costs of a hosting arrangement that is a service contract over the term of the hosting arrangement. Currently, such costs are generally expensed as incurred. ASU No. 2018-15 becomes effective for the Company during the first quarter of 2020 and may be applied on a prospective or retrospective basis. Early adoption is permitted. The Company is currently evaluating ASU No. 2018-15 to determine the impact that adopting this standard will have on its consolidated financial statements.

The following ASUs are relevant to the Company's operations and are not yet effective. These ASUs are not expected to have a material impact on the Company's financial position, results of operations or cash flows:

- ASU No. 2017-08, *Receivables - Nonrefundable Fees and Other Costs (Subtopic 310-20): Premium Amortization on Purchased Callable Debt Securities*
- ASU No. 2018-13, *Fair Value Measurement (Topic 820): Disclosure Framework-Changes to the Disclosure Requirements for Fair Value Measurement*
- ASU No. 2018-14, *Compensation—Retirement Benefits—Defined Benefit Plans—General (Subtopic 715-20): Disclosure Framework—Changes to the Disclosure Requirements for Defined Benefit Plans*
- ASU No. 2018-17, *Consolidation (Topic 810): Targeted Improvements to Related Party Guidance for Variable Interest Entities*

2 . Acquisitions

Brahmin Leather Works, LLC

In October 2018, the Company acquired 90% of Brahmin Leather Works, LLC (Brahmin), a Massachusetts-based privately held creator of fashion leather handbags. Total consideration for the acquisition was \$193.8 million , which included cash consideration of \$173.3 million . Total consideration also includes the estimated fair value of contingent consideration the Company expects to pay based on Brahmin's earnings as defined in the purchase agreement, for the period of 2019 through 2021. The purchase price was preliminarily allocated to the acquired assets and liabilities of Brahmin based on estimated fair values at the acquisition date. The Company preliminarily recognized goodwill of \$72.9 million , which is primarily attributable to expected future earnings and cash flow potential of Brahmin. The majority of the goodwill recognized is expected to be deductible for income tax purposes. The Company also preliminarily recognized other intangible assets of \$81.3 million , which includes \$45.0 million of customer relationships, \$35.0 million of trade names and \$1.3 million of other intangible assets, which are expected to be amortized over a weighted average period of 16 years , 16 years and 8 years , respectively. The Company also recognized redeemable non-controlling interests of \$19.6 million . Results attributable to Brahmin are included in the Company's Market Ventures segment.

The Company has not completed the process of determining the fair value of the assets acquired and liabilities assumed. These valuations will be completed within the measurement period, which cannot exceed 12 months from the acquisition date. As a result, the fair value recorded for these items is a provisional estimate and may be subject to adjustment. Once completed, any adjustments resulting from the valuations may impact the individual amounts recorded for assets acquired and liabilities assumed, as well as the residual goodwill.

Nephila Holdings Ltd.

In November 2018, the Company acquired all of the outstanding shares of Nephila Holdings Ltd. (Nephila), a Bermuda-based investment fund manager offering a broad range of investment products, including insurance-linked securities, catastrophe bonds, insurance swaps and weather derivatives. Nephila generates revenue primarily through management and incentive fees. Total consideration for the acquisition was \$972.6 million , all of which was cash consideration. The purchase price was allocated to the acquired assets and liabilities of Nephila based on estimated fair values at the acquisition date. The Company preliminarily recognized goodwill of \$474.9 million , which is primarily attributable to expected future earnings and cash flow potential of Nephila. None of the goodwill recognized is expected to be deductible for income tax purposes. The Company also preliminarily recognized other intangible assets of \$516.8 million , which includes \$441.0 million of investment management agreements, \$31.0 million of broker relationships, \$22.8 million of technology and \$22.0 million of trade names, which are expected to be amortized over a weighted average period of 16 years , 12 years , 6 years and 14 years , respectively. The Company also recognized noncontrolling interests of \$23.4 million attributable to certain consolidated subsidiaries of Nephila that are not wholly-owned. Nephila operates as a separate business unit and its operating results are not included in a reportable segment.

The Company has not completed the process of determining the fair value of the assets acquired and liabilities assumed. These valuations will be completed within the measurement period, which cannot exceed 12 months from the acquisition date. As a result, the fair value recorded for these items is a provisional estimate and may be subject to adjustment. Once completed, any adjustments resulting from the valuations may impact the individual amounts recorded for assets acquired and liabilities assumed, as well as the residual goodwill.

SureTec Financial Corp.

In April 2017, the Company completed the acquisition of SureTec Financial Corp. (SureTec), a Texas-based privately held surety company primarily offering contract, commercial and court bonds. Results attributable to this acquisition are included in the Insurance segment.

Total consideration for this acquisition was \$246.9 million , which included cash consideration of \$225.6 million . Total consideration also includes the estimated fair value of contingent consideration the Company expects to pay based on SureTec's earnings, as defined in the merger agreement, for the years 2017 through 2020. The purchase price was allocated to the acquired assets and liabilities of SureTec based on estimated fair values on the acquisition date. The Company recognized goodwill of \$70.4 million , which is primarily attributable to synergies that are expected to result upon integration of SureTec into the Company's insurance operations. None of the goodwill recognized is deductible for income tax purposes. The Company also recognized other intangible assets of \$103.0 million , which includes \$92.0 million of agent relationships to be amortized over a weighted average period of 15 years .

Costa Farms Companies

In August 2017, the Company acquired 81% of the holding company for the Costa Farms companies (Costa Farms), a Florida-based privately held grower of house and garden plants. Under the terms of the acquisition agreement, the Company has the option to acquire the remaining equity interests and the remaining equity interests have the option to sell their interests to the Company in the future. The redemption value of the remaining equity interests is generally based on Costa Farm's earnings in specified periods preceding the redemption date. Total consideration for the purchase was \$417.2 million , which included cash consideration of \$387.9 million . Total consideration also included \$29.3 million of contingent consideration, which represented the Company's initial estimate of the fair value of the contingent consideration the Company expected to pay based on Costa Farms' earnings, as defined in the purchase agreement, annually through 2021. Subsequent changes in the Company's expectation of the contingent consideration obligation are recorded as operating expenses in the consolidated statement of income and comprehensive income. Operating expenses for the year ended December 31, 2017 included \$19.0 million related to an increase in the Company's estimate of the contingent consideration obligation, which now reflects the maximum amount of contingent consideration payable under the purchase agreement. The purchase price was allocated to the acquired assets and liabilities of Costa Farms based on estimated fair values at the acquisition date. The Company recognized goodwill of \$186.2 million , which is primarily attributable to expected future earnings and cash flow potential of Costa Farms. The majority of the goodwill recognized is deductible for income tax purposes. The Company also recognized other intangible assets of \$192.0 million , which includes \$161.0 million of customer relationships and \$31.0 million of trade names, which are expected to be amortized over a weighted average period of 17 years and nine years , respectively. The Company also recognized redeemable non-controlling interests of \$66.6 million . Results attributable to this acquisition are included in the Company's Market Ventures segment.

State National Companies, Inc.

In November 2017, the Company completed its acquisition of 100% of the issued and outstanding common stock of State National Companies, Inc. (State National), a Texas-based leading specialty provider of property and casualty insurance that includes both fronting services and collateral protection insurance coverage. Results attributable to State National's collateral protection insurance coverages are included in the Insurance segment. Results attributable to State National's program services business are not included in a reportable segment.

Pursuant to the terms of the merger agreement, State National stockholders received \$21.00 cash for each outstanding share of State National common stock (other than certain performance-based restricted shares that did not vest in connection with the transaction). Total consideration for this acquisition was \$918.8 million , all of which was cash consideration.

As of December 31, 2017, the purchase price was preliminarily allocated to the acquired assets and liabilities of State National based on estimated fair value at the acquisition date. During the first quarter of 2018, the Company completed the process of determining the fair value of the assets and liabilities acquired with State National. The Company recognized goodwill of \$379.2 million , none of which is deductible for income tax purposes. The goodwill is attributable to the Company's ability to achieve future revenue growth from new customers and the continued enhancement of State National's existing technology. Goodwill is also attributable to State National's assembled workforce and synergies associated with the integration of State National into the Company's insurance operations and investing activities. The Company also recognized indefinite lived intangible assets of \$32.0 million and other intangible assets of \$338.5 million , which are being amortized over a weighted average period of 13 years .

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The following table summarizes the fair values of the assets acquired and liabilities assumed at the acquisition date.

(dollars in thousands)

ASSETS		
Investments	\$	395,940
Cash and cash equivalents		77,302
Restricted cash and cash equivalents		25,545
Receivables		147,256
Prepaid reinsurance premiums		808,331
Reinsurance recoverables		2,075,734
Other assets		83,721
LIABILITIES		
Unpaid losses and loss adjustment expenses		2,086,621
Unearned premiums		825,529
Payables to insurance and reinsurance companies		122,203
Senior long-term debt and other debt		44,500
Other liabilities		365,826
Net assets		169,150
Goodwill		379,150
Intangible assets		370,500
Acquisition date fair value	\$	918,800

Other liabilities included an increase of \$64.5 million to reflect the risk premium for program services business, which is attributed to the net capital charges arising from the gross and ceded unpaid losses and loss adjustment expenses and unearned premium balances at the acquisition date. This adjustment will be amortized to other expenses over a weighted average period of three years, based on the estimated payout pattern of net unpaid losses and loss adjustment expenses as of the acquisition date. As of December 31, 2018 and 2017, the amount of the unamortized fair value adjustment included in other liabilities was \$35.3 million and \$57.7 million, respectively.

Other liabilities also included a decrease of \$28.3 million to adjust the carrying value of State National's historical deferred program services fees to fair value as of the acquisition date. The fair value of deferred program services fees is based on the cost of fulfilling the obligation plus a normal profit margin. The adjustment was amortized to service and other expenses over the life of the underlying business, which was a weighted average period of one year. As of December 31, 2017, the amount of the unamortized fair value adjustment included in other liabilities was \$19.3 million. As of December 31, 2018, this fair value adjustment was fully amortized.

The following table summarizes the intangible assets recorded in connection with the acquisition, and as of December 31, 2018.

<i>(dollars in thousands)</i>	Amount	Economic Useful Life
Customer relationships	\$ 289,000	13 years
Trade names	22,500	13 years
Technology	27,000	Nine years
Insurance licenses	32,000	Indefinite
Intangible assets, before amortization, as of the Acquisition Date	370,500	
Amortization (from the Acquisition Date through December 31, 2018)	32,336	
Net intangible assets as of December 31, 2018	\$ 338,164	

Customer relationships represent lender relationships, fronting relationships and other relationships through which State National conducted its operations. The fair value of customer relationships was estimated using the income approach. Critical inputs into the valuation model for customer relationships include estimates of expected premium and attrition rates, and discounting at a weighted average cost of capital. Technology represents intangible assets related to State National's proprietary insurance systems and was valued using the income approach.

3 . Investments

a) The following tables summarize the Company's available-for-sale investments. Commercial and residential mortgage-backed securities include securities issued by U.S. government-sponsored enterprises and U.S. government agencies.

	December 31, 2018			
	Amortized Cost	Gross Unrealized Holding Gains	Gross Unrealized Holding Losses	Estimated Fair Value
<i>(dollars in thousands)</i>				
Fixed maturities:				
U.S. Treasury securities	\$ 248,286	\$ 308	\$ (1,952)	\$ 246,642
U.S. government-sponsored enterprises	357,765	5,671	(4,114)	359,322
Obligations of states, municipalities and political subdivisions	4,285,068	96,730	(28,868)	4,352,930
Foreign governments	1,482,826	98,356	(21,578)	1,559,604
Commercial mortgage-backed securities	1,691,572	3,154	(44,527)	1,650,199
Residential mortgage-backed securities	886,501	6,170	(12,499)	880,172
Asset-backed securities	19,614	7	(213)	19,408
Corporate bonds	979,141	13,234	(17,464)	974,911
Total fixed maturities	9,950,773	223,630	(131,215)	10,043,188
Short-term investments	1,080,027	443	(2,774)	1,077,696
Investments, available-for-sale	\$ 11,030,800	\$ 224,073	\$ (133,989)	\$ 11,120,884

	December 31, 2017			
	Amortized Cost	Gross Unrealized Holding Gains	Gross Unrealized Holding Losses	Estimated Fair Value
<i>(dollars in thousands)</i>				
Fixed maturities:				
U.S. Treasury securities	\$ 162,378	\$ 54	\$ (1,819)	\$ 160,613
U.S. government-sponsored enterprises	352,455	11,883	(818)	363,520
Obligations of states, municipalities and political subdivisions	4,381,358	193,120	(7,916)	4,566,562
Foreign governments	1,341,628	150,010	(2,410)	1,489,228
Commercial mortgage-backed securities	1,244,777	6,108	(16,559)	1,234,326
Residential mortgage-backed securities	846,916	14,115	(4,863)	856,168
Asset-backed securities	34,942	8	(222)	34,728
Corporate bonds	1,186,699	51,563	(2,737)	1,235,525
Total fixed maturities	9,551,153	426,861	(37,344)	9,940,670
Equity securities: ⁽¹⁾				
Insurance, banks and other financial institutions	899,324	1,209,162	(5,453)	2,103,033
Industrial, consumer and all other	1,768,337	2,110,959	(14,482)	3,864,814
Total equity securities	2,667,661	3,320,121	(19,935)	5,967,847
Short-term investments	2,161,017	26	(69)	2,160,974
Investments, available-for-sale	\$ 14,379,831	\$ 3,747,008	\$ (57,348)	\$ 18,069,491

(1) Effective January 1, 2018, the Company adopted ASU No. 2016-01 and equity securities are no longer classified as available-for-sale. Prior periods have not been restated to conform to the current presentation. See note 1.

b) The following tables summarize gross unrealized investment losses on available-for-sale investments by the length of time that securities have continuously been in an unrealized loss position.

	December 31, 2018					
	Less than 12 months		12 months or longer		Total	
	Estimated Fair Value	Gross Unrealized Holding Losses	Estimated Fair Value	Gross Unrealized Holding Losses	Estimated Fair Value	Gross Unrealized Holding Losses
<i>(dollars in thousands)</i>						
Fixed maturities:						
U.S. Treasury securities	\$ 2,922	\$ (83)	\$ 156,352	\$ (1,869)	\$ 159,274	\$ (1,952)
U.S. government-sponsored enterprises	88,854	(1,923)	96,337	(2,191)	185,191	(4,114)
Obligations of states, municipalities and political subdivisions	656,573	(12,455)	453,736	(16,413)	1,110,309	(28,868)
Foreign governments	419,764	(14,461)	84,776	(7,117)	504,540	(21,578)
Commercial mortgage-backed securities	653,410	(10,128)	709,971	(34,399)	1,363,381	(44,527)
Residential mortgage-backed securities	276,777	(3,685)	242,949	(8,814)	519,726	(12,499)
Asset-backed securities	1,645	(11)	17,030	(202)	18,675	(213)
Corporate bonds	313,164	(10,965)	222,761	(6,499)	535,925	(17,464)
Total fixed maturities	2,413,109	(53,711)	1,983,912	(77,504)	4,397,021	(131,215)
Short-term investments	197,643	(2,774)	—	—	197,643	(2,774)
Total	\$ 2,610,752	\$ (56,485)	\$ 1,983,912	\$ (77,504)	\$ 4,594,664	\$ (133,989)

At December 31, 2018, the Company held 1,005 available-for-sale securities with a total estimated fair value of \$4.6 billion and gross unrealized losses of \$134.0 million. Of these 1,005 securities, 541 securities had been in a continuous unrealized loss position for one year or longer and had a total estimated fair value of \$2.0 billion and gross unrealized losses of \$77.5 million. The Company does not intend to sell or believe it will be required to sell these available-for-sale securities before recovery of their amortized cost.

	December 31, 2017					
	Less than 12 months		12 months or longer		Total	
	Estimated Fair Value	Gross Unrealized Holding Losses	Estimated Fair Value	Gross Unrealized Holding Losses	Estimated Fair Value	Gross Unrealized Holding Losses
<i>(dollars in thousands)</i>						
Fixed maturities:						
U.S. Treasury securities	\$ 78,756	\$ (659)	\$ 78,298	\$ (1,160)	\$ 157,054	\$ (1,819)
U.S. government-sponsored enterprises	11,593	(79)	89,194	(739)	100,787	(818)
Obligations of states, municipalities and political subdivisions	80,654	(789)	404,814	(7,127)	485,468	(7,916)
Foreign governments	31,752	(452)	63,406	(1,958)	95,158	(2,410)
Commercial mortgage-backed securities	253,936	(1,980)	481,216	(14,579)	735,152	(16,559)
Residential mortgage-backed securities	157,508	(1,345)	148,960	(3,518)	306,468	(4,863)
Asset-backed securities	14,263	(123)	15,165	(99)	29,428	(222)
Corporate bonds	149,345	(863)	187,754	(1,874)	337,099	(2,737)
Total fixed maturities	777,807	(6,290)	1,468,807	(31,054)	2,246,614	(37,344)
Equity securities: ⁽¹⁾						
Insurance, banks and other financial institutions	60,848	(4,843)	1,291	(610)	62,139	(5,453)
Industrial, consumer and all other	78,552	(11,798)	11,243	(2,684)	89,795	(14,482)
Total equity securities	139,400	(16,641)	12,534	(3,294)	151,934	(19,935)
Short-term investments	369,104	(69)	—	—	369,104	(69)
Total	\$ 1,286,311	\$ (23,000)	\$ 1,481,341	\$ (34,348)	\$ 2,767,652	\$ (57,348)

(1) Effective January 1, 2018, the Company adopted ASU No. 2016-01 and equity securities are no longer classified as available-for-sale. Prior periods have not been restated to conform to the current presentation. See note 1.

At December 31, 2017, the Company held 739 securities with a total estimated fair value of \$2.8 billion and gross unrealized losses of \$57.3 million. Of these 739 securities, 272 securities had been in a continuous unrealized loss position for one year or longer and had a total estimated fair value of \$1.5 billion and gross unrealized losses of \$34.3 million. Of these securities, 258 securities were fixed maturities and 14 were equity securities.

The Company completes a detailed analysis each quarter to assess whether the decline in the fair value of any investment below its cost basis is deemed other-than-temporary. All available-for-sale securities with unrealized losses are reviewed. The Company considers many factors in completing its quarterly review of securities with unrealized losses for other-than-temporary impairment, including the length of time and the extent to which fair value has been below cost and the financial condition and near-term prospects of the issuer.

For fixed maturities, the Company considers whether it intends to sell the security or if it is more likely than not that it will be required to sell the security before recovery, the implied yield-to-maturity, the credit quality of the issuer and the ability to recover all amounts outstanding when contractually due. For fixed maturities where the Company intends to sell the security or it is more likely than not that the Company will be required to sell the security before recovery of its amortized cost, a decline in fair value is considered to be other-than-temporary and is recognized in net income based on the fair value of the security at the time of assessment, resulting in a new cost basis for the security. If the decline in fair value of a fixed maturity below its amortized cost is considered to be other-than-temporary based upon other considerations, the Company compares the estimated present value of the cash flows expected to be collected to the amortized cost of the security. The extent to which the estimated present value of the cash flows expected to be collected is less than the amortized cost of the security represents the credit-related portion of the other-than-temporary impairment, which is recognized in net income, resulting in a new cost basis for the security. Any remaining decline in fair value represents the non-credit portion of the other-than-temporary impairment, which is recognized in other comprehensive income.

Prior to the adoption of ASU No. 2016-01, equity securities were considered available-for-sale and were included in the analysis of other than temporary impairments. For equity securities, the ability and intent to hold the security for a period of time sufficient to allow for anticipated recovery was considered. A decline in fair value of equity securities that was considered to be other-than-temporary was recognized in net income based on the fair value of the security at the time of assessment, resulting in a new cost basis for the security.

c) The amortized cost and estimated fair value of fixed maturities at December 31, 2018 are shown below by contractual maturity.

<i>(dollars in thousands)</i>	Amortized Cost	Estimated Fair Value
Due in one year or less	\$ 377,745	\$ 376,564
Due after one year through five years	1,293,384	1,298,995
Due after five years through ten years	2,103,596	2,137,866
Due after ten years	3,578,361	3,679,984
	<u>7,353,086</u>	<u>7,493,409</u>
Commercial mortgage-backed securities	1,691,572	1,650,199
Residential mortgage-backed securities	886,501	880,172
Asset-backed securities	19,614	19,408
Total fixed maturities	<u>\$ 9,950,773</u>	<u>\$ 10,043,188</u>

Expected maturities may differ from contractual maturities because borrowers may have the right to call or prepay obligations with or without call or prepayment penalties, and the lenders may have the right to put the securities back to the borrower. Based on expected maturities, the estimated average duration of fixed maturities at December 31, 2018 was 6.1 years .

d) The following table presents the components of net investment income.

<i>(dollars in thousands)</i>	Years Ended December 31,		
	2018	2017	2016
Interest:			
Municipal bonds (tax-exempt)	\$ 80,016	\$ 87,768	\$ 88,654
Municipal bonds (taxable)	73,058	70,771	65,749
Other taxable bonds	159,329	145,085	144,752
Short-term investments, including overnight deposits	48,765	26,772	11,177
Dividends on equity securities	90,840	82,096	70,577
Income (loss) from equity method investments	(1,924)	11,076	6,852
Other	881	(828)	2,676
	<u>450,965</u>	<u>422,740</u>	<u>390,437</u>
Investment expenses	(16,750)	(17,031)	(17,207)
Net investment income	<u>\$ 434,215</u>	<u>\$ 405,709</u>	<u>\$ 373,230</u>

e) Cumulative credit losses recognized in net income on fixed maturities where other-than-temporary impairment was identified and a portion of the other-than-temporary impairment was included in other comprehensive income were \$10.7 million for the year ended December 31, 2016 . There were no such losses included in other comprehensive income (loss) for the years ended December 31, 2018 and 2017 .

f) The following table presents net investment gains (losses) and the change in net unrealized gains on available-for-sale investments.

<i>(dollars in thousands)</i>	Years Ended December 31,		
	2018	2017	2016
Realized gains:			
Sales and maturities of fixed maturities	\$ 4,221	\$ 5,525	\$ 5,160
Sales of equity securities ⁽¹⁾	—	40,113	70,177
Sales and maturities of short-term investments	1,604	—	—
Other	1,281	6,644	1,415
Total realized gains	7,106	52,282	76,752
Realized losses:			
Sales and maturities of fixed maturities	(5,768)	(1,983)	(704)
Sales of equity securities ⁽¹⁾	—	(1,830)	(6,988)
Sales and maturities of short-term investments	(10,545)	(699)	(522)
Other-than-temporary impairments	—	(7,589)	(18,355)
Other	(2,767)	(596)	(1,827)
Total realized losses	(19,080)	(12,697)	(28,396)
Net realized investment gains (losses)	(11,974)	39,585	48,356
Change in fair value of equity securities: ⁽¹⁾			
Change in fair value of equity securities sold during the period	20,177	6,989	(3,990)
Change in fair value of equity securities held at the end of the period	(445,799)	(51,877)	20,781
Change in fair value of equity securities ⁽¹⁾	(425,622)	(44,888)	16,791
Net investment gains (losses)	\$ (437,596)	\$ (5,303)	\$ 65,147
Change in net unrealized gains on available-for-sale investments included in other comprehensive income (loss):			
Fixed maturities	\$ (297,158)	\$ 89,741	\$ (56,534)
Equity securities ⁽¹⁾	—	1,035,793	398,752
Short-term investments	(2,288)	(94)	(107)
Net increase (decrease)	\$ (299,446)	\$ 1,125,440	\$ 342,111

⁽¹⁾ Effective January 1, 2018, the Company adopted ASU No. 2016-01. As a result, equity securities are no longer classified as available-for-sale with unrealized gains and losses recognized in other comprehensive income; rather, all changes in the fair value of equity securities are now recognized in net income. Prior periods have not been restated to conform to the current presentation. See note 1. Prior to adopting ASU No. 2016-01, the Company recorded certain investments in equity securities at estimated fair value with changes in fair value recorded in net income.

g) Total restricted assets are included on the Company's consolidated balance sheets as follows.

<i>(dollars in thousands)</i>	December 31,	
	2018	2017
Investments	\$ 4,781,566	\$ 4,672,073
Restricted cash and cash equivalents	382,264	302,387
Total	\$ 5,163,830	\$ 4,974,460

The following table presents the components of restricted assets.

<i>(dollars in thousands)</i>	December 31,	
	2018	2017
Restricted assets held in trust or on deposit to support underwriting activities	\$ 4,780,613	\$ 4,624,998
Investments and cash and cash equivalents pledged as security for letters of credit	383,217	349,462
Total	\$ 5,163,830	\$ 4,974,460

h) At December 31, 2018 and 2017 , investments in securities issued by the U.S. Treasury, U.S. government agencies and U.S. government-sponsored enterprises were the only investments in any one issuer that exceeded 10% of shareholders' equity.

At December 31, 2018 , the Company's ten largest equity holdings represented \$2.3 billion , or 41% , of the equity portfolio. Investments in the property and casualty insurance industry represented \$1.0 billion , or 18% , of the equity portfolio at December 31, 2018 . Investments in the property and casualty insurance industry included a \$645.9 million investment in the common stock of Berkshire Hathaway Inc.

4 . Receivables

The following table presents the components of receivables.

<i>(dollars in thousands)</i>	December 31,	
	2018	2017
Amounts receivable from agents, brokers and insureds	\$ 1,327,549	\$ 1,281,366
Trade accounts receivable	226,282	181,666
Notes receivable	40,375	528
Program services fees receivable	24,787	22,767
Employee stock loans receivable (see note 12(c))	19,227	18,499
Investment management and incentive fees receivable	16,744	5,796
Insurance proceeds receivable	—	39,196
Other	53,140	31,410
	1,708,104	1,581,228
Allowance for doubtful receivables	(15,578)	(13,775)
Receivables	\$ 1,692,526	\$ 1,567,453

5 . Deferred Policy Acquisition Costs

The following table presents the amounts of policy acquisition costs deferred and amortized.

<i>(dollars in thousands)</i>	Years Ended December 31,		
	2018	2017	2016
Balance, beginning of year	\$ 465,569	\$ 392,410	\$ 352,756
Policy acquisition costs deferred	1,024,888	964,755	823,840
Amortization of policy acquisition costs	(1,009,303)	(894,353)	(782,221)
Foreign currency movements	(6,641)	2,757	(1,965)
Deferred policy acquisition costs	\$ 474,513	\$ 465,569	\$ 392,410

The following table presents the components of underwriting, acquisition and insurance expenses.

<i>(dollars in thousands)</i>	Years Ended December 31,		
	2018	2017	2016
Amortization of policy acquisition costs	\$ 1,009,303	\$ 894,353	\$ 782,221
Other operating expenses	768,208	695,111	714,904
Underwriting, acquisition and insurance expenses	\$ 1,777,511	\$ 1,589,464	\$ 1,497,125

6 . Property and Equipment

The following table presents the components of property and equipment, which are included in other assets on the consolidated balance sheets.

<i>(dollars in thousands)</i>	December 31,	
	2018	2017
Land	\$ 72,011	\$ 66,885
Buildings	137,095	119,729
Leasehold improvements	108,973	98,246
Land improvements	93,545	89,444
Furniture and equipment	392,060	341,450
Other	227,356	196,465
	1,031,040	912,219
Accumulated depreciation and amortization	(479,498)	(410,602)
Property and equipment	\$ 551,542	\$ 501,617

Depreciation and amortization expense of property and equipment was \$80.9 million , \$71.6 million and \$64.8 million for the years ended December 31, 2018 , 2017 and 2016 , respectively.

The Company does not own any individually material properties. The Company leases substantially all of the facilities used by its insurance operations and certain furniture and equipment under operating leases. The Company leases offices for the Insurance segment in Glen Allen, Virginia, London, England and in 63 other locations. The Company leases offices for the Reinsurance segment primarily in Summit, New Jersey and Hamilton, Bermuda. The Company either owns or leases office, clinic, manufacturing, warehouse and distribution facilities for the Markel Ventures segment in 96 locations, primarily in the U.S. The Company also leases offices for its other operations in Hamilton, Bermuda, London, England and in 13 other locations. The Company believes its facilities are suitable and adequate for the Company's operations.

7 . Goodwill and Intangible Assets

The following table presents the components of goodwill by reportable segment. Prior year amounts have been recast for consistency with the current year presentation.

<i>(dollars in thousands)</i>	Insurance	Reinsurance	Markel Ventures	Other ⁽¹⁾	Total
January 1, 2017	\$ 672,763	\$ 122,745	\$ 237,767	\$ 108,973	\$ 1,142,248
Acquisitions (see note 2)	93,123	—	186,194	347,418	626,735
Foreign currency movements and other adjustments	5,935	—	1,020	1,526	8,481
December 31, 2017 ⁽²⁾	\$ 771,821	\$ 122,745	\$ 424,981	\$ 457,917	\$ 1,777,464
Acquisitions (see note 2)	—	—	73,174	474,901	548,075
Impairment of goodwill	—	—	—	(91,910)	(91,910)
Foreign currency movements and other adjustments	(1,637)	—	(817)	6,800	4,346
December 31, 2018 ⁽²⁾	\$ 770,184	\$ 122,745	\$ 497,338	\$ 847,708	\$ 2,237,975

⁽¹⁾ Amounts included in Other reflect the Company's operations that are not included in a reportable segment.

⁽²⁾ As of December 31, 2018 , goodwill was net of accumulated impairment losses of \$139.2 million , of which \$91.9 million was in Other and \$47.3 million was in Markel Ventures. As of December 31, 2017 , goodwill was net of accumulated impairment losses of \$47.3 million , all of which was included in Markel Ventures.

Goodwill and indefinite-lived intangible assets are tested for impairment at least annually. The Company completes an annual test during the fourth quarter of each year based upon the results of operations through September 30. Total impairment of goodwill for the years ended December 31, 2018 and 2016 was \$91.9 million and \$18.7 million , respectively. There was no impairment of goodwill during 2017 .

During the fourth quarter of 2018, the Company recorded a goodwill and intangible asset impairment charge at Markel CATCo Investment Management Ltd. (MCIM) totaling \$179.0 million. In light of governmental inquiries into loss reserves recorded in late 2017 and early 2018 at Markel CATCo Re Ltd. (Markel CATCo Re), an unconsolidated subsidiary managed by MCIM, and taking into consideration the departure of two senior MCIM executives and special redemption rights that are now being offered to investors in the Markel CATCo Funds, as defined in note 16, and all of which is further described in note 18, the Company concluded MCIM's ability to maintain or raise capital has been adversely impacted. As a result, the Company performed an assessment of the recoverability of goodwill and intangible assets at the MCIM reporting unit as of December 31, 2018. As a result of the assessment, the Company reduced the carrying value of the goodwill and intangible assets of the MCIM reporting unit to zero, which resulted in a goodwill impairment charge of \$91.9 million and an intangible asset impairment charge of \$87.1 million, both of which were recorded to impairment of goodwill and intangible assets in the consolidated statement of loss and comprehensive loss for the year ended December 31, 2018.

The Company estimated the fair value of the reporting unit, and resulting goodwill impairment loss, primarily using an income approach based on a discounted cash flow model. The discount rates used to determine the fair value estimates were developed based on the capital asset pricing model using market-based inputs as well as an assessment of the inherent risk in the projected cash flows. The cash flow projections used in the discounted cash flow model include management's best estimate of future growth and margins. Significant assumptions in the discounted cash flow model used to determine the fair value of the MCIM reporting unit included the amount and timing of new investor capital being introduced, anticipated redemptions during 2019 in light of special redemption rights now being offered to investors in the Markel CATCo Funds, and other assumptions impacting the expected level of management fees to be earned by MCIM.

The MCIM intangible asset impairment of \$87.1 million primarily related to intangible assets associated with MCIM's investment management agreements with the Markel CATCo Funds. After determining that the intangible assets of MCIM were unrecoverable, the Company estimated the fair value of the intangible assets using an income approach based on an excess earnings model. In light of the special redemption rights that are now being offered to investors in the Markel CATCo Funds, the cash flows supporting the intangible assets have been adversely impacted.

During the fourth quarter of 2016, the Company recorded a goodwill impairment charge of \$18.7 million to impairment of goodwill and intangible assets for one of Markel Ventures' industrial products reporting units, to reduce the carrying value of its goodwill to its implied fair value. Unfavorable market conditions, specifically declining oil prices from late 2014 through 2016 resulted in lower than expected earnings over a similar time period. The reporting unit's earnings are generally tied to infrastructure spending across global markets, a significant portion of which are influenced by the price of oil. To determine the value of the impairment loss, the Company estimated the fair value of the reporting unit primarily using an income approach based on a discounted cash flow model. While the cash flow projections, at that time, yielded positive cash flows and earnings in the long-term, they were insufficient to support the carrying value of the reporting unit due to the unfavorable impact of market conditions and recent trends on the Company's shorter-term projections. Following the impairment charge in 2016, the carrying value of the reporting unit's goodwill was reduced to zero.

The following table presents the components of intangible assets.

	December 31,			
	2018		2017	
	Gross Carrying Amount	Accumulated Amortization	Gross Carrying Amount	Accumulated Amortization
<i>(dollars in thousands)</i>				
Customer relationships	\$ 953,739	\$ (204,261)	\$ 941,477	\$ (161,797)
Investment management agreements	441,000	—	98,000	(14,000)
Broker relationships	204,367	(78,559)	184,959	(69,677)
Trade names	193,154	(62,827)	164,335	(59,660)
Technology	109,208	(47,090)	94,712	(44,489)
Agent relationships	92,000	(10,175)	92,000	(4,042)
Insurance licenses	74,635	—	70,385	—
Renewal rights	21,053	(18,272)	19,514	(17,681)
Other	107,441	(49,217)	111,633	(49,988)
Total	\$ 2,196,597	\$ (470,401)	\$ 1,777,015	\$ (421,334)

During 2018, the Company recorded intangible asset impairment charges of \$107.3 million, including \$87.1 million related to MCIM, as described above, and \$14.9 million related to one of the Markel Ventures industrial products businesses. See note 18.

Amortization of intangible assets was \$115.9 million, \$80.8 million and \$68.5 million for the years ended December 31, 2018, 2017 and 2016, respectively. Amortization of intangible assets is estimated to be \$140.3 million for 2019, \$137.2 million for 2020, \$133.5 million for 2021, \$130.1 million for 2022 and \$128.4 million for 2023. Indefinite-lived intangible assets were \$92.4 million at December 31, 2018 and \$88.2 million at December 31, 2017.

For the year ended December 31, 2018, the Company acquired \$608.3 million of intangible assets, of which \$604.1 million is amortizable. The definite-lived intangible assets acquired are expected to be amortized over a weighted average period of 15 years. The definite-lived intangible assets acquired during 2018 include investment management relationships, customer relationships, trade names, broker relationships, technology and other intangible assets, which are expected to be amortized over a weighted average period of 16, 16, 15, 12, 6 and 5 years, respectively.

8. Income Taxes

Income (loss) before income taxes includes the following components.

<i>(dollars in thousands)</i>	Years Ended December 31,		
	2018	2017	2016
Domestic operations	\$ 99,373	\$ 337,704	\$ 288,905
Foreign operations	(107,228)	(250,409)	341,015
Income (loss) before income taxes	\$ (7,855)	\$ 87,295	\$ 629,920

Income tax expense (benefit) includes the following components.

<i>(dollars in thousands)</i>	Years Ended December 31,		
	2018	2017	2016
Current:			
Domestic	\$ 77,936	\$ (19,255)	\$ 57,916
Foreign	41,833	29,882	48,203
Total current tax expense	119,769	10,627	106,119
Deferred:			
Domestic	(77,255)	(222,427)	19,991
Foreign	79,984	(101,663)	43,367
Total deferred tax expense (benefit)	2,729	(324,090)	63,358
Income tax expense (benefit)	\$ 122,498	\$ (313,463)	\$ 169,477

Foreign income tax expense includes U.S. income tax expense on foreign operations, which includes U.S. income tax on the Company's United Kingdom (U.K.) and Bermuda-based operations, certain of which have elected to be taxed as domestic corporations for U.S. tax purposes.

State income tax expense is not material to the consolidated financial statements.

The Company made income tax payments of \$63.1 million, \$70.2 million and \$142.2 million in 2018, 2017 and 2016, respectively. Income taxes payable were \$83.7 million and \$51.3 million at December 31, 2018 and 2017, respectively, and were included in other liabilities on the consolidated balance sheets. Income taxes receivable were \$49.3 million and \$64.3 million at December 31, 2018 and 2017, respectively, and were included in other assets on the consolidated balance sheets.

On December 22, 2017, the U.S. enacted the Tax Cuts and Jobs Act (TCJA), which made significant modifications to U.S. income tax law, most of which were effective January 1, 2018. As a result, the Company recorded a one-time tax benefit of \$339.9 million in the fourth quarter of 2017, a portion of which was considered provisional at December 31, 2017. The one-time benefit from the TCJA was attributable to the remeasurement of the Company's U.S. deferred tax assets and liabilities on temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and their tax bases at the lower enacted U.S. corporation tax rate, partially offset by the tax on the deemed repatriation of foreign earnings. In 2018, the Company completed its determination of the accounting for the TCJA, which resulted in an additional tax benefit of \$5.7 million.

After extensive discussions and analysis of the Company's overall capital and tax profile resulting from the enactment of the TCJA, in 2018 the Company decided to elect to treat its most significant U.K. subsidiaries as domestic corporations for U.S. tax purposes. As a result, the earnings and profits of those subsidiaries are no longer considered to be indefinitely reinvested and the Company recorded a one-time deferred tax charge of \$103.3 million related to the book and tax basis differences attributable to those subsidiaries. The Company continues to be indefinitely reinvested in its other foreign subsidiaries, with the exception of certain Bermuda-based subsidiaries. As of December 31, 2018, the cumulative earnings of the Company's foreign subsidiaries that are considered indefinitely reinvested, and have not previously been subject to tax in the U.S., are not material.

The following table presents a reconciliation of income taxes computed using the U.S. corporate tax rate to the Company's income tax expense (benefit).

	Years Ended December 31,		
	2018	2017	2016
Income taxes at U.S. corporate tax rate	\$ (1,650)	\$ 30,553	\$ 220,472
Increase (decrease) resulting from:			
Change in tax status of U.K. subsidiaries	103,281	—	—
Nondeductible loss on investments managed by MCIM	26,552	16,231	—
Foreign operations	4,951	37,207	4,672
Tax-exempt investment income	(18,927)	(41,565)	(39,710)
TCJA	(5,699)	(339,899)	—
Tax credits	(3,617)	(10,236)	(13,294)
Stock based compensation	(2,635)	(9,001)	(5,411)
Other	20,242	3,247	2,748
Income tax expense (benefit)	\$ 122,498	\$ (313,463)	\$ 169,477

The following table presents the components of domestic and foreign deferred tax assets and liabilities.

<i>(dollars in thousands)</i>	December 31,	
	2018	2017
Assets:		
Unpaid losses and loss adjustment expenses	\$ 164,497	\$ 144,761
Unearned premiums recognized for income tax purposes	85,952	74,282
Life and annuity benefits	78,370	77,945
Net operating loss carryforwards	46,662	29,252
Tax credit carryforwards	39,877	48,938
Accrued incentive compensation	30,308	23,167
Other differences between financial reporting and tax bases	39,763	60,995
Total gross deferred tax assets	485,429	459,340
Less valuation allowance	(36,286)	(25,225)
Total gross deferred tax assets, net of allowance	449,143	434,115
Liabilities:		
Investments	590,250	603,523
Goodwill and other intangible assets	124,953	171,681
Deferred policy acquisition costs	89,716	90,826
Other differences between financial reporting and tax bases	90,269	73,664
Total gross deferred tax liabilities	895,188	939,694
Net deferred tax liability	\$ 446,045	\$ 505,579

The net deferred tax liability at December 31, 2018 and 2017 was included in other liabilities on the consolidated balance sheets.

At December 31, 2018, the Company had tax credit carryforwards of \$39.9 million. The earliest any of these credits will expire is 2028.

At December 31, 2018, the Company also had net operating losses of \$40.7 million that can be used to offset future taxable income in the U.S. The Company's ability to use the majority of these losses expires between the years 2028 and 2037. At December 31, 2018, certain branch operations in Europe and a wholly owned subsidiary in Brazil had net operating losses of \$121.7 million that can be used to offset future income in their local jurisdictions. The Company's ability to use \$31.4 million of these losses expires between the years 2020 and 2027. The remaining losses are not subject to expiration. As discussed below, the deferred tax assets related to losses at the Company's European branches, its Brazilian subsidiary and certain U.S. subsidiaries are offset by valuation allowances.

The Company believes that it is more likely than not that it will realize \$449.1 million of gross deferred tax assets, including net operating losses at December 31, 2018, through generating taxable income or the reversal of existing temporary differences attributable to the gross deferred tax liabilities. As a result of cumulative net operating losses in certain jurisdictions, the Company has a valuation allowance of \$36.3 million at December 31, 2018 that offsets the deferred tax assets primarily related to losses incurred at European branches of one of the Company's U.K. subsidiaries, at one of the Company's Brazilian subsidiaries and at certain U.S. subsidiaries.

At December 31, 2018, the Company did not have any material unrecognized tax benefits. The Company does not anticipate any changes in unrecognized tax benefits during 2019 that would have a material impact on the Company's income tax provision.

The Company is subject to income tax in the U.S. and in foreign jurisdictions. With few exceptions, the Company is no longer subject to income tax examination by tax authorities for years ended before January 1, 2015.

9 . Unpaid Losses and Loss Adjustment Expenses

a) The following table presents a reconciliation of consolidated beginning and ending reserves for losses and loss adjustment expenses.

<i>(dollars in thousands)</i>	Years Ended December 31,		
	2018	2017	2016
Net reserves for losses and loss adjustment expenses, beginning of year	\$ 8,964,945	\$ 8,108,717	\$ 8,235,288
Foreign currency movements	(69,119)	110,079	(129,692)
Adjusted net reserves for losses and loss adjustment expenses, beginning of year	8,895,826	8,218,796	8,105,596
Incurred losses and loss adjustment expenses:			
Current accident year	3,371,699	3,367,223	2,555,902
Prior accident years	(551,040)	(497,627)	(493,495)
Total incurred losses and loss adjustment expenses	2,820,659	2,869,596	2,062,407
Payments:			
Current accident year	666,515	671,112	532,140
Prior accident years	1,835,027	1,513,580	1,529,206
Total payments	2,501,542	2,184,692	2,061,346
Effect of foreign currency rate changes	(500)	3,752	2,060
Net reserves for losses and loss adjustment expenses of acquired insurance companies	—	57,493	—
Net reserves for losses and loss adjustment expenses, end of year	9,214,443	8,964,945	8,108,717
Reinsurance recoverable on unpaid losses	5,062,036	4,619,336	2,006,945
Gross reserves for losses and loss adjustment expenses, end of year	\$ 14,276,479	\$ 13,584,281	\$ 10,115,662

In 2018, underwriting results included \$287.3 million of underwriting loss from Hurricanes Florence and Michael, Typhoon Jebi and wildfires in California (2018 Catastrophes). The underwriting loss on the 2018 Catastrophes was comprised of \$292.8 million of estimated net losses and loss adjustment expenses partially offset by \$5.4 million of net assumed reinstatement premiums. The estimated net losses and loss adjustment expenses on the 2018 Catastrophes were net of estimated ceded losses of \$244.1 million .

Incurred losses and loss adjustment expenses in 2018 included \$551.0 million of favorable development on prior years' loss reserves, which included \$424.1 million of favorable development on the Company's general liability, workers' compensation, professional liability and marine and energy product lines within the Insurance segment and surety and marine and energy product lines within the Reinsurance segment.

In 2017, underwriting results included \$565.3 million of underwriting loss from Hurricanes Harvey, Irma, Maria and Nate as well as the earthquakes in Mexico and wildfires in California (2017 Catastrophes). The underwriting loss on the 2017 Catastrophes was comprised of \$585.4 million of estimated net losses and loss adjustment expenses and \$20.1 million of net assumed reinstatement premiums. The estimated net losses and loss adjustment expenses on the 2017 Catastrophes for the year ended December 31, 2017 were net of estimated ceded losses of \$490.3 million .

Incurred losses and loss adjustment expenses in 2017 included \$497.6 million of favorable development on prior years' loss reserves, which included \$422.9 million of favorable development on the Company's general liability, marine and energy product lines, professional liability, and workers' compensation product lines as well as personal lines business within the Insurance segment and property product lines within the Reinsurance segment. Favorable development in 2017 was partially offset by \$85.0 million of adverse development on our auto product line resulting from a decrease in the discount rate, known as the Ogden Rate, used to calculate lump sum awards in U.K. bodily injury cases.

In 2017, the Company recorded net reserves for losses and loss adjustment expenses of \$57.5 million as a result of acquisitions completed during the year. All acquired net reserves were recorded at fair value as part of the Company's purchase accounting. See note 2 for a discussion of the Company's acquisitions.

In 2017, the Company recognized a previously deferred gain of \$3.9 million, which is included in losses and loss adjustment expenses on the consolidated statement of income and comprehensive income. This amount is excluded from the prior years' incurred losses and loss adjustment expenses for 2017 in the above table as the deferred gain was included in other liabilities on the consolidated balance sheet as of December 31, 2016, rather than unpaid losses and loss adjustment expenses.

In 2016, incurred losses and loss adjustment expenses included \$493.5 million of favorable development on prior years' loss reserves, which included \$418.0 million of favorable development on the Company's general liability, property and marine and energy product lines within the Insurance segment and property product lines in the Reinsurance segment, as actual claims reporting and development patterns on prior accident years have been more favorable than the Company's actuarial analyses initially anticipated. Favorable development in 2016 was partially offset by \$71.2 million of adverse development on the Company's specified medical and medical malpractice product lines within the Insurance segment.

In 2016, incurred losses and loss adjustment expenses in the above table exclude \$11.7 million of favorable development on prior years loss reserves included in losses and loss adjustment expenses on the consolidated statement of income and comprehensive income related to the commutation of a property and casualty deposit contract, for which the underlying deposit liability was included in other liabilities on the consolidated balance sheet as of December 31, 2015, rather than unpaid losses and loss adjustment expenses.

The Company uses a variety of techniques to establish the liabilities for unpaid losses and loss adjustment expenses based upon estimates of the ultimate amounts payable. The Company maintains reserves for specific claims incurred and reported (case reserves) and reserves for claims incurred but not reported (IBNR reserves), which include expected development on reported claims. The Company does not discount its reserves for losses and loss adjustment expenses to reflect estimated present value, except for reserves held for a runoff book of U.K. motor business. Additionally, reserves assumed in connection with an acquisition are recorded at fair value at the acquisition date. The fair value adjustment includes an adjustment to reflect the acquired reserves for losses and loss adjustment expenses at present value plus a risk premium, the net of which is amortized to losses and loss adjustment expenses within the consolidated statements of income.

As of any balance sheet date, all claims have not yet been reported, and some claims may not be reported for many years. As a result, the liability for unpaid losses and loss adjustment expenses includes significant estimates for incurred but not reported claims.

There is normally a time lag between when a loss event occurs and when it is actually reported to the Company. The actuarial methods that the Company uses to estimate losses have been designed to address the lag in loss reporting as well as the delay in obtaining information that would allow the Company to more accurately estimate future payments. There is also a time lag between cedents establishing case reserves and re-estimating their reserves, and notifying the Company of the new or revised case reserves. As a result, the reporting lag is more pronounced in reinsurance contracts than in the insurance contracts due to the reliance on ceding companies to report their claims. On reinsurance transactions, the reporting lag will generally be 60 to 90 days after the end of a reporting period, but can be longer in some cases. Based on the experience of the Company's actuaries and management, loss development factors and trending techniques are selected to mitigate the difficulties caused by reporting lags. The loss development and trending factor selections are evaluated at least annually and updated using cedent specific and industry data.

IBNR reserves are based on the estimated ultimate cost of settling claims, including the effects of inflation and other social and economic factors, using past experience adjusted for current trends and any other factors that would modify past experience. IBNR reserves, which include expected development on reported claims, are generally calculated by subtracting paid losses and loss adjustment expenses and case reserves from estimated ultimate losses and loss adjustment expenses. IBNR reserves were 64% of total unpaid losses and loss adjustment expenses at both December 31, 2018 and 2017.

In establishing liabilities for unpaid losses and loss adjustment expenses, the Company's actuaries estimate an ultimate loss ratio, by accident year or policy year, for each product line with input from underwriting and claims associates. For product lines in which loss reserves are established on a policy year basis, the Company has developed a methodology to convert from policy year to accident year for financial reporting purposes. In estimating an ultimate loss ratio for a particular line of business, the actuaries may use one or more actuarial reserving methods and select from these a single point estimate. To varying degrees, these methods include detailed statistical analysis of past claim reporting, settlement activity, claim frequency and severity, policyholder loss experience, industry loss experience and changes in market conditions, policy forms and exposures. Greater judgment may be required when new product lines are introduced or when there have been changes in claims handling practices, as the statistical data available may be insufficient. These estimates also reflect implicit and explicit assumptions regarding the potential effects of external factors, including economic and social inflation, judicial decisions, changes in law, general economic conditions and recent trends in these factors. Management believes the process of evaluating past experience, adjusted for the effects of current developments and anticipated trends, is an appropriate basis for predicting future events.

Loss reserves are established at management's best estimate, which is generally higher than the corresponding actuarially calculated point estimate. The actuarial point estimate represents the actuaries' estimate of the most likely amount that will ultimately be paid to settle the loss reserves that are recorded at a particular point in time; however, there is inherent uncertainty in the point estimate as it is the expected value in a range of possible reserve estimates. In some cases, actuarial analyses, which are based on statistical analysis, cannot fully incorporate all of the subjective factors that affect development of losses. In other cases, management's perspective of these more subjective factors may differ from the actuarial perspective. Subjective factors where management's perspective may differ from that of the actuaries include: the credibility and timeliness of claims information received from third parties, economic and social inflation, judicial decisions, changes in law, changes in underwriting or claims handling practices, general economic conditions, the risk of moral hazard and other current and developing trends within the insurance and reinsurance markets, including the effects of competition. As a result, the actuarially calculated point estimate for each line of business represents the starting point for management's quarterly review of loss reserves.

Inherent in the Company's reserving practices is the desire to establish loss reserves that are more likely redundant than deficient. As such, the Company seeks to establish loss reserves that will ultimately prove to be adequate. As part of the Company's acquisition of insurance operations, to the extent the reserving philosophy of the acquired business differs from the Company's reserving philosophy, the post-acquisition loss reserves will be strengthened until total loss reserves are consistent with the Company's target level of confidence. Furthermore, the Company's philosophy is to price its insurance products to make an underwriting profit. Management continually attempts to improve its loss estimation process by refining its ability to analyze loss development patterns, claim payments and other information, but uncertainty remains regarding the potential for adverse development of estimated ultimate liabilities.

Management currently believes the Company's gross and net reserves are adequate. However, there is no precise method for evaluating the impact of any significant factor on the adequacy of reserves, and actual results will differ from original estimates.

b) The following tables present undiscounted loss development information, by accident year, for the Company's Insurance and Reinsurance segments, including cumulative incurred and paid losses and allocated loss adjustment expenses, net of reinsurance, as well as the corresponding amount of IBNR reserves as of December 31, 2018. This level of disaggregation is consistent with how the Company analyzes loss reserves for both internal and external reporting purposes. The loss development information for the years ended December 31, 2012 through 2017 is presented as supplementary information. Incurred losses in both our Insurance and Reinsurance segments generally remain outstanding more than seven years; however, data prior to 2012 is not practically available by segment as a result of a change in the Company's reportable segments in 2014. Additionally, reserves for the Company's international operations are determined on a policy year basis and historical data prior to 2012 does not exist by accident year. All amounts included in the tables below related to transactions denominated in a foreign currency have been translated into U.S. Dollars using the exchange rates in effect at December 31, 2018.

The difference between the segment loss development implied by the tables for the year ended December 31, 2018 and actual losses and loss adjustment expenses on prior accident years for the Insurance and Reinsurance segments for the year ended December 31, 2018 is primarily attributed to the fact that amounts presented in these tables exclude amounts attributed to the 2011 and prior accident years, exclude unallocated loss adjustment expenses and exclude amounts attributable to reserve discounting and fair value adjustments recorded in conjunction with acquisitions, as well as differences in the presentation of foreign currency movements, as described above.

The Insurance segment table below also includes claim frequency information, by accident year. The Company defines a claim as a single claim incident, per policy, which may include multiple claimants and multiple coverages on a single policy. Claim counts include claims closed without a payment as well as claims where the Company is monitoring to determine if an exposure exists, even if a reserve has not been established.

All of the business contained within the Company's Reinsurance segment represents treaty business that is assumed from other insurance or reinsurance companies, for which the Company does not have access to the underlying claim counts. Further, this business includes both quota share and excess of loss treaty reinsurance, through which only a portion of each reported claim results in losses to the Company. As such, the Company has excluded claim count information from the Reinsurance segment disclosures.

In 2013, the Company completed the acquisition of Alterra Capital Holdings Limited (Alterra), the results of which are included in both of the Company's reportable segments. Ultimate incurred losses and loss adjustment expenses, net of reinsurance as of December 31, 2013 include outstanding liabilities for losses and loss adjustment expenses of Alterra as of the acquisition date, by accident year, and not in any prior periods. Pre-acquisition data is not available by segment and accident year due in part to the impact of significant intercompany reinsurance contracts. Additionally, Alterra reserves were historically determined on a policy year basis and pre-acquisition data does not exist in a format that can be used to determine accident year. Following the acquisition, ongoing business attributable to Alterra was integrated with the Company's other insurance operations and is not separately tracked.

Insurance Segment

	Ultimate Incurred Losses and Allocated Loss Adjustment Expenses, Net of Reinsurance							Total of Incurred-but-Not-Reported Liabilities, Net of Reinsurance	Cumulative Number of Reported Claims
	Unaudited								
(in thousands)	As of December 31,								
Accident Year	2012	2013	2014	2015	2016	2017	2018	December 31, 2018	
2012	\$ 1,369,219	\$ 1,609,802	\$ 1,489,026	\$ 1,427,255	\$ 1,395,103	\$ 1,361,513	\$ 1,348,062	\$ 119,585	127
2013		1,735,667	1,694,879	1,525,750	1,462,652	1,428,733	1,387,804	200,744	87
2014			1,862,947	1,695,698	1,627,960	1,570,428	1,522,132	213,237	78
2015				1,783,064	1,710,271	1,585,447	1,530,354	291,364	84
2016					1,871,455	1,786,959	1,686,374	378,681	89
2017						2,326,966	2,160,771	691,736	116
2018							2,452,747	1,466,264	147
Total							\$ 12,088,244		

Cumulative Paid Losses and Allocated Loss Adjustment Expenses, Net of Reinsurance							
Accident Year	Unaudited						As of December 31,
	As of December 31,						
	2012	2013	2014	2015	2016	2017	
2012	\$ 233,371	\$ 567,450	\$ 780,067	\$ 937,643	\$ 1,052,859	\$ 1,117,221	\$ 1,150,793
2013		271,439	571,548	779,023	949,370	1,037,635	1,099,985
2014			331,626	657,742	894,470	1,062,211	1,167,598
2015				322,633	665,112	876,509	1,040,377
2016					372,182	752,606	981,920
2017						438,289	990,931
2018							496,812
Total							\$ 6,928,416
All outstanding liabilities for unpaid losses and loss adjustment expenses before 2012, net of reinsurance							605,610
Total liabilities for unpaid losses and loss adjustment expenses, net of reinsurance							\$ 5,765,438

Ultimate incurred losses and allocated loss adjustment expenses as of December 31, 2013 for the Insurance segment include \$256.4 million and \$313.3 million of losses and loss adjustment expenses on the 2012 and 2013 accident years, respectively, attributable to Alterra. Cumulative paid losses and allocated loss adjustment expenses as of December 31, 2013 include \$36.8 million and \$29.5 million of paid losses and allocated loss adjustment expenses on the 2012 and 2013 accident years, respectively, attributable to the acquired Alterra reserves and post-acquisition Alterra business. Cumulative paid losses and allocated loss adjustment expenses and cumulative reported claims for the 2012 and 2013 accident years exclude any claims paid or closed prior to the acquisition.

Variability in claim counts is primarily attributable to claim counts associated with a personal lines product with high claim frequency and low claim severity. Cumulative reported claims for the 2012, 2013, 2017 and 2018 accident years include 66 thousand , 17 thousand , 24 thousand and 46 thousand , respectively, of claim counts associated with this product. The Company did not write this business from 2014 to 2016. The related net incurred losses and allocated loss adjustment expenses are not material to the Insurance segment.

Reinsurance Segment

Ultimate Incurred Losses and Allocated Loss Adjustment Expenses, Net of Reinsurance								Total of Incurred-but-Not-Reported Liabilities, Net of Reinsurance	
(in thousands)	Unaudited								
	As of December 31,								As of December 31,
	2012	2013	2014	2015	2016	2017	2018		December 31, 2018
Accident Year									
2012	\$ 72,903	\$ 550,343	\$ 507,023	\$ 485,374	\$ 457,038	\$ 454,839	\$ 446,722	\$ 62,700	
2013		586,074	578,994	547,828	534,148	543,963	506,609	78,266	
2014			577,123	564,720	536,247	578,688	556,775	121,489	
2015				528,076	514,050	531,854	522,783	197,446	
2016					523,958	533,526	531,769	199,881	
2017						906,216	939,604	403,107	
2018							760,161	543,670	
Total							\$ 4,264,423		

Cumulative Paid Losses and Allocated Loss Adjustment Expenses, Net of Reinsurance							
Accident Year	Unaudited						As of December 31,
	As of December 31,						
	2012	2013	2014	2015	2016	2017	
2012	\$ 4,049	\$ 64,460	\$ 128,769	\$ 183,943	\$ 231,541	\$ 263,811	\$ 288,772
2013		71,503	155,515	209,893	268,761	301,714	331,630
2014			97,918	158,105	226,883	275,278	312,296
2015				63,924	133,932	207,985	259,366
2016					79,383	169,877	241,072
2017						158,049	359,659
2018							87,614
Total							\$ 1,880,409
All outstanding liabilities for unpaid losses and loss adjustment expenses before 2012, net of reinsurance							650,117
Total liabilities for unpaid losses and loss adjustment expenses, net of reinsurance							\$ 3,034,131

Ultimate incurred losses and allocated loss adjustment expenses as of December 31, 2013 for the Reinsurance segment include \$474.2 million and \$536.2 million of losses and loss adjustment expenses on the 2012 and 2013 accident years, respectively, attributable to Alterra. Cumulative paid losses and allocated loss adjustment expenses as of December 31, 2013 include \$52.6 million and \$68.9 million of paid losses and allocated loss adjustment expenses on the 2012 and 2013 accident years, respectively, attributable to the acquired Alterra reserves and post-acquisition Alterra business. Cumulative paid losses and allocated loss adjustment expenses for the 2012 and 2013 accident years exclude any claims paid prior to the acquisition.

The following table presents supplementary information about average historical claims duration as of December 31, 2018 based on the cumulative incurred and paid losses and allocated loss adjustment expenses presented above.

Unaudited	Average Annual Percentage Payout of Incurred Losses by Age (in Years), Net of Reinsurance						
	1	2	3	4	5	6	7
Insurance	20.3%	23.1%	14.7%	11.4%	7.3%	4.6%	2.5%
Reinsurance	12.6%	15.5%	13.0%	10.6%	7.9%	6.6%	5.6%

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The following table reconciles the net incurred and paid loss development tables to the liability for losses and loss adjustment expenses in the consolidated balance sheet.

<i>(dollars in thousands)</i>	December 31, 2018
Net outstanding liabilities	
Insurance segment	\$ 5,765,438
Reinsurance segment	3,034,131
Other	204,069
Program services	2,561
Liabilities for unpaid losses and loss adjustment expenses, net of reinsurance	9,006,199
Reinsurance recoverable on unpaid losses	
Insurance segment	1,965,565
Reinsurance segment	415,900
Other	166,505
Program services	2,514,066
Total reinsurance recoverable on unpaid losses	5,062,036
Unallocated loss adjustment expenses	239,753
Unamortized discount, net of acquisition fair value adjustments, included in unpaid losses and loss adjustment expenses	(31,509)
	208,244
Total gross liability for unpaid losses and loss adjustment expenses	\$ 14,276,479

c) The Company's exposure to asbestos and environmental (A&E) claims primarily results from policies written by acquired insurance operations before their acquisition by the Company. The Company's exposure to A&E claims originated from umbrella, excess and commercial general liability insurance policies and assumed reinsurance contracts that were written on an occurrence basis from the 1970s to mid-1980s. Exposure also originated from claims-made policies that were designed to cover environmental risks provided that all other terms and conditions of the policy were met. A&E claims include property damage and clean-up costs related to pollution, as well as personal injury allegedly arising from exposure to hazardous materials. Development on asbestos and environmental loss reserves is monitored separately from the Company's ongoing underwriting operations and are not included in a reportable segment.

The following table provides a reconciliation of beginning and ending A&E reserves for losses and loss adjustment expenses, which are a component of consolidated unpaid losses and loss adjustment expenses. Amounts included in the following table are presented before consideration of reinsurance allowances.

<i>(dollars in thousands)</i>	Years Ended December 31,		
	2018	2017	2016
Net reserves for A&E losses and loss adjustment expenses, beginning of year	\$ 104,661	\$ 111,604	\$ 132,869
Commutations and other	(305)	6,827	—
Adjusted net reserves for A&E losses and loss adjustment expenses, beginning of year	104,356	118,431	132,869
Incurred losses and loss adjustment expenses	—	659	(5,277)
Payments	(21,308)	(14,429)	(15,988)
Net reserves for A&E losses and loss adjustment expenses, end of year	83,048	104,661	111,604
Reinsurance recoverable on unpaid losses	164,663	169,866	212,300
Gross reserves for A&E losses and loss adjustment expenses, end of year	\$ 247,711	\$ 274,527	\$ 323,904

At December 31, 2018, asbestos-related reserves were \$188.3 million and \$63.4 million on a gross and net basis, respectively. Net reserves for reported claims for A&E exposures were \$74.4 million at December 31, 2018. Net incurred but not reported reserves for A&E exposures were \$8.7 million at December 31, 2018. Inception-to-date net paid losses and loss adjustment expenses for A&E related exposures totaled \$647.7 million at December 31, 2018.

The Company's reserves for losses and loss adjustment expenses related to A&E exposures represent management's best estimate of ultimate settlement values based on the Company's statistical analysis of these reserves, which is reviewed by the Company's independent actuaries. A&E exposures are subject to significant uncertainty due to potential loss severity and frequency resulting from the uncertain and unfavorable legal climate. A&E reserves could be subject to increases in the future; however, management believes the Company's gross and net A&E reserves at December 31, 2018 are adequate.

10 . Life and Annuity Benefits

The following table presents life and annuity benefits.

<i>(dollars in thousands)</i>	December 31,	
	2018	2017
Life	\$ 122,798	\$ 127,208
Annuities	827,773	885,984
Accident and health	50,882	58,920
Total	\$ 1,001,453	\$ 1,072,112

Life and annuity benefits are compiled on a reinsurance contract-by-contract basis and are discounted using standard actuarial techniques and cash flow models. Since the development of the life and annuity reinsurance reserves is based upon cash flow projection models, the Company must make estimates and assumptions based on cedent experience, industry mortality tables, and expense and investment experience, including a provision for adverse deviation. The assumptions used to determine policy benefit reserves are generally locked-in for the life of the contract unless an unlocking event occurs. Loss recognition testing is performed to determine if existing policy benefit reserves, together with the present value of future gross premiums and expected investment income earned thereon, are adequate to cover the present value of future benefits, settlement and maintenance costs. If the existing policy benefit reserves are not sufficient, the locked-in assumptions are revised to current best estimate assumptions and a charge to earnings for life and annuity benefits is recognized at that time.

Because of the assumptions and estimates used in establishing the Company's reserves for life and annuity benefit obligations and the long-term nature of these reinsurance contracts, the ultimate liability may be greater or less than the estimates. The average discount rate for the life and annuity benefit reserves was 2.3% as of December 31, 2018.

As of December 31, 2018, the largest life and annuity benefits reserve for a single contract was 33.1% of the total.

No annuities included in life and annuity benefits in the consolidated balance sheet are subject to discretionary withdrawal.

11 . Senior Long-Term Debt and Other Debt

The following table summarizes the Company's senior long-term debt and other debt.

<i>(dollars in thousands)</i>	December 31,	
	2018	2017
7.125% unsecured senior notes, due September 30, 2019, interest payable semi-annually, net of unamortized discount of \$142 in 2018 and \$332 in 2017	\$ 234,640	\$ 234,411
6.25% unsecured senior notes, due September 30, 2020, interest payable semi-annually, net of unamortized premium of \$17,213 in 2018 and \$26,618 in 2017	367,213	376,616
5.35% unsecured senior notes, due June 1, 2021, interest payable semi-annually, net of unamortized discount of \$499 in 2018 and \$706 in 2017	249,417	249,176
4.90% unsecured senior notes, due July 1, 2022, interest payable semi-annually, net of unamortized discount of \$978 in 2018 and \$1,257 in 2017	348,864	348,540
3.625% unsecured senior notes, due March 30, 2023, interest payable semi-annually, net of unamortized discount of \$855 in 2018 and \$1,056 in 2017	248,988	248,749
3.50% unsecured senior notes, due November 1, 2027, interest payable semi-annually, net of unamortized discount of \$2,298 in 2018 and \$2,558 in 2017	297,035	296,728
7.35% unsecured senior notes, due August 15, 2034, interest payable semi-annually, net of unamortized discount of \$1,074 in 2018 and \$1,143 in 2017	128,715	128,642
5.0% unsecured senior notes, due March 30, 2043, interest payable semi-annually, net of unamortized discount of \$5,431 in 2018 and \$5,655 in 2017	244,269	244,033
5.0% unsecured senior notes, due April 5, 2046, interest payable semi-annually, net of unamortized discount of \$6,664 in 2018 and \$6,909 in 2017	492,486	492,219
4.30% unsecured senior notes, due November 1, 2047, interest payable semi-annually, net of unamortized discount of \$4,278 in 2018 and \$4,451 in 2017	294,975	294,834
Other debt, at various interest rates ranging from 1.7% to 6.3%	102,975	185,282
Senior long-term debt and other debt	<u>\$ 3,009,577</u>	<u>\$ 3,099,230</u>

The Company's 6.25% unsecured senior notes were issued by Alterra Finance LLC, which is a wholly owned indirect subsidiary of the Company, and are guaranteed by Markel Corporation. All of the Company's other unsecured senior notes were issued by Markel Corporation. In April 2017, the Company repaid its 7.20% unsecured senior notes due April 14, 2017 (\$90.6 million principal outstanding at December 31, 2016). In 2018 and 2017, the Company repaid \$44.5 million and \$84.3 million , respectively, of debt assumed in connection with acquisitions.

In November 2017, the Company issued \$300 million of 3.50% unsecured notes due November 1, 2027 and \$300 million of 4.30% unsecured notes due November 1, 2047. Net proceeds to the Company were \$297.4 million and \$295.5 million , respectively, to be used for general corporate purposes.

In 2016, the Company issued \$500 million of 5.0% unsecured senior notes due April 5, 2046. Net proceeds to the Company were \$493.1 million . The Company used a portion of these proceeds to purchase \$70.2 million of principal on its 7.35% unsecured senior notes due 2034 and \$108.8 million of principal on its 7.125% unsecured senior notes due 2019 through a tender offer for a total purchase price of \$95.0 million and \$126.4 million , respectively. In connection with the purchase, the Company recognized a loss on early extinguishment of debt of \$44.1 million during the year ended December 31, 2016.

The Company's 7.35% unsecured senior notes due August 15, 2034 are not redeemable. The Company's other unsecured senior notes are redeemable by the Company at any time, subject to payment of a make-whole premium to the noteholders. None of the Company's senior long-term debt is subject to any sinking fund requirements.

The Company's other debt is primarily associated with its subsidiaries and includes \$78.1 million and \$78.3 million associated with its Markel Ventures subsidiaries as of December 31, 2018 and 2017 , respectively. The Markel Ventures debt is non-recourse to the holding company and generally is secured by the assets of those subsidiaries. ParkLand, a subsidiary of the Company, has formed subsidiaries for the purpose of acquiring and financing real estate (the real estate subsidiaries). The assets of certain real estate subsidiaries, which are not material to the Company, are consolidated in accordance with U.S. GAAP but are not available to satisfy the debt and other obligations of the Company or any affiliates other than those real estate subsidiaries. Other debt also includes a note payable of \$24.9 million and \$62.5 million at December 31, 2018 and 2017 , respectively, that was delivered as part of the consideration provided for the investment held by the Markel Diversified Fund, as discussed in note 16 .

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The estimated fair value of the Company's senior long-term debt and other debt was \$3.0 billion and \$3.4 billion at December 31, 2018 and 2017 , respectively.

The following table summarizes the future principal payments due at maturity on senior long-term debt and other debt as of December 31, 2018 .

<u>Years Ending December 31,</u>	<i>(dollars in thousands)</i>
2019	\$ 288,538
2020	356,585
2021	281,287
2022	356,315
2023	250,671
2024 and thereafter	1,484,896
Total principal payments	\$ 3,018,292
Net unamortized discount	(5,005)
Net unamortized debt issuance costs	(3,710)
Senior long-term debt and other debt	\$ 3,009,577

The Company maintains a revolving credit facility which provides \$300 million of capacity for future acquisitions, investments, repurchases of capital stock of the Company and for general corporate purposes. At the Company's discretion, \$200 million of the total capacity may be used for secured letters of credit. The Company may increase the capacity of the facility to \$500 million subject to certain terms and conditions. The Company pays interest on balances outstanding under the facility and a utilization fee for letters of credit issued under the facility. The Company also pays a commitment fee (0.25% at December 31, 2018) on the unused portion of the facility based on the Company's debt to equity leverage ratio as calculated under the credit agreement. Markel Corporation, along with Alterra Finance LLC and Alterra USA Holdings Limited, guaranteed the Company's obligations under the facility. As a result, the Company's revolving credit facility ranks equally with the 6.25% unsecured senior notes. At December 31, 2018 and 2017 , the Company had no borrowings outstanding under this revolving credit facility. This facility expires in August 2019.

On February 5, 2019, the Company amended the revolving credit facility to increase its leverage ratio covenant from " 0.375 to 1.00 " to " 0.40 to 1.00 " effective on and after December 31, 2018. This change addresses the impact to the consolidated net worth calculation under the facility from the purchase of Nephila in November 2018 and 2018 Catastrophe and investment losses that occurred in the fourth quarter of 2018. Under the facility, consolidated net worth serves as the denominator for the leverage ratio and excludes, among other things, the net worth associated with the Nephila acquisition. The change also provides additional flexibility through the maturity date of the facility on August 1, 2019 for unanticipated future developments, including additional catastrophe events, or greater than anticipated effects from known events.

At December 31, 2018 , the Company was in compliance with all covenants contained in its revolving credit facility as amended. To the extent that the Company is not in compliance with its covenants, the Company's access to the revolving credit facility could be restricted.

The Company paid \$155.4 million , \$141.3 million and \$135.4 million in interest on its senior long-term debt and other debt during the years ended December 31, 2018 , 2017 and 2016 , respectively.

12 . Shareholders' Equity

a) The Company had 50,000,000 shares of no par value common stock authorized of which 13,887,711 shares and 13,903,526 shares were issued and outstanding at December 31, 2018 and 2017 , respectively. The Company also has 10,000,000 shares of no par value preferred stock authorized, none of which was issued or outstanding at December 31, 2018 or 2017 .

In May 2018, the Company's Board of Directors approved a new share repurchase program (the 2018 Program) to replace the previous share repurchase program that was approved by the Board of Directors in November 2013 (the 2013 Program). The 2018 Program provides for the repurchase of up to \$300 million of common stock and has no expiration date but may be terminated by the Board of Directors at any time.

During the year ended December 31, 2018 , the Company repurchased an aggregate of 35,174 shares of common stock at a cost of \$39.0 million , including 15,509 shares repurchased under the 2013 Program at a cost of \$17.6 million , and 19,665 shares repurchased under the 2018 Program at a cost of \$21.4 million . In total, the Company repurchased 199,244 shares of common stock under the 2013 Program at a cost of \$175.6 million .

b) Net income per share was determined by dividing adjusted net income to shareholders by the applicable weighted average shares outstanding. Basic shares outstanding include restricted stock units that are no longer subject to any contingencies for issuance, but for which the corresponding shares have not been issued. Diluted net income per share is computed by dividing adjusted net income to shareholders by the weighted average number of common shares and dilutive potential common shares outstanding during the year. Average closing common stock market prices are used to calculate the dilutive effect attributable to restricted stock.

	Years Ended December 31,		
	2018	2017	2016
<i>(in thousands, except per share amounts)</i>			
Net income (loss) to shareholders ⁽¹⁾	\$ (128,180)	\$ 395,269	\$ 455,689
Adjustment of redeemable noncontrolling interests	(4,828)	(33,738)	(15,472)
Adjusted net income (loss) to shareholders	\$ (133,008)	\$ 361,531	\$ 440,217
Basic common shares outstanding	13,923	13,964	14,013
Dilutive potential common shares from options	—	1	4
Dilutive potential common shares from restricted stock units and restricted stock	—	41	61
Diluted shares outstanding	13,923	14,006	14,078
Basic net income (loss) per share	\$ (9.55)	\$ 25.89	\$ 31.41
Diluted net income (loss) per share ⁽²⁾	\$ (9.55)	\$ 25.81	\$ 31.27

(1) Effective January 1, 2018, the Company adopted ASU No. 2016-01 and equity securities are no longer classified as available-for-sale with unrealized gains and losses recognized in other comprehensive income, rather, changes in the fair value of equity securities are now recognized in net income. Prior periods have not been restated to conform to the current presentation. See note 1.

(2) The impact of restricted stock units and restricted stock of 25 thousand shares was excluded from the computation of diluted earnings per share for the year ended December 31, 2018 because the effect would have been anti-dilutive.

c) The Company's Employee Stock Purchase and Bonus Plan provides a method for employees and directors to purchase shares of the Company's common stock on the open market. The plan encourages share ownership by providing for the award of bonus shares to participants equal to 10% of the net increase in the number of shares owned under the plan in a given year, excluding shares acquired through the plan's loan program component. Under the loan program, the Company offers subsidized unsecured loans so participants may purchase shares and awards bonus shares equal to 5% of the shares purchased with a loan. In May 2016, the Company adopted the Markel Corporation 2016 Employee Stock Purchase and Bonus Plan which replaced the Company's prior employee stock purchase and bonus plan. No shares have been issued under the prior employee stock purchase and bonus plan since the effective date of the 2016 Employee Stock Purchase and Bonus Plan. The Company authorized 125,000 shares for purchase under the 2016 Employee Stock Purchase and Bonus Plan, of which 105,283 and 113,690 shares were available for purchase as of December 31, 2018 and 2017 , respectively. At December 31, 2018 and 2017 , loans outstanding under the plans, which are included in receivables on the consolidated balance sheets, totaled \$19.2 million and \$18.5 million , respectively.

d) In May 2016, the Company adopted the 2016 Equity Incentive Compensation Plan (2016 Compensation Plan), which replaced the 2012 Equity Incentive Compensation Plan (2012 Compensation Plan). The 2016 Compensation Plan provides for grants and awards of restricted stock, restricted stock units, performance grants, and other stock based awards to employees and non-employee directors and is administered by the Compensation Committee of the Company's Board of Directors (Compensation Committee). No share-based awards have been issued under the 2012 Compensation Plan after the effective date of the 2016 Compensation Plan. At December 31, 2018, there were 220,831 shares available for future awards under the 2016 Compensation Plan.

Restricted stock units are awarded to certain associates and executive officers based upon meeting performance conditions determined by the Compensation Committee. These awards generally vest at the end of the third year following the year for which the Compensation Committee determines performance conditions have been met. At the end of the vesting period, recipients are entitled to receive one share of the Company's common stock for each vested restricted stock unit. During 2018, the Company awarded 11,214 restricted stock units to associates and executive officers based on performance conditions being met.

Restricted stock units also are awarded to associates to assist the Company in securing or retaining the services of key employees. During 2018, the Company awarded 2,102 restricted stock units to associates as a hiring or retention incentive. These awards generally vest over a three -year period and entitle the recipient to receive one share of the Company's common stock for each vested restricted stock unit.

During 2018, the Company awarded 990 shares of restricted stock to its non-employee directors. The shares awarded to non-employee directors will vest in 2019.

The following table summarizes nonvested share-based awards.

	Number of Awards	Weighted Average Grant-Date Fair Value
Nonvested awards at January 1, 2018	31,518	\$ 808.63
Granted	14,306	1,121.68
Vested	(24,535)	779.65
Forfeited	(416)	914.94
Nonvested awards at December 31, 2018	20,873	\$ 1,042.83

The fair value of the Company's share-based awards granted under the 2012 Compensation Plan and 2016 Compensation Plan was determined based on the closing price of the Company's common shares on the grant date. The fair value of the Company's share-based awards issued under the Markel Corporation Omnibus Incentive Plan, which preceded the 2012 Compensation Plan, was determined based on the average price of the Company's common shares on the grant date. The weighted average grant-date fair value of the Company's share-based awards granted in 2018, 2017 and 2016 was \$1,121.68, \$979.23 and \$878.03, respectively. As of December 31, 2018, unrecognized compensation cost related to nonvested share-based awards was \$8.8 million, which is expected to be recognized over a weighted average period of 1.8 years. The fair value of the Company's share-based awards that vested during 2018, 2017 and 2016 was \$19.1 million, \$28.8 million and \$29.8 million, respectively.

13 . Other Comprehensive Income

Other comprehensive income includes net holding gains arising during the period, changes in unrealized other-than-temporary impairment losses on fixed maturities arising during the period and reclassification adjustments for net gains included in net income. Other comprehensive income also includes changes in foreign currency translation adjustments and changes in net actuarial pension loss.

The following table presents the change in accumulated other comprehensive income (loss) by component, net of taxes and noncontrolling interests.

<i>(dollars in thousands)</i>	Unrealized Holding Gains on Available-for- Sale Securities	Foreign Currency	Net Actuarial Pension Loss	Total
December 31, 2015	\$ 1,472,762	\$ (72,696)	\$ (45,558)	\$ 1,354,508
Other comprehensive income (loss) before reclassifications	275,696	(11,710)	(20,700)	243,286
Amounts reclassified from accumulated other comprehensive income	(33,528)	—	1,600	(31,928)
Total other comprehensive income (loss)	242,168	(11,710)	(19,100)	211,358
December 31, 2016	\$ 1,714,930	\$ (84,406)	\$ (64,658)	\$ 1,565,866
Other comprehensive income before reclassifications	787,339	10,403	3,092	800,834
Amounts reclassified from accumulated other comprehensive income	(24,296)	—	3,167	(21,129)
Total other comprehensive income	763,043	10,403	6,259	779,705
December 31, 2017	\$ 2,477,973	\$ (74,003)	\$ (58,399)	\$ 2,345,571
Cumulative effect of adoption of ASU No. 2016-01	(2,597,976)	2,492	—	(2,595,484)
Cumulative effect of adoption of ASU No. 2018-02	401,539	1,314	—	402,853
January 1, 2018	281,536	(70,197)	(58,399)	152,940
Other comprehensive loss before reclassifications	(241,325)	(16,455)	—	(257,780)
Amounts reclassified from accumulated other comprehensive income ⁽¹⁾	7,849	—	2,341	10,190
Total other comprehensive income (loss)	(233,476)	(16,455)	2,341	(247,590)
December 31, 2018	\$ 48,060	\$ (86,652)	\$ (56,058)	\$ (94,650)

- (1) Effective January 1, 2018, the Company adopted ASU No. 2016-01 and equity securities are no longer classified as available-for-sale with unrealized gains and losses recognized in other comprehensive income, rather, changes in the fair value of equity securities are now recognized in net income. Prior periods have not been restated to conform to the current presentation. See note 1.

The following table summarizes the tax expense (benefit) associated with each component of other comprehensive income (loss).

<i>(dollars in thousands)</i>	Years Ended December 31,		
	2018	2017	2016
Change in net unrealized gains on available-for-sale investments: ⁽¹⁾			
Net holding gains (losses) arising during the period	\$ (68,056)	\$ 372,469	\$ 112,399
Change in unrealized other-than-temporary impairment losses on fixed maturities arising during the period	—	—	6
Reclassification adjustments for net gains (losses) included in net income (loss)	2,086	(10,072)	(12,462)
Change in net unrealized gains on available-for-sale investments	(65,970)	362,397	99,943
Change in foreign currency translation adjustments	1,523	28	1,037
Change in net actuarial pension loss	622	1,284	(4,192)
Total	\$ (63,825)	\$ 363,709	\$ 96,788

- (1) Effective January 1, 2018, the Company adopted ASU No. 2016-01 and equity securities are no longer classified as available-for-sale with unrealized gains and losses recognized in other comprehensive income, rather, changes in the fair value of equity securities are now recognized in net income. Prior periods have not been restated to conform to the current presentation. See note 1.

The following table presents the details of amounts reclassified from accumulated other comprehensive income into income , by component.

<i>(dollars in thousands)</i>	Years Ended December 31,		
	2018	2017	2016
Unrealized holding gains on available-for-sale investments: ⁽¹⁾			
Other-than-temporary impairment losses	\$ —	\$ (7,589)	\$ (18,355)
Net realized investment gains (losses), excluding other-than-temporary impairment losses	(9,935)	41,957	64,345
Total before income taxes	(9,935)	34,368	45,990
Income taxes	2,086	(10,072)	(12,462)
Reclassification of unrealized holding gains, net of taxes	<u>\$ (7,849)</u>	<u>\$ 24,296</u>	<u>\$ 33,528</u>
Net actuarial pension loss:			
Underwriting, acquisition and insurance expenses	\$ (2,963)	\$ (3,815)	\$ (1,951)
Income taxes	622	648	351
Reclassification of net actuarial pension loss, net of taxes	<u>\$ (2,341)</u>	<u>\$ (3,167)</u>	<u>\$ (1,600)</u>

⁽¹⁾ Effective January 1, 2018, the Company adopted ASU No. 2016-01 and equity securities are no longer classified as available-for-sale with unrealized gains and losses recognized in other comprehensive income, rather, changes in the fair value of equity securities are now recognized in net income. Prior periods have not been restated to conform to the current presentation. See note 1.

14 . Fair Value Measurements

ASC 820, *Fair Value Measurements and Disclosures*, establishes a three-level hierarchy that prioritizes the inputs to valuation techniques used to measure fair value. 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). If the inputs used to measure the assets or liabilities fall within different levels of the hierarchy, the classification is based on the lowest level input that is significant to the fair value measurement of the asset or liability.

Classification of assets and liabilities within the hierarchy considers the markets in which the assets and liabilities are traded and the reliability and transparency of the assumptions used to determine fair value. The hierarchy requires the use of observable market data when available. The levels of the hierarchy are defined as follows:

Level 1 - Inputs to the valuation methodology are quoted prices (unadjusted) for identical assets or liabilities traded in active markets.

Level 2 - Inputs to the valuation methodology include quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active, inputs other than quoted prices that are observable for the asset or liability and market-corroborated inputs.

Level 3 - Inputs to the valuation methodology are unobservable for the asset or liability and are significant to the fair value measurement.

In accordance with ASC 820, the Company determines fair value based on the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. In determining fair value, the Company uses various methods, including the market, income and cost approaches. The Company uses valuation techniques that maximize the use of observable inputs and minimize the use of unobservable inputs. The following section describes the valuation methodologies used by the Company to measure assets and liabilities at fair value, including an indication of the level within the fair value hierarchy in which each asset or liability is generally classified.

Investments available-for-sale and equity securities. Equity securities and available-for-sale investments are recorded at fair value on a recurring basis. Available-for-sale investments include fixed maturities and short-term investments. Short-term investments include certificates of deposit, commercial paper, discount notes and treasury bills with original maturities of one year or less. Fair value for investments available-for-sale and equity securities are determined by the Company after considering various sources of information, including information provided by a third party pricing service. The pricing service provides prices for substantially all of the Company's fixed maturities and equity securities. In determining fair value, the Company generally does not adjust the prices obtained from the pricing service. The Company obtains an understanding of the pricing service's valuation methodologies and related inputs, which include, but are not limited to, reported trades, benchmark yields, issuer spreads, bids, offers, duration, credit ratings, estimated cash flows and prepayment speeds. The Company validates prices provided by the pricing service by reviewing prices from other pricing sources and analyzing pricing data in certain instances.

The Company has evaluated the various types of securities in its investment portfolio to determine an appropriate fair value hierarchy level based upon trading activity and the observability of market inputs. Level 1 investments include those traded on an active exchange, such as the New York Stock Exchange. Level 2 investments include U.S. Treasury securities, U.S. government-sponsored enterprises, municipal bonds, foreign government bonds, commercial mortgage-backed securities, residential mortgage-backed securities, asset-backed securities and corporate debt securities. Level 3 investments include the Company's investments in certain insurance-linked securities funds managed by MCIM that are not traded on an active exchange, as further described and defined in note 16 (the Markel CATCo Funds), and are valued using unobservable inputs.

Fair value for investments available-for-sale and equity securities is measured based upon quoted prices in active markets, if available. Due to variations in trading volumes and the lack of quoted market prices, fixed maturities are classified as Level 2 investments. The fair value of fixed maturities is normally derived through recent reported trades for identical or similar securities, making adjustments through the reporting date based upon available market observable data described above. If there are no recent reported trades, the fair value of fixed maturities may be derived through the use of matrix pricing or model processes, where future cash flow expectations are developed based upon collateral performance and discounted at an estimated market rate. Significant inputs used to determine the fair value of obligations of states, municipalities and political subdivisions, corporate bonds and obligations of foreign governments include reported trades, benchmark yields, issuer spreads, bids, offers, credit information and estimated cash flows. Significant inputs used to determine the fair value of commercial mortgage-backed securities, residential mortgage-backed securities and asset-backed securities include the type of underlying assets, benchmark yields, prepayment speeds, collateral information, tranche type and volatility, estimated cash flows, credit information, default rates, recovery rates, issuer spreads and the year of issue.

Due to the significance of unobservable inputs required in measuring the fair value of the Company's investments in the Markel CATCo Funds, these investments are classified as Level 3 within the fair value hierarchy. The fair value of the securities are derived using their reported net asset value (NAV) as the primary input, as well as other observable and unobservable inputs as deemed necessary by management. Management has obtained an understanding of the inputs, assumptions, process, and controls used to determine NAV, which is calculated by an independent third party. Unobservable inputs to the NAV calculations include assumptions around premium earnings patterns and loss reserve estimates for the underlying securitized reinsurance contracts in which the Markel CATCo Funds invest. Significant unobservable inputs used in the valuation of these investments include an adjustment to include the fair value of the equity that was issued by one of the Markel CATCo Funds in exchange for notes receivable, rather than cash, which is excluded from NAV. The determination of fair value of the securities also considers external market data, including the trading price relative to its NAV of CATCo Reinsurance Opportunities Fund Ltd. (CROF), a comparable security traded on a market operated by the London Stock Exchange and on the Bermuda Stock Exchange further described in note 16. Generally, the Company's investments in the Markel CATCo Funds are redeemable annually as of January 1st of each calendar year. However, in years with significant loss events on the underlying securitized reinsurance contracts, as was the case in 2018 and 2017, certain investments may be restricted from redemption for up to three years.

The Company's valuation policies and procedures for Level 3 investments are determined by management. Fair value measurements are analyzed quarterly to ensure the change in fair value from prior periods is reasonable relative to management's understanding of the underlying investments, recent market trends and external market data.

Senior long-term debt and other debt. Senior long-term debt and other debt is carried at amortized cost with the estimated fair value disclosed on the consolidated balance sheets. Senior long-term debt and other debt is classified as Level 2 within the fair value hierarchy due to variations in trading volumes and the lack of quoted market prices. Fair value for senior long-term debt and other debt is generally derived through recent reported trades for identical securities, making adjustments through the reporting date, if necessary, based upon available market observable data including U.S. Treasury securities and implied credit spreads. Significant inputs used to determine the fair value of senior long-term debt and other debt include reported trades, benchmark yields, issuer spreads, bids and offers.

The following tables present the balances of assets measured at fair value on a recurring basis by level within the fair value hierarchy.

<i>(dollars in thousands)</i>	December 31, 2018			
	Level 1	Level 2	Level 3	Total
Assets:				
Investments:				
Fixed maturities, available-for-sale:				
U.S. Treasury securities	\$ —	\$ 246,642	\$ —	\$ 246,642
U.S. government-sponsored enterprises	—	359,322	—	359,322
Obligations of states, municipalities and political subdivisions	—	4,352,930	—	4,352,930
Foreign governments	—	1,559,604	—	1,559,604
Commercial mortgage-backed securities	—	1,650,199	—	1,650,199
Residential mortgage-backed securities	—	880,172	—	880,172
Asset-backed securities	—	19,408	—	19,408
Corporate bonds	—	974,911	—	974,911
Total fixed maturities, available-for-sale	—	10,043,188	—	10,043,188
Equity securities:				
Insurance, banks and other financial institutions	1,876,811	—	53,728	1,930,539
Industrial, consumer and all other	3,790,406	—	—	3,790,406
Total equity securities	5,667,217	—	53,728	5,720,945
Short-term investments, available-for-sale	981,616	96,080	—	1,077,696
Total investments	\$ 6,648,833	\$ 10,139,268	\$ 53,728	\$ 16,841,829

<i>(dollars in thousands)</i>	December 31, 2017			
	Level 1	Level 2	Level 3	Total
Assets:				
Investments available-for-sale:				
Fixed maturities:				
U.S. Treasury securities	\$ —	\$ 160,613	\$ —	\$ 160,613
U.S. government-sponsored enterprises	—	363,520	—	363,520
Obligations of states, municipalities and political subdivisions	—	4,566,562	—	4,566,562
Foreign governments	—	1,489,228	—	1,489,228
Commercial mortgage-backed securities	—	1,234,326	—	1,234,326
Residential mortgage-backed securities	—	856,168	—	856,168
Asset-backed securities	—	34,728	—	34,728
Corporate bonds	—	1,235,525	—	1,235,525
Total fixed maturities	—	9,940,670	—	9,940,670
Equity securities: ⁽¹⁾				
Insurance, banks and other financial institutions	1,934,224	—	168,809	2,103,033
Industrial, consumer and all other	3,864,814	—	—	3,864,814
Total equity securities	5,799,038	—	168,809	5,967,847
Short-term investments	2,065,749	95,225	—	2,160,974
Total investments available-for-sale ⁽¹⁾	\$ 7,864,787	\$ 10,035,895	\$ 168,809	\$ 18,069,491

⁽¹⁾ Effective January 1, 2018, the Company adopted ASU No. 2016-01 and equity securities are no longer classified as available-for-sale. Prior periods have not been restated to conform to the current presentation. See note 1.

The following table summarizes changes in Level 3 investments measured at fair value on a recurring basis.

<i>(dollars in thousands)</i>	2018	2017
Equity securities, beginning of period	\$ 168,809	\$ 191,203
Purchases	28,900	56,250
Sales	(35,335)	(26,674)
Net investment losses on Level 3 investments ⁽¹⁾	(108,646)	(51,970)
Transfers into Level 3	—	—
Transfers out of Level 3	—	—
Equity securities, end of period	\$ 53,728	\$ 168,809

⁽¹⁾ Included in change in fair value of equity securities in the consolidated statements of income (loss) and comprehensive income (loss) for the years ended December 31, 2018 and 2017.

Net investment losses related to the Company's investments in the Markel CATCo Funds primarily resulted from decreases in the NAV of these funds in both 2018 and 2017.

The Company also holds an investment in CROF which is a Level 1 investment included in equity securities on the Company's consolidated balance sheets. CROF is managed by MCIM and invests substantially all of its assets in one of the unconsolidated Markel CATCo Funds. Net investment losses in 2018 also included a loss of \$16.0 million related to the Company's investment in CROF. In 2017, the Company's investment in CROF was considered an available-for-sale security, with changes in fair value included in other comprehensive income. Other comprehensive income for 2017 included a loss of \$5.8 million attributable to the Company's investment in CROF. At December 31, 2018 and 2017, the fair value of the Company's investment in CROF was \$4.5 million and \$20.5 million, respectively.

There were no transfers into or out of Level 1 and Level 2 during 2018 or 2017.

Except as disclosed in note 2, the Company did not have any assets or liabilities measured at fair value on a non-recurring basis during the years ended December 31, 2018 and 2017.

15. Reinsurance

In reinsurance and retrocession transactions, an insurance or reinsurance company transfers, or cedes, all or part of its exposure in return for a portion of the premium. The ceding of insurance does not legally discharge the Company from its primary liability for the full amount of the policies, and the Company will be required to pay the loss and bear collection risk if the reinsurer fails to meet its obligations under the reinsurance or retrocessional agreement. A credit risk exists with ceded reinsurance to the extent that any reinsurer is unable to meet the obligations assumed under the reinsurance or retrocessional contracts. Allowances are established for amounts deemed uncollectible.

Within its underwriting operations, the Company uses reinsurance and retrocessional reinsurance to manage its net retention on individual risks and overall exposure to losses while providing it with the ability to offer policies with sufficient limits to meet policyholder needs. The Company evaluates the financial condition of its reinsurers and monitors concentration of credit risk arising from its exposure to individual reinsurers. To further reduce credit exposure to reinsurance recoverable balances, the Company has received collateral, including letters of credit and trust accounts, from certain reinsurers. Collateral related to these reinsurance agreements is available, without restriction, when the Company pays losses covered by the reinsurance agreements.

Within the Company's underwriting operations, at both December 31, 2018 and 2017, balances recoverable from the ten largest reinsurers, by group, represented 61% of the reinsurance recoverable on paid and unpaid losses, before considering reinsurance allowances and collateral. At December 31, 2018, the largest reinsurance balance was due from Fairfax Financial Group and represented 9% of the reinsurance recoverable on paid and unpaid losses, before considering reinsurance allowances and collateral.

Within the Company's program services business, acquired as a part of the State National acquisition in November 2017, the Company generally enters into 100% quota share reinsurance agreements whereby the Company cedes to the capacity provider (reinsurer) substantially all of its gross liability under all policies issued by and on behalf of the Company by the general agent. The Company remains exposed to the credit risk of the reinsurer, or the risk that one of its reinsurers becomes insolvent or otherwise unable or unwilling to pay policyholder claims. This credit risk is generally mitigated by either selecting well capitalized, highly rated authorized capacity providers or requiring that the capacity provider post substantial collateral to secure the reinsured risks.

Within the Company's program services business, at December 31, 2018 and 2017, balances recoverable from the ten largest reinsurers, by group, represented 75% and 79% , respectively, of the reinsurance recoverable on paid and unpaid losses, before considering reinsurance allowances and collateral. At December 31, 2018 , the largest reinsurance balance was due from Fosun International Holdings Ltd. and represented 24% of the reinsurance recoverable on paid and unpaid losses, before considering reinsurance allowances and collateral.

The following tables summarize the effect of reinsurance and retrocessional reinsurance on premiums written and earned.

<i>(dollars in thousands)</i>	Year Ended December 31,			
	2018			
	Direct	Assumed	Ceded	Net Premiums
Underwriting:				
Written	\$ 4,562,256	\$ 1,236,740	\$ (1,013,406)	\$ 4,785,590
Earned	\$ 4,384,562	\$ 1,291,032	\$ (964,549)	\$ 4,711,045
Program services:				
Written	2,022,548	42,925	(2,063,485)	1,988
Earned	1,850,656	28,581	(1,878,222)	1,015
Consolidated:				
Written	\$ 6,584,804	\$ 1,279,665	\$ (3,076,891)	\$ 4,787,578
Earned	\$ 6,235,218	\$ 1,319,613	\$ (2,842,771)	\$ 4,712,060

<i>(dollars in thousands)</i>	Year Ended December 31,			
	2017			
	Direct	Assumed	Ceded	Net Premiums
Underwriting:				
Written	\$ 3,919,602	\$ 1,333,505	\$ (835,320)	\$ 4,417,787
Earned	\$ 3,777,335	\$ 1,286,043	\$ (815,400)	\$ 4,247,978
Program services:				
Written	252,865	988	(253,853)	—
Earned	291,287	1,352	(292,639)	—
Consolidated:				
Written	\$ 4,172,467	\$ 1,334,493	\$ (1,089,173)	\$ 4,417,787
Earned	\$ 4,068,622	\$ 1,287,395	\$ (1,108,039)	\$ 4,247,978

(dollars in thousands)	Year Ended December 31,			
	2016			
	Direct	Assumed	Ceded	Net Premiums
Underwriting:				
Written	\$ 3,560,635	\$ 1,236,010	\$ (795,625)	\$ 4,001,020
Earned	\$ 3,506,687	\$ 1,176,205	\$ (817,022)	\$ 3,865,870
Program services:				
Written	—	—	—	—
Earned	—	—	—	—
Consolidated:				
Written	\$ 3,560,635	\$ 1,236,010	\$ (795,625)	\$ 4,001,020
Earned	\$ 3,506,687	\$ 1,176,205	\$ (817,022)	\$ 3,865,870

Substantially all of the premium written and earned in the Company's program services business for the year ended December 31, 2018 and 2017 was ceded. The percentage of consolidated ceded earned premiums to gross earned premiums was 38% , 21% and 17% for the years ended December 31, 2018 , 2017 and 2016 , respectively. The percentage of consolidated assumed earned premiums to net earned premiums was 28% , 30% and 30% for the years ended December 31, 2018 , 2017 and 2016 , respectively.

Substantially all of the incurred losses and loss adjustment expenses in the Company's program services business, which totaled \$1.3 billion , were ceded. Incurred losses and loss adjustment expenses for the Company's underwriting operations were net of ceded incurred losses and loss adjustment expenses of \$710.5 million , \$856.8 million and \$362.0 million for the years ended December 31, 2018 , 2017 and 2016 , respectively. The estimated net losses and loss adjustment expenses on the 2018 and 2017 Catastrophes were net of estimated ceded losses of \$244.1 million and \$490.3 million , respectively.

16 . Variable Interest Entities

MCIM, a wholly-owned consolidated subsidiary of the Company, is an insurance-linked securities investment fund manager and reinsurance manager headquartered in Bermuda. Results attributable to MCIM are not included in a reportable segment.

MCIM serves as the insurance manager for Markel CATCo Re, a Bermuda Class 3 reinsurance company, and as the investment manager for Markel CATCo Reinsurance Fund Ltd., a Bermuda exempted mutual fund company comprised of multiple segregated accounts (Markel CATCo Funds). MCIM also serves as the investment manager to CATCo Reinsurance Opportunities Fund Ltd. (CROF), a limited liability closed-end Bermuda exempted mutual fund company which invests substantially all of its assets in Markel CATCo Reinsurance Fund Ltd. The Markel CATCo Funds issue multiple classes of nonvoting, redeemable preference shares to investors and the Markel CATCo Funds are primarily invested in nonvoting preference shares of Markel CATCo Re. The underwriting results of Markel CATCo Re are attributed to the Markel CATCo Funds through those nonvoting preference shares.

The Markel CATCo Funds and Markel CATCo Re are considered VIEs, as their preference shareholders have no voting rights. MCIM has the power to direct the activities that most significantly impact the economic performance of these entities, but does not have a variable interest in any of the entities. Except as described below, the Company is not the primary beneficiary of the Markel CATCo Funds or Markel CATCo Re, and therefore does not consolidate these entities, as the Company's involvement is generally limited to that of an investment or insurance manager, receiving fees that are at market and commensurate with the level of effort required. Investment management and incentive fees earned by the Company from unconsolidated Markel CATCo Funds were \$66.2 million , \$28.7 million and \$56.5 million for the years ended December 31, 2018 , 2017 and 2016 , respectively. The Company is the sole investor in one of the Markel CATCo Funds, the Marke l Diversified Fund, and consolidates that fund as its primary beneficiary.

The following table presents the assets and liabilities of the Markel Diversified Fund, which are included in the Company's consolidated balance sheet.

<i>(dollars in thousands)</i>	December 31,	
	2018	2017
Assets		
Equity securities: Investment in unconsolidated Markel CATCo Fund	\$ 27,547	\$ 168,192
Other	1,082	2,059
Total Assets	\$ 28,629	\$ 170,251
Liabilities		
Note payable	\$ 24,875	\$ 62,500
Other	200	168
Total Liabilities	\$ 25,075	\$ 62,668

The assets of the Markel Diversified Fund are available for use only by the Markel Diversified Fund, and are not available for use by the Company. Equity securities for the Markel Diversified Fund represent an investment in one of the unconsolidated Markel CATCo Funds, and represents 2% of the outstanding preference shares of that fund as of December 31, 2018 and 7% as of December 31, 2017. The note payable was delivered as part of the consideration provided for the Markel Diversified Fund's investment in the unconsolidated Fund. This note payable is included in senior long-term debt and other debt on the Company's consolidated balance sheets. Other than the note payable, any liabilities held by the Markel Diversified Fund have no recourse to the Company's general credit.

During 2018, the Company also made an investment in another one of the Markel CATCo Funds (\$26.2 million as of December 31, 2018) but does not have the obligation to absorb losses or the right to receive benefits from the VIE that could potentially be significant to the VIE, and therefore does not consolidate that fund.

The Company also holds an investment in CROF, which is not a VIE. See note 14.

As of December 31, 2018, the Company's exposure to risk from the unconsolidated Markel CATCo Funds and Markel CATCo Re is generally limited to its investment and any earned but uncollected fees. See note 17 for details regarding reinsurance contracts entered into in 2019 by the Company on behalf of Markel CATCo Re. The Company has not issued any investment performance guarantees to these VIEs or their investors. As of December 31, 2018, net assets under management of MCIM for unconsolidated VIEs were \$3.4 billion.

17. Related Party Transactions

The Company engages in certain related party transactions in the normal course of business at arm's length. Details of the Company's transactions with related parties in its investment management operations are included below.

Nephila

In November 2018, the Company expanded its investment management operations through the acquisition of Nephila, which serves as the investment manager to several Bermuda, Ireland and U.S. based private funds (the Nephila Funds). To provide access for the Nephila Funds to the insurance, reinsurance and weather markets, Nephila also acts as an insurance manager to certain Bermuda Class 3 and 3A reinsurance companies and as both a service company coverholder and agent with binding authority for Lloyd's Syndicate 2357 (Syndicate 2357) (collectively, the Nephila Reinsurers). Nephila receives management fees for its investment and insurance management services from these unconsolidated affiliates based on the net asset value of the accounts managed, and for certain funds, incentive fees based on the annual performance of the funds it manages. Total revenues attributed to the management contracts with the Nephila Funds and the Nephila Reinsurers from the acquisition date to December 31, 2018 were \$24.4 million.

Within the Company's program services business, the Company has a program with Nephila and Lloyd's Syndicate 2357 (Syndicate 2357), one of its unconsolidated affiliates, through which the Company writes insurance policies that are ceded to Syndicate 2357. Through this arrangement, Nephila has the exclusive right, through 2019, to utilize certain of the Company's licensed insurance companies to write U.S. catastrophe exposed property risk that will then be ceded to Syndicate 2357. For the year ended December 31, 2018, gross premiums written on the Company's program with Nephila were \$322.1 million, all of which was ceded to Syndicate 2357. As of December 31, 2018, reinsurance recoverables on the consolidated balance sheet included \$179.8 million due from Syndicate 2357.

Under this program, the Company also bears underwriting risk for annual aggregate agreement year losses in excess of a limit the Company believes is highly unlikely to be exceeded. To the extent losses under this program exceed the prescribed limit, the Company is obligated to pay such losses to the cedents without recourse to Syndicate 2357. While the Company believes losses under this program are highly unlikely, those losses, if incurred, could be material to the Company's consolidated results of operations and financial condition.

Markel CATCo

Within the Company's reinsurance operations, the Company enters into reinsurance contracts that are ceded to Markel CATCo Re, an unconsolidated subsidiary. Under this program, the Company retains underwriting risk for annual aggregate agreement year losses in excess of a limit the Company believes is highly unlikely to be exceeded. To the extent losses under this program exceed the prescribed limit, the Company is obligated to pay such losses to the cedents without recourse to Markel CATCo Re. For the years ended December 31, 2018, 2017 and 2016, gross premiums written on behalf of Markel CATCo Re were \$10.9 million, \$9.7 million and \$6.7 million, respectively.

In early 2019, the Company committed to enter into various reinsurance contracts with third parties on behalf of Markel CATCo Re. These reinsurance contracts will primarily cover losses for events that may occur during 2019, however, in some instances, coverage will also provide for adverse development on 2018 and prior accident years' loss events. Incurred losses on these contracts will be fully ceded to Markel CATCo Re. The loss exposures on these contracts will be fully collateralized by Markel CATCo Re up to an amount that the Company believes is highly unlikely to be exceeded. The Company will have credit risk from Markel CATCo Re for any uncollateralized amounts. Markel CATCo Re's ability to pay losses in excess of the collateralized amounts will depend on the availability of funds that are not otherwise needed to pay losses on other contracts. The Company's maximum exposure to loss on these contracts, representing the net uncollateralized risks, is not expected to exceed \$250 million in 2019.

See note 16 for details of the Company's other transactions with Markel CATCo Re and the Markel CATCo Funds.

18. Commitments and Contingencies

- a) The Company leases substantially all of its facilities and certain furniture and equipment under noncancelable operating leases with remaining terms up to 16 years.

The following table summarizes the Company's minimum annual rental commitments, excluding taxes, insurance and other operating costs payable directly by the Company, for noncancelable operating leases at December 31, 2018.

<u>Years Ending December 31,</u>	<i>(dollars in thousands)</i>
2019	\$ 48,853
2020	41,630
2021	37,602
2022	31,898
2023	28,261
2024 and thereafter	117,663
Total	<u>\$ 305,907</u>

Rental expense was \$52.9 million, \$44.6 million and \$40.2 million for the years ended December 31, 2018, 2017 and 2016, respectively.

b) Late in the fourth quarter of 2018, the Company was contacted by and received inquiries from the U.S. Department of Justice, U.S. Securities and Exchange Commission and Bermuda Monetary Authority (BMA) into loss reserves recorded in late 2017 and early 2018 at Markel CATCo Re (the Markel CATCo Inquiries), an unconsolidated subsidiary managed by MCIM. As a result, the Company engaged outside counsel to conduct an internal review, through which the Company discovered violations of Markel policies by two senior executives of MCIM that existed as of December 31, 2018. As a result, these two executives are no longer with the Company (the MCIM Executive Departures).

As of December 31, 2017, the Company had accrued incentive and retention compensation for the two executives totaling \$34.9 million which remained unpaid as of December 31, 2018. This amount was reversed in the fourth quarter of 2018 and reflected as a reduction to services and other expenses. All accruals for retention and incentive compensation recorded earlier in 2018 for the two executives were also reversed in the fourth quarter of 2018. In conjunction with the Markel CATCo acquisition in December 2015, certain incentive and retention compensation arrangements were established for employees of MCIM, a portion of which was based on expected management fees over the three year period following the acquisition. The Company's initial estimate of the amounts payable under the incentive and retention compensation arrangements totaled \$100 million, portions of which were paid in 2016, 2017 and 2018. After considering the reversal of accruals described above, the Company's total expected payments under these arrangements across all years is \$52.9 million. As of December 31, 2018, accrued and unpaid incentive and retention expense for other employees of MCIM totaled \$19.2 million, of which \$12.3 million was expensed during the year ended December 31, 2018. Compensation expense for the years ended December 31, 2017 and 2016 included \$38.1 million and \$33.2 million, respectively, for these incentive and retention compensation arrangements.

In light of the governmental inquiries into loss reserves at Markel CATCo Re, and taking into consideration the departure of two senior MCIM executives and special redemption rights that are now being offered to investors in the Markel CATCo Funds, as described below, management concluded MCIM's ability to maintain or raise capital has been adversely impacted. Following an assessment of the recoverability of goodwill and intangible assets at the MCIM reporting unit as of December 31, 2018, the Company reduced the carrying value of the goodwill and intangible assets of the MCIM reporting unit to zero, which resulted in a goodwill impairment charge of \$91.9 million and an intangible asset impairment charge of \$87.1 million. See note 7 for further details around these impairment charges.

In December 2018, investors in the Markel CATCo Funds were offered an additional redemption opportunity (the Special Redemption). Under the Special Redemption, investors in the Markel CATCo Funds may elect to redeem any or all shares held as of June 30, 2019, with the exception of (1) shares that have been restricted following the occurrence of catastrophic loss events for which uncertainty still exists around the ultimate incurred losses on the underlying reinsurance contracts at Markel CATCo Re and (2) shares that support insurance contracts that are still exposed to future underwriting risk. Investors may elect to redeem these restricted shares, however, such amounts will not be paid until all remaining exposures are fully settled or released by cedents, which could take up to four years. Payment for the redemptions of shares is an obligation of the Markel CATCo Funds, not Markel Corporation or its subsidiaries.

On January 11, 2019, a putative class action lawsuit captioned *Bergen v. Markel Corporation, et al.*, was filed naming Markel Corporation and certain present or former officers as defendants (the Bergen Suit). The lawsuit alleges violations of the federal securities laws relating to the pending governmental inquiries into Markel CATCo Re loss reserves. The plaintiff in this matter seeks to represent a class of persons or entities that purchased Markel Corporation securities between July 26, 2017 and December 6, 2018. The Company believes that the claims against it are without merit. The Company further believes any material loss resulting from the suit to be remote.

On February 21, 2019, Anthony Belisle and Alissa Fredricks, the two senior executives who are no longer with MCIM, each separately filed suit against MCIM and Markel Corporation, alleging, among other claims, breach of contract, defamation and invasion of privacy (the MCIM Executive Suits). Mr. Belisle's complaint seeks relief including payment of \$66.0 million in incentive compensation and Ms. Fredricks's complaint seeks relief including payment of \$7.5 million in incentive compensation. In addition, both seek consequential damages, damages for emotional distress and injury to reputation, statutory interest and attorneys' fees. Mr. Belisle's complaint further seeks enhanced compensatory damages. The Company believes that all claims are without merit. The Company further believes any material loss resulting from the suits to be remote.

The Company's internal review relating to the governmental inquiries is ongoing with no conclusions reached at this time. The Markel CATCo Inquiries, Bergen Suit, MCIM Executive Departures and MCIM Executive Suits, as well as other related matters of which the Company is currently unaware, could result in additional claims, litigation, investigations, enforcement actions or proceedings. For example, additional litigation may be filed by investors in the Markel CATCo Funds. The Company also could become subject to increased regulatory scrutiny, investigations or proceedings in any of the jurisdictions where it operates. If any regulatory authority takes action against the Company or the Company enters into an agreement to settle a matter, the Company may incur sanctions or be required to pay substantial fines or implement remedial measures that could prove costly or disruptive to its businesses and operations.

An unfavorable outcome in one or more of these matters, and others the Company cannot anticipate, could have a material adverse effect on the Company's results of operations and financial condition. In addition, the Company may take further steps to support the Markel CATCo operations, including steps to mitigate potential risks or liabilities that may arise from the Markel CATCo Inquiries and related developments and some of those steps may have a material impact on the Company's results of operations or financial condition. Even if an unfavorable outcome does not materialize, these matters, and actions the Company may take in response, could have an adverse impact on the Company's reputation and result in substantial expense and disruption.

Additionally, revenues for MCIM for 2019 and beyond will be adversely impacted by its inability to maintain or raise new capital. Costs associated with the Company's internal review, including legal and investigation costs, as well as legal costs incurred in connection with any existing or future litigation, will be expensed as incurred.

c) The Company has reviewed events at one of its Markel Ventures products businesses. Since becoming aware of a matter in the first quarter of 2018 related to the business's manufacture of products, the Company has conducted an investigation, reviewed the business's operations and developed remediation plans. Upon completion of its review during the second quarter of 2018, the Company recorded an expense of \$33.5 million in its results of operations. This amount represented management's best estimate of amounts considered probable including: remediation costs associated with the manufacture of products, costs associated with the investigation of this matter, a write down of inventory on hand and settlement costs related to pre-existing litigation. The Company also recorded an impairment charge of \$14.9 million during 2018 which reduced the carrying value of intangible assets at this reporting unit to zero .

Final resolution of this matter could ultimately result in additional remediation and other costs, the amount of which cannot be estimated at this time, but which could have a material impact on the Company's income before income taxes. However, management does not expect this matter ultimately will have a material adverse effect on the Company's results of operations or financial condition. If a determination is made that additional costs associated with this matter are considered probable, these additional costs will be recognized as an expense in the Company's results of operations. As of December 31, 2018, \$33.5 million remained accrued for remediation efforts which are continuing into 2019.

In addition, contingencies arise in the normal course of the Company's operations and are not expected to have a material impact on the Company's financial condition or results of operations.

19 . Statutory Financial Information

a) Statutory capital and surplus and statutory net income (loss) for the Company's insurance subsidiaries as of December 31, 2018 and 2017 and for the years ended December 31, 2018 , 2017 and 2016 , respectively, is summarized below.

Statutory Capital and Surplus

<i>(dollars in thousands)</i>	December 31,	
	2018	2017
United States	\$ 3,158,828	\$ 3,424,330
United Kingdom	\$ 621,802	\$ 642,418
Bermuda	\$ 1,495,563	\$ 1,779,387
Other	\$ 74,704	\$ 34,002

As of December 31, 2018 , the Company's actual statutory capital and surplus significantly exceeded the regulatory requirements. As a result, the amount of statutory capital and surplus necessary to satisfy regulatory requirements is not significant in relation to actual statutory capital and surplus.

Statutory Net Income (Loss)

<i>(dollars in thousands)</i>	Years Ended December 31,		
	2018	2017	2016
United States	\$ 414,957	\$ 312,828	\$ 249,176
United Kingdom	\$ 40,203	\$ (25,785)	\$ 78,033
Bermuda	\$ (131,411)	\$ (78,070)	\$ 132,442
Other	\$ (5,193)	\$ (4,812)	\$ (965)

The Solvency II Directive that governs the calculation of statutory capital and surplus for the Company's U.K. and German insurance subsidiaries does not provide requirements for the calculation of net income. Amounts presented in the table above for the Company's U.K. and German insurance subsidiaries, in which the amount attributable to Germany is included in Other, have been calculated in accordance with U.K. and German GAAP, respectively.

United States

The laws of the domicile states of the Company's U.S. insurance subsidiaries govern the amount of dividends that may be paid to the Company. Generally, statutes in the domicile states of the Company's U.S. insurance subsidiaries require prior approval for payment of extraordinary, as opposed to ordinary, dividends. At December 31, 2018 , the Company's U.S. insurance subsidiaries could pay up to \$466.0 million to the Company during the following 12 months under the ordinary dividend regulations.

In converting from U.S. statutory accounting principles to U.S. GAAP, typical adjustments include deferral of policy acquisition costs, differences in the calculation of deferred income taxes and the inclusion of net unrealized gains or losses relating to fixed maturities in shareholders' equity. The Company does not use any permitted statutory accounting practices that are different from prescribed statutory accounting practices which impact statutory capital and surplus.

United Kingdom

The Company's U.K. insurance subsidiary, Markel International Insurance Company Limited (MIICL), and its Lloyd's managing agent, Markel Syndicate Management Limited (MSM), are authorized by the Prudential Regulation Authority (PRA) and regulated by both the PRA and the Financial Conduct Authority (FCA). The PRA oversees compliance with established periodic auditing and reporting requirements, minimum solvency margins and individual capital assessment requirements under the Solvency II Directive and imposes dividend restrictions, while both the PRA and the FCA oversee compliance with risk assessment reviews and various other requirements. MIICL is required to give advance notice to the PRA for any transaction or proposed transaction with a connected or related person. MSM is required to satisfy the solvency requirements of Lloyd's. In addition, the Company's U.K. subsidiaries must comply with the United Kingdom Companies Act of 2006, which provides that dividends may only be paid out of profits available for that purpose. As of December 31, 2018, earnings of the Company's U.K. insurance subsidiaries are no longer considered indefinitely reinvested for U.S. income tax purposes and, as a result, are available for distribution to the holding company to the extent not otherwise restricted. Amounts available for distribution to the holding company will be determined during 2019.

Bermuda

The Company's Bermuda insurance subsidiary, Markel Bermuda Limited (Markel Bermuda), is subject to enhanced capital requirements in addition to minimum solvency and liquidity requirements. The enhanced capital requirement is determined by reference to a risk-based capital model that determines a control threshold for statutory capital and surplus by taking into account the risk characteristics of different aspects of the insurer's business. At December 31, 2018, Markel Bermuda satisfied both the enhanced capital requirements and the minimum solvency and liquidity requirements.

Under the Bermuda Insurance Act, Markel Bermuda is prohibited from paying or declaring dividends during a fiscal year if it is in breach of its enhanced capital requirement, solvency margin or minimum liquidity ratio or if the declaration or payment of the dividend would cause a breach of those requirements. If an insurer fails to meet its solvency margin or minimum liquidity ratio on the last day of any financial year, it is prohibited from declaring or paying any dividends during the next financial year without the approval of the BMA. Further, Markel Bermuda is prohibited from declaring or paying, in any financial year, dividends of more than 25% of its total statutory capital and surplus as set forth in its previous year's statutory balance sheet unless at least seven days before payment of those dividends it files with the BMA an affidavit stating that it will continue to meet its solvency margin and minimum liquidity ratio. Markel Bermuda must obtain the BMA's prior approval for a reduction by 15% or more of the total statutory capital as set forth in its previous year's financial statements. In addition, as a long-term insurer, Markel Bermuda may not declare or pay a dividend to any person other than a policyholder unless the value of the assets in its long-term business fund, as certified by Markel Bermuda's approved actuary, exceeds the liabilities of its long-term business. The amount of the dividend cannot exceed the aggregate of that excess and any other funds legally available for the payment of the dividend. As of December 31, 2018, Markel Bermuda could pay up to \$373.9 million during the following 12 months without making any additional filings with the BMA.

Other Jurisdictions

The Company's other foreign subsidiaries are subject to capital and solvency requirements in their respective jurisdictions of domicile that govern their ability to declare and pay dividends. As of December 31, 2018, earnings of the Company's other foreign subsidiaries, to the extent not previously taxed in the U.S., are considered reinvested indefinitely for U.S. income tax purposes and will not be made available for distributions to the holding company.

b) Lloyd's sets the corporate members' required capital annually based on each syndicates' business plans, rating environment, reserving environment and input arising from Lloyd's discussions with, among others, regulatory and rating agencies. Such required capital is referred to as Funds at Lloyd's (FAL), and comprises cash and investments. The amount of cash and investments held as FAL as of December 31, 2018 was \$864.3 million. Of this amount, \$311.6 million was provided by the holding company and is not available for general use by the Company. The remaining amount, provided by the Company's insurance subsidiaries, is not available for distribution to the holding company. The Company's corporate member may also be required to maintain funds under the control of Lloyd's in excess of their capital requirements and such funds also may not be available for distribution to the holding company.

20 . Segment Reporting Disclosures

Through December 31, 2017, the Company monitored and reported its ongoing underwriting operations in the following three segments: U.S. Insurance, International Insurance and Reinsurance. In conjunction with the Company's continued growth and diversification, beginning in the first quarter of 2018 the Company's chief operating decision maker changed the way it reviews the Company's ongoing underwriting results. Effective January 1, 2018, the chief operating decision maker reviews the Company's ongoing underwriting operations on a global basis in the following two segments: Insurance and Reinsurance. In determining how to allocate resources and assess the performance of its underwriting results, management considers many factors, including the nature of the insurance product sold, the type of account written and the type of customer served. The Insurance segment includes all direct business and facultative placements written across the Company. The Reinsurance segment includes all treaty reinsurance written across the Company. All investing activities related to the Company's insurance operations are included in the Investing segment.

Also during the first quarter of 2018, the Company's chief operating decision maker changed the way it assesses the performance of and allocates resources to its Markel Ventures operations. Historically, the Company's chief operating decision maker reviewed and assessed the performance of each Markel Ventures business separately with no single business being individually significant. Following the continued growth in the Company's Markel Ventures operations, effective January 1, 2018, the chief operating decision maker reviews and assesses Markel Ventures' performance in the aggregate, as a single operating segment. The Markel Ventures segment primarily consists of controlling interests in a diverse portfolio of businesses that operate in various industries. Prior period amounts in the tables below have been recast for consistency with the current segment presentation.

The Company's other operations include the results of the Company's legal and professional consulting services and the results of the Company's investment management services attributable to MCIM and, beginning November 2018, Nephila. The Company's other operations also include results for lines of business discontinued prior to, or in conjunction with, acquisitions, including development on asbestos and environmental loss reserves and results attributable to the run-off of life and annuity reinsurance business, which are monitored separately from the Company's ongoing underwriting operations. Beginning November 2017, the Company's other operations also include the results of the program services business acquired as part of the State National transaction. For purposes of segment reporting, none of these other operations are considered to be reportable segments.

Segment profit for each of the Company's underwriting segments is measured by underwriting profit. The property and casualty insurance industry commonly defines underwriting profit as earned premiums net of losses and loss adjustment expenses and underwriting, acquisition and insurance expenses. Underwriting profit does not replace operating income or net income computed in accordance with U.S. GAAP as a measure of profitability. Underwriting profit or loss provides a basis for management to evaluate the Company's underwriting performance. Segment profit for the Investing segment is measured by net investment income and net investment gains. Segment profit for the Markel Ventures segment is measured by operating income.

For management reporting purposes, the Company allocates assets to its underwriting, investing, Markel Ventures, and other operations. Underwriting assets are all assets not specifically allocated to the Investing or Markel Ventures segments, or to the Company's other operations. Underwriting and investing assets are not allocated to the Insurance and Reinsurance segments since the Company does not manage its assets by underwriting segment. The Company does not allocate capital expenditures for long-lived assets to either of its underwriting segments for management reporting purposes.

a) The following tables summarize the Company's segment disclosures.

	Year Ended December 31, 2018					
<i>(dollars in thousands)</i>	Insurance	Reinsurance	Investing	Markel Ventures	Other ⁽¹⁾	Consolidated
Gross premium volume	\$ 4,749,166	\$ 1,050,870	\$ —	\$ —	\$ 2,064,433	\$ 7,864,469
Net written premiums	3,904,773	882,285	—	—	520	4,787,578
Earned premiums	3,783,939	928,574	—	—	(453)	4,712,060
Losses and loss adjustment expenses:						
Current accident year	(2,596,057)	(775,642)	—	—	—	(3,371,699)
Prior accident years	502,260	42,982	—	—	5,742	550,984
Amortization of policy acquisition costs	(770,183)	(239,120)	—	—	—	(1,009,303)
Other operating expenses	(691,186)	(75,081)	—	—	(1,941)	(768,208)
Underwriting profit (loss)	228,773	(118,287)	—	—	3,348	113,834
Net investment income	—	—	433,702	513	—	434,215
Net investment losses ⁽²⁾	—	—	(437,596)	—	—	(437,596)
Products revenues	—	—	—	1,497,523	—	1,497,523
Services and other revenues	—	—	—	414,542	220,541	635,083
Products expenses ⁽³⁾	—	—	—	(1,413,248)	—	(1,413,248)
Services and other expenses ⁽³⁾	—	—	—	(366,739)	(108,185)	(474,924)
Amortization of intangible assets ⁽⁴⁾	—	—	—	(40,208)	(75,722)	(115,930)
Impairment of goodwill and intangible assets	—	—	—	(14,904)	(184,294)	(199,198)
Segment profit (loss)	\$ 228,773	\$ (118,287)	\$ (3,894)	\$ 77,479	\$ (144,312)	\$ 39,759
Interest expense						(154,212)
Net foreign exchange gains						106,598
Loss before income taxes						\$ (7,855)
U.S. GAAP combined ratio ⁽⁵⁾	94%	113%			NM ⁽⁶⁾	98%

(1) Other represents the total profit (loss) attributable to the Company's operations that are not included in a reportable segment as well as any amortization of intangible assets and impairment of goodwill and intangible assets that are not allocated to a reportable segment.

(2) Effective January 1, 2018, the Company adopted ASU No. 2016-01. As a result, the change in fair value of equity securities is no longer recognized in other comprehensive income; rather, all changes in the fair value of equity securities are now recognized in net investment losses within net income. Prior periods have not been restated to conform to the current presentation. See note 1.

(3) Products expenses and services and other expenses for the Markel Ventures segment include depreciation expense of \$52.2 million for the year ended December 31, 2018.

(4) Segment profit for the Markel Ventures segment includes amortization of intangible assets attributable to Markel Ventures. Amortization of intangible assets is not allocated to any other reportable segments.

(5) The U.S. GAAP combined ratio is a measure of underwriting performance and represents the relationship of incurred losses, loss adjustment expenses and underwriting, acquisition and insurance expenses to earned premiums.

(6) NM - Ratio is not meaningful

	Year Ended December 31, 2017					
<i>(dollars in thousands)</i>	Insurance	Reinsurance	Investing	Markel Ventures	Other ⁽¹⁾	Consolidated
Gross premium volume	\$ 4,141,201	\$ 1,112,101	\$ —	\$ —	\$ 253,658	\$ 5,506,960
Net written premiums	3,439,796	978,160	—	—	(169)	4,417,787
Earned premiums	3,314,033	934,114			(169)	4,247,978
Losses and loss adjustment expenses:						
Current accident year	(2,442,344)	(924,879)	—	—	—	(3,367,223)
Prior accident years	500,627	(7,803)	—	—	8,638	501,462
Amortization of policy acquisition costs	(675,470)	(218,883)	—	—	—	(894,353)
Other operating expenses	(611,749)	(82,567)	—	—	(795)	(695,111)
Underwriting profit (loss)	85,097	(300,018)	—	—	7,674	(207,247)
Net investment income	—	—	405,377	332		405,709
Net investment losses ⁽²⁾	—	—	(5,303)	—		(5,303)
Products revenues	—	—	—	951,012	—	951,012
Services and other revenues	—	—	—	382,268	79,995	462,263
Products expenses ⁽³⁾	—	—	—	(850,449)	—	(850,449)
Services and other expenses ⁽³⁾	—	—	—	(336,484)	(122,137)	(458,621)
Amortization of intangible assets ⁽⁴⁾	—	—	—	(31,429)	(49,329)	(80,758)
Segment profit (loss)	\$ 85,097	\$ (300,018)	\$ 400,074	\$ 115,250	\$ (83,797)	\$ 216,606
Interest expense						(132,451)
Net foreign exchange gains						3,140
Income before income taxes						\$ 87,295
U.S. GAAP combined ratio ⁽⁵⁾	<u>97%</u>	<u>132%</u>			<u>NM ⁽⁶⁾</u>	<u>105%</u>

- (1) Other represents the total profit (loss) attributable to the Company's operations that are not included in a reportable segment as well as any amortization of intangible assets that is not allocated to a reportable segment.
- (2) Effective January 1, 2018, the Company adopted ASU No. 2016-01. As a result, the change in fair value of equity securities is no longer recognized in other comprehensive income; rather, all changes in the fair value of equity securities are now recognized in net investment losses within net income. Prior periods have not been restated to conform to the current presentation. See note 1.
- (3) Products expenses and services and other expenses for the Markel Ventures segment include depreciation expense of \$41.7 million for the year ended December 31, 2017.
- (4) Segment profit for the Markel Ventures segment includes amortization of intangible assets attributable to Markel Ventures. Amortization of intangible assets is not allocated to any other reportable segments.
- (5) The U.S. GAAP combined ratio is a measure of underwriting performance and represents the relationship of incurred losses, loss adjustment expenses and underwriting, acquisition and insurance expenses to earned premiums.
- (6) NM - Ratio is not meaningful

	Year Ended December 31, 2016					
<i>(dollars in thousands)</i>	Insurance	Reinsurance	Investing	Markel Ventures	Other ⁽¹⁾	Consolidated
Gross premium volume	\$ 3,755,081	\$ 1,041,055	\$ —	\$ —	\$ 509	\$ 4,796,645
Net written premiums	3,101,657	898,728	—	—	635	4,001,020
Earned premiums	3,028,844	836,264	—	—	762	3,865,870
Losses and loss adjustment expenses:						
Current accident year	(2,009,426)	(546,476)	—	—	—	(2,555,902)
Prior accident years	369,594	125,514	—	—	10,050	505,158
Amortization of policy acquisition costs	(592,766)	(189,455)	—	—	—	(782,221)
Other operating expenses	(597,201)	(116,642)	—	—	(1,061)	(714,904)
Underwriting profit	199,045	109,205	—	—	9,751	318,001
Net investment income	—	—	373,121	109	—	373,230
Net investment gains ⁽²⁾	—	—	65,147	—	—	65,147
Products revenues	—	—	—	885,473	—	885,473
Services and other revenues	—	—	—	328,976	93,330	422,306
Products expenses ⁽³⁾	—	—	—	(755,591)	—	(755,591)
Services and other expenses ⁽³⁾	—	—	—	(297,841)	(118,300)	(416,141)
Amortization of intangible assets ⁽⁴⁾	—	—	—	(29,105)	(39,428)	(68,533)
Impairment of goodwill and intangible assets	—	—	—	(18,723)	—	(18,723)
Segment profit (loss)	\$ 199,045	\$ 109,205	\$ 438,268	\$ 113,298	\$ (54,647)	\$ 805,169
Interest expense						(129,896)
Loss on early extinguishment of debt						(44,100)
Net foreign exchange losses						(1,253)
Income before income taxes						\$ 629,920
U.S. GAAP combined ratio ⁽⁵⁾	93%	87%			NM ⁽⁶⁾	92%

- (1) Other represents the total profit (loss) attributable to the Company's operations that are not included in a reportable segment as well as any amortization of intangible assets and impairment of goodwill and intangible assets that are not allocated to a reportable segment.
- (2) Effective January 1, 2018, the Company adopted ASU No. 2016-01. As a result, the change in fair value of equity securities is no longer recognized in other comprehensive income; rather, all changes in the fair value of equity securities are now recognized in net investment gains within net income. Prior periods have not been restated to conform to the current presentation. See note 1.
- (3) Products expenses and services and other expenses for the Markel Ventures segment include depreciation expense of \$35.5 million for the year ended December 31, 2016.
- (4) Segment profit for the Markel Ventures segment includes amortization of intangible assets attributable to Markel Ventures. Amortization of intangible assets is not allocated to any other reportable segments.
- (5) The U.S. GAAP combined ratio is a measure of underwriting performance and represents the relationship of incurred losses, loss adjustment expenses and underwriting, acquisition and insurance expenses to earned premiums.
- (6) NM - Ratio is not meaningful

b) The following table summarizes deferred policy acquisition costs, unearned premiums and unpaid losses and loss adjustment expenses.

<i>(dollars in thousands)</i>	Deferred Policy Acquisition Costs	Unearned Premiums	Unpaid Losses and Loss Adjustment Expenses
December 31, 2018			
Insurance segment	\$ 315,363	\$ 2,031,140	\$ 7,947,772
Reinsurance segment	159,150	630,435	3,425,751
Other	—	—	386,329
Total Underwriting	474,513	2,661,575	11,759,852
Program services	—	949,453	2,516,627
Total	\$ 474,513	\$ 3,611,028	\$ 14,276,479
December 31, 2017			
Insurance segment	\$ 286,780	\$ 1,855,331	\$ 7,711,510
Reinsurance segment	178,789	690,565	3,248,070
Other	—	—	429,270
Total Underwriting	465,569	2,545,896	11,388,850
Program services	—	762,883	2,195,431
Total	\$ 465,569	\$ 3,308,779	\$ 13,584,281

c) The following table summarizes earned premiums by major product grouping.

<i>(dollars in thousands)</i>	Years Ended December 31,		
	2018	2017	2016
Insurance segment:			
General liability	\$ 889,543	\$ 764,956	\$ 675,199
Professional liability	701,867	628,878	600,607
Property	369,116	365,513	357,320
Marine and energy	376,747	312,282	277,608
Personal lines	374,543	382,761	374,175
Programs	288,398	273,954	263,783
Workers compensation	329,690	319,679	301,126
Other products	454,035	266,010	179,026
Total Insurance	3,783,939	3,314,033	3,028,844
Reinsurance segment:			
Property	233,195	321,178	288,771
Casualty	417,601	351,457	327,383
Auto	12,422	28,700	65,363
Other products	265,356	232,779	154,747
Total Reinsurance	928,574	934,114	836,264
Other	(453)	(169)	762
Total earned premiums	\$ 4,712,060	\$ 4,247,978	\$ 3,865,870

The Company does not manage products at this level of aggregation. The Company offers a diverse portfolio of products and manages these products in logical groupings within each operating segment.

d) The following table summarizes the Company's gross written premiums by country. Gross written premiums are attributed to individual countries based upon location of risk or cedent.

<i>(dollars in thousands)</i>	Years Ended December 31,					
	2018	% of Total	2017	% of Total	2016	% of Total
United States	\$ 4,587,486	79%	\$ 4,163,753	79%	\$ 3,691,840	77%
United Kingdom	471,818	8	374,941	7	358,348	7
Canada	127,546	2	132,018	3	125,444	3
Other countries	612,146	11	582,395	11	621,013	13
Total Underwriting	5,798,996	100%	5,253,107	100%	4,796,645	100%
United States - Program services	2,065,473		253,853		—	
Total	\$ 7,864,469		\$ 5,506,960		\$ 4,796,645	

Most of the Company's gross written premiums are placed through insurance and reinsurance brokers. During the years ended December 31, 2018, 2017 and 2016, the top three independent brokers accounted for 25%, 27% and 28% of gross premiums written in the Company's underwriting segments. During the years ended December 31, 2018, 2017 and 2016, the top three independent brokers accounted for 13%, 14% and 15%, respectively, of gross premiums written in the Insurance segment and 76%, 78% and 75%, respectively, of gross premiums written in the Reinsurance segment.

e) During the years ended December 31, 2018, 2017 and 2016, Markel Ventures segment revenues attributable to U.S. operations were 88%, 85%, and 84%, respectively, of total Markel Ventures segment revenues.

f) The following table reconciles segment assets to the Company's consolidated balance sheets.

<i>(dollars in thousands)</i>	December 31,		
	2018	2017	2016
Segment assets:			
Investing	\$ 19,100,790	\$ 20,317,160	\$ 19,029,584
Underwriting	6,451,984	6,828,048	5,397,696
Markel Ventures	2,124,506	1,900,728	1,206,223
Total segment assets	27,677,280	29,045,936	25,633,503
Other operations	5,628,983	3,759,080	241,796
Total assets	\$ 33,306,263	\$ 32,805,016	\$ 25,875,299

21 . Products, Services and Other Revenues

The amount of revenues from contracts with customers for the years ended December 31, 2018 , 2017 and 2016 was \$1.9 billion , \$1.3 billion and \$1.2 billion , respectively.

The following table disaggregates revenues from contracts with customers by type, all of which are included in products revenues and services and other revenues on the consolidated statements of income (loss) and comprehensive income (loss).

<i>(dollars in thousands)</i>	Years Ended December 31,								
	2018			2017			2016		
	Markel Ventures	Other	Total	Markel Ventures	Other	Total	Markel Ventures	Other	Total
Products	\$ 1,452,332	\$ —	\$ 1,452,332	\$ 902,739	\$ —	\$ 902,739	\$ 843,140	\$ —	\$ 843,140
Services	367,572	33,236	400,808	339,430	34,746	374,176	288,726	34,984	323,710
Investment management	—	91,527	91,527	—	28,740	28,740	—	56,455	56,455
Total revenues from contracts with customers	1,819,904	124,763	1,944,667	1,242,169	63,486	1,305,655	1,131,866	91,439	1,223,305
Program services	—	94,118	94,118	—	14,487	14,487	—	—	—
Other	92,161	1,660	93,821	91,111	2,022	93,133	82,583	1,891	84,474
Total	\$ 1,912,065	\$ 220,541	\$ 2,132,606	\$ 1,333,280	\$ 79,995	\$ 1,413,275	\$ 1,214,449	\$ 93,330	\$ 1,307,779

The following table presents receivables and customer deposits related to our contracts with customers.

<i>(dollars in thousands)</i>	December 31, 2018	December 31, 2017
Receivables	\$ 247,532	\$ 176,865
Customer deposits	\$ 48,238	\$ 61,546

22 . Employee Benefit Plans

a) The Company maintains defined contribution plans for employees of its U.S. insurance operations in accordance with Section 401(k) of the U.S. Internal Revenue Code of 1986. Employees of the Company's Markel Ventures subsidiaries are provided post-retirement benefits under separate plans. The Company also provides various defined contribution plans for employees of its international insurance and other operations, which are in line with local market terms and conditions of employment. Expenses relating to the Company's defined contribution plans were \$41.8 million , \$36.7 million and \$30.1 million in 2018 , 2017 and 2016 , respectively.

b) The Terra Nova Pension Plan is a defined benefit plan which covers certain employees in the Company's international insurance operations who meet the eligibility conditions set out in the plan. The plan has been closed to new participants since 2001. The cost of providing pensions for employees is charged to earnings over the average working life of employees according to actuarial recommendations. Final benefits are based on the employee's years of credited service and the higher of pensionable compensation received in the calendar year preceding retirement or the best average pensionable compensation received in any three consecutive years in the ten years preceding retirement. Employees have not accrued benefits for future service in the Terra Nova Pension Plan since April 2012. The Company uses December 31 as the measurement date for the Terra Nova Pension Plan.

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The following table summarizes the funded status of the Terra Nova Pension Plan and the amounts recognized on the accompanying consolidated balance sheets of the Company.

<i>(dollars in thousands)</i>	Years Ended December 31,	
	2018	2017
Change in projected benefit obligation:		
Projected benefit obligation at beginning of period	\$ 199,117	\$ 178,618
Interest cost	4,815	5,016
Benefits paid	(8,045)	(5,644)
Actuarial gain (loss)	(15,853)	4,985
Effect of foreign currency rate changes	(8,537)	16,142
Projected benefit obligation at end of year	\$ 171,497	\$ 199,117
Change in plan assets:		
Fair value of plan assets at beginning of period	\$ 206,570	\$ 175,644
Actual gain (loss) on plan assets	(5,683)	16,902
Employer contributions	3,368	3,393
Benefits paid	(8,045)	(5,644)
Effect of foreign currency rate changes	(9,246)	16,275
Fair value of plan assets at end of year	\$ 186,964	\$ 206,570
Funded status of the plan	\$ 15,467	\$ 7,453
Net actuarial pension loss	\$ 74,604	\$ 77,567

Net actuarial pension loss is recognized as a component of accumulated other comprehensive income, net of taxes. The asset for pension benefits, also referred to as the funded status of the plan, at December 31, 2018 and 2017 was included in other assets on the consolidated balance sheets.

The following table presents the changes in plan assets and projected benefit obligation recognized in accumulated other comprehensive income.

<i>(dollars in thousands)</i>	Years Ended December 31,		
	2018	2017	2016
Net actuarial gain (loss)	\$ —	\$ 3,728	\$ (25,243)
Amortization of net actuarial loss	2,963	3,815	1,951
Tax benefit (expense)	(622)	(1,284)	4,192
Total other comprehensive income (loss)	\$ 2,341	\$ 6,259	\$ (19,100)

The following table summarizes the components of net periodic benefit income (loss) and the weighted average assumptions for the Terra Nova Pension Plan.

<i>(dollars in thousands)</i>	Years Ended December 31,		
	2018	2017	2016
Components of net periodic benefit income (loss):			
Interest cost	\$ 4,815	\$ 5,016	\$ 6,113
Expected return on plan assets	(8,782)	(8,189)	(9,124)
Amortization of net actuarial pension loss	2,963	3,815	1,951
Net periodic benefit income (loss)	\$ (1,004)	\$ 642	\$ (1,060)
Weighted average assumptions as of December 31:			
Discount rate	3.0%	2.6%	2.7%
Expected return on plan assets	4.5%	4.5%	4.5%
Rate of compensation increase	3.0%	3.0%	3.0%

The projected benefit obligation and the net periodic benefit income (loss) are determined by independent actuaries using assumptions provided by the Company. In determining the discount rate, the Company uses the current yield on high-quality, fixed maturity investments that have maturities corresponding to the anticipated timing of estimated defined benefit payments. The expected return on plan assets is estimated based upon the anticipated average yield on plan assets using asset return assumptions for each asset class, and the cross-correlations between the asset classes, over a specified projection horizon. The rate of compensation increase is based upon historical experience and management's expectation of future compensation.

Management's discount rate and rate of compensation increase assumptions at December 31, 2018 were used to calculate the Company's projected benefit obligation. Management's discount rate, expected return on plan assets and rate of compensation increase assumptions at December 31, 2017 were used to calculate the net periodic benefit income for 2018. The Company estimates that net periodic benefit cost in 2019 will include an expense of \$2.7 million resulting from the amortization of the net actuarial pension loss included as a component of accumulated other comprehensive loss at December 31, 2018.

The fair values of each of the plan's assets are measured using quoted prices in active markets for identical assets, which represent Level 1 inputs within the fair value hierarchy established in ASC 820. The following table summarizes the fair value of plan assets as of December 31, 2018 and 2017.

<i>(dollars in thousands)</i>	December 31,	
	2018	2017
Plan assets:		
Fixed maturity index funds	\$ 102,047	\$ 110,936
Equity security index funds	84,909	95,452
Cash and cash equivalents	8	182
Total	\$ 186,964	\$ 206,570

The Company's target asset allocation for the plan is 47% equity securities and 53% fixed maturities. At December 31, 2018, the actual allocation of assets in the plan was 45% equity securities and 55% fixed maturities. At December 31, 2017, the actual allocation of assets in the plan was 46% equity securities and 54% fixed maturities.

Investments are managed by a third party investment manager. Equity securities are invested in an index fund where 30% is indexed to U.K. equities and 70% is indexed to other markets. Assets are also invested in a mutual fund with a diversified global portfolio of equities, investment grade debt, property and cash. The primary objective of investing in these funds is to earn rates of return that are consistently in excess of inflation. Investing in equity securities, historically, has provided rates of return that are higher than investments in fixed maturities. Fixed maturity investments are allocated between five mutual funds; two index funds that include U.K. government securities, one index fund that includes securities issued by other foreign governments, one mutual fund that includes investment grade corporate bonds from the U.K. and foreign markets and one index fund that includes U.K. corporate securities. The assets in these funds are invested to meet the Company's obligations for current pensioners and those individuals nearing retirement. The plan does not invest in the Company's common shares.

At December 31, 2018 and 2017, the fair value of plan assets exceeded the plan's accumulated benefit obligation of \$168.1 million and \$195.1 million, respectively. The Company expects to make plan contributions of \$3.4 million in 2019.

The benefits expected to be paid in each year from 2019 to 2023 are \$3.8 million, \$3.8 million, \$3.9 million, \$4.0 million and \$4.1 million, respectively. The aggregate benefits expected to be paid in the five years from 2024 to 2028 are \$22.0 million. The expected benefits to be paid are based on the same assumptions used to measure the Company's projected benefit obligation at December 31, 2018.

23. Markel Corporation (Parent Company Only) Financial Information

The following parent company only condensed financial information reflects the financial position, results of operations and cash flows of Markel Corporation.

CONDENSED BALANCE SHEETS

	December 31,	
	2018	2017
	(dollars in thousands)	
ASSETS		
Investments, at estimated fair value:		
Fixed maturities, available-for-sale (amortized cost of \$717,666 in 2018 and \$533,183 in 2017)	\$ 717,681	\$ 532,438
Equity securities, available-for-sale (cost of \$402,694 in 2017)	—	646,060
Equity securities (cost of \$1,117,363 in 2018) ⁽¹⁾	1,175,120	—
Short-term investments, available-for-sale (estimated fair value approximates cost)	451,499	1,159,323
Total Investments	2,344,300	2,337,821
Cash and cash equivalents	263,043	349,347
Restricted cash and cash equivalents	3,177	1,419
Receivables	19,295	18,684
Investments in consolidated subsidiaries	10,697,605	9,510,215
Notes receivable from subsidiaries	160,111	140,110
Income taxes receivable	21,174	5,704
Other assets	135,722	121,233
Total Assets	\$ 13,644,427	\$ 12,484,533
LIABILITIES AND SHAREHOLDERS' EQUITY		
Senior long-term debt	\$ 2,539,389	\$ 2,537,331
Notes payable to subsidiaries ⁽²⁾	1,895,000	285,000
Net deferred tax liability	64,564	84,507
Other liabilities	64,820	73,547
Total Liabilities	4,563,773	2,980,385
Total Shareholders' Equity	9,080,654	9,504,148
Total Liabilities and Shareholders' Equity	\$ 13,644,427	\$ 12,484,533

⁽¹⁾ Effective January 1, 2018, the Company adopted ASU No. 2016-01. As a result, equity securities are no longer classified as available-for-sale with unrealized gains and losses recognized in other comprehensive income; rather, all changes in the fair value of equity securities are now recognized in net income. Prior periods have not been restated to conform to the current presentation. See note 1.

⁽²⁾ In December 2018, Markel Corporation purchased Markel Global Reinsurance Company, an indirectly owned subsidiary of Markel Corporation, from Alterra USA Holdings Limited, another indirectly owned subsidiary of Markel Corporation, by issuing a \$1.4 billion note payable to subsidiary.

CONDENSED STATEMENTS OF INCOME (LOSS) AND COMPREHENSIVE INCOME (LOSS)

	Years Ended December 31,		
	2018	2017	2016
	(dollars in thousands)		
REVENUES			
Net investment income	\$ 32,631	\$ 21,076	\$ 9,561
Dividends on common stock of consolidated subsidiaries	749,171	895,920	349,622
Net investment gains (losses):			
Net realized investment gains (losses), including other-than-temporary impairment losses	(3,341)	3,383	1,068
Change in fair value of equity securities ⁽¹⁾	(110,356)	—	—
Net investment gains (losses)	(113,697)	3,383	1,068
Total Revenues	668,105	920,379	360,251
EXPENSES			
Services and other expenses	6,532	11,708	13,076
Interest expense	145,681	122,151	116,013
Net foreign exchange gains	(3,391)	—	—
Loss on early extinguishment of debt	—	—	44,100
Total Expenses	148,822	133,859	173,189
Income Before Equity in Undistributed Earnings of Consolidated Subsidiaries and Income Taxes	519,283	786,520	187,062
Equity in undistributed earnings of consolidated subsidiaries	(696,045)	(469,365)	196,615
Income tax benefit	(48,582)	(78,114)	(72,012)
Net Income (Loss) to Shareholders	\$ (128,180)	\$ 395,269	\$ 455,689
OTHER COMPREHENSIVE INCOME (LOSS) TO SHAREHOLDERS			
Change in net unrealized gains on available-for-sale investments, net of taxes:			
Net holding gains (losses) arising during the period	\$ (1,492)	\$ 52,277	\$ 37,045
Consolidated subsidiaries' net holding gains (losses) arising during the period	(239,833)	735,062	238,616
Reclassification adjustments for net gains (losses) included in net income (loss) to shareholders	2,564	(1,513)	(523)
Consolidated subsidiaries' reclassification adjustments for net gains included in net income (loss) to shareholders	5,285	(22,783)	(32,970)
Change in net unrealized gains on available-for-sale investments, net of taxes	(233,476)	763,043	242,168
Change in foreign currency translation adjustments, net of taxes	—	(2,260)	(1,326)
Consolidated subsidiaries' change in foreign currency translation adjustments, net of taxes	(16,455)	12,663	(10,384)
Consolidated subsidiaries' change in net actuarial pension loss, net of taxes	2,341	6,259	(19,100)
Total Other Comprehensive Income (Loss) to Shareholders	(247,590)	779,705	211,358
Comprehensive Income (Loss) to Shareholders	\$ (375,770)	\$ 1,174,974	\$ 667,047

(1) Effective January 1, 2018, the Company adopted ASU No. 2016-01. As a result, equity securities are no longer classified as available-for-sale with unrealized gains and losses recognized in other comprehensive income; rather, all changes in the fair value of equity securities are now recognized in net income. Prior periods have not been restated to conform to the current presentation. See note 1.

CONDENSED STATEMENTS OF CASH FLOWS

	Years Ended December 31,		
	2018	2017	2016
	(dollars in thousands)		
OPERATING ACTIVITIES			
Net income (loss) to shareholders	\$ (128,180)	\$ 395,269	\$ 455,689
Adjustments to reconcile net income (loss) to shareholders to net cash provided (used) by operating activities	3,637	(166,132)	(120,564)
Net Cash Provided (Used) By Operating Activities	(124,543)	229,137	335,125
INVESTING ACTIVITIES			
Proceeds from sales of fixed maturities and equity securities	204,478	20,562	1,831
Proceeds from maturities, calls and prepayments of fixed maturities	34,560	64,705	11,960
Cost of fixed maturities and equity securities purchased	(26,336)	(72,910)	(29,110)
Net change in short-term investments	930,876	649,181	(731,389)
Return of capital from subsidiaries	12,712	45,225	21,021
Decrease (increase) in notes receivable due from subsidiaries	(20,000)	(58)	92,530
Capital contributions to subsidiaries	(103,133)	(270,623)	—
Acquisitions, net of cash acquired	(972,619)	(1,153,683)	—
Cost of equity method investments	(5,117)	(10,633)	(3,100)
Additions to property and equipment	(3,191)	—	(584)
Other	(5,261)	6,972	(3,207)
Net Cash Provided (Used) By Investing Activities	46,969	(721,262)	(640,048)
FINANCING ACTIVITIES			
Additions to senior long-term debt	—	592,923	493,149
Increase in notes payable to subsidiaries	47,105	—	—
Repayment and retirement of senior long-term debt	—	—	(183,343)
Premiums and fees related to early extinguishment of debt	—	—	(43,691)
Repurchases of common stock	(54,007)	(110,838)	(51,142)
Other	(70)	(9,848)	(337)
Net Cash Provided (Used) By Financing Activities	(6,972)	472,237	214,636
Decrease in cash, cash equivalents, restricted cash and restricted cash equivalents	(84,546)	(19,888)	(90,287)
Cash, cash equivalents, restricted cash and restricted cash equivalents at beginning of year	350,766	370,654	460,941
CASH, CASH EQUIVALENTS, RESTRICTED CASH AND RESTRICTED CASH EQUIVALENTS AT END OF YEAR	\$ 266,220	\$ 350,766	\$ 370,654

24 . Quarterly Financial Information (unaudited)

The following table presents the unaudited quarterly results of consolidated operations for 2018 , 2017 and 2016 .

<i>(dollars in thousands, except per share amounts)</i>	Quarters Ended			
	Mar. 31	June 30	Sept. 30	Dec. 31
2018				
Operating revenues	\$ 1,575,471	\$ 1,987,013	\$ 2,235,949	\$ 1,042,852
Net income (loss) ⁽¹⁾	(65,594)	279,587	409,028	(753,374)
Net income (loss) to shareholders ⁽¹⁾	(64,306)	278,231	409,438	(751,543)
Comprehensive income (loss) to shareholders	(174,839)	164,336	315,106	(680,373)
Net income (loss) per share:				
Basic	\$ (4.25)	\$ 20.01	\$ 28.56	\$ (53.88)
Diluted	(4.25)	19.97	28.50	(53.88)
2017				
Operating revenues	\$ 1,411,751	\$ 1,481,493	\$ 1,506,148	\$ 1,662,267
Net income (loss) ⁽¹⁾	71,040	151,427	(261,035)	439,326
Net income (loss) to shareholders ⁽¹⁾	69,869	149,660	(259,141)	434,881
Comprehensive income (loss) to shareholders	223,239	342,357	(19,869)	629,247
Net income (loss) per share:				
Basic	\$ 3.91	\$ 10.34	\$ (18.82)	\$ 30.48
Diluted	3.90	10.31	(18.82)	30.39
2016				
Operating revenues	\$ 1,376,182	\$ 1,375,937	\$ 1,431,282	\$ 1,428,625
Net income ⁽¹⁾	163,646	80,673	83,421	132,703
Net income to shareholders ⁽¹⁾	160,370	78,797	83,796	132,726
Comprehensive income (loss) to shareholders	396,994	209,942	89,161	(29,050)
Net income per share:				
Basic	\$ 11.21	\$ 5.44	\$ 5.62	\$ 9.14
Diluted	11.15	5.41	5.60	9.11

⁽¹⁾ Effective January 1, 2018, the Company adopted ASU No. 2016-01. As a result, the change in fair value of equity securities is no longer recognized in other comprehensive income; rather, all changes in the fair value of equity securities are now recognized in net income. Prior periods have not been restated to conform to the current presentation. See note 1.

MANAGEMENT'S DISCUSSION & ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The accompanying consolidated financial statements and related notes have been prepared in accordance with United States (U.S.) generally accepted accounting principles (GAAP) and include the accounts of Markel Corporation and its subsidiaries, as well as any variable interest entities that meet the requirements for consolidation (the Company). For a discussion of our significant accounting policies, see note 1 of the notes to consolidated financial statements.

The following discussion and analysis should be read in conjunction with Selected Financial Data, the consolidated financial statements and related notes and the discussion under "Risk Factors" and "Safe Harbor and Cautionary Statement."

Our Business

We are a diverse financial holding company serving a variety of niche markets. Our principal business markets and underwrites specialty insurance products. We believe that our specialty product focus and niche market strategy enable us to develop expertise and specialized market knowledge. We seek to differentiate ourselves from competitors by our expertise, service, continuity and other value-based considerations. We also own interests in various businesses that operate outside of the specialty insurance marketplace. Our financial goals are to earn consistent underwriting and operating profits and superior investment returns to build shareholder value.

Our business is comprised of the following types of operations:

- Underwriting - our underwriting operations are comprised of our risk-bearing insurance and reinsurance operations
- Investing - our investing activities are primarily related to our underwriting operations
- Markel Ventures - our Markel Ventures operations include our controlling interests in a diverse portfolio of businesses that operate outside of the specialty insurance marketplace
- Investment management - our investment management operations include investment fund managers that offer a variety of investment products, including insurance-linked securities, catastrophe bonds, insurance swaps and weather derivatives
- Program services - our program services business serves as a fronting platform that provides other insurance companies access to the U.S. property and casualty insurance market

Through December 31, 2017, we monitored and reported our ongoing underwriting operations in the following three segments: U.S. Insurance, International Insurance and Reinsurance. In conjunction with the continued growth and diversification of our business, beginning the first quarter of 2018 we changed the way we review our ongoing underwriting operations. Effective January 1, 2018, our chief operating decision maker allocates resources to and assesses the performance of our ongoing underwriting operations on a global basis in the following two segments: Insurance and Reinsurance. In determining how to monitor our underwriting results, we consider many factors, including the nature of the insurance product sold, the type of account written and the type of customer served. The Insurance segment includes all direct business and facultative placements written across the Company. The Reinsurance segment includes all treaty reinsurance written across the Company. Results for lines of business discontinued prior to, or in conjunction with, acquisitions, including development on asbestos and environmental loss reserves and the results attributable to the run-off of life and annuity reinsurance business, are monitored separately and are not included in a reportable segment. All investing activities related to our underwriting operations are included in the Investing segment.

Our Insurance segment includes both hard-to-place risks written outside of the standard market on an excess and surplus lines basis and unique and hard-to-place risks that must be written on an admitted basis due to marketing and regulatory reasons. Risks written in our Insurance segment are written on either a direct basis or a subscription basis, the latter of which means that the loss exposures brought into the market are typically insured by more than one insurance company or Lloyd's syndicate. When we write business in the subscription market, we prefer to participate as lead underwriter in order to control underwriting terms, policy conditions and claims handling. The following products are included in this segment: general liability, professional liability, primary and excess of loss property, including catastrophe-exposed property, personal property, workers' compensation, marine and energy liability coverages, specialty program insurance for well-defined niche markets, and liability and other coverages tailored for unique exposures. Business in this segment is written through our Markel Assurance, Markel Specialty and Markel International divisions. The Markel Assurance division writes commercial and Fortune 1000 accounts on an E&S as well as admitted basis. The Markel Specialty division writes program insurance and other specialty coverages for well-defined niche markets, primarily on an admitted basis. The Markel International division writes business worldwide, primarily from our London-based platform, which includes our syndicate at Lloyd's.

In April 2017, we completed the acquisition of SureTec Financial Corp. (SureTec), a Texas-based privately held surety company primarily offering contract, commercial and court bonds. Results attributable to SureTec are included in the Insurance segment.

In November 2017, we completed the acquisition of State National Companies, Inc. (State National), a leading specialty provider of property and casualty insurance. The acquisition of State National adds a premier fronting platform to our insurance operations through which insurance products can be offered throughout the United States. State National also offers collateral protection insurance (CPI) to credit unions and regional banks. Results attributable to CPI business are included in the Insurance segment. Results attributable to the program services operations are not included in a reportable segment.

Our Reinsurance segment includes property, casualty and specialty treaty reinsurance products offered to other insurance and reinsurance companies globally through the broker market. Our treaty reinsurance offerings include both quota share and excess of loss reinsurance and are typically written on a participation basis, which means each reinsurer shares proportionally in the business ceded under the reinsurance treaty written. Principal lines of business include: property (including catastrophe-exposed property), professional liability, general casualty, credit, surety, auto and workers' compensation. Our reinsurance product offerings are underwritten by our Global Reinsurance division and our Markel International division.

Through our wholly-owned subsidiary Markel Ventures, Inc. (Markel Ventures), we own interests in various businesses that, effective January 1, 2018, we monitor and report in the Markel Ventures segment. These businesses are viewed by management as separate and distinct from our insurance operations and are comprised of a diverse portfolio of businesses from different industries that offer various types of products and services to businesses and consumers, predominately in the United States. Our products group manufactures, builds or produces consumer and industrial products, such as equipment used in baking systems and food processing, portable dredges, over-the-road car haulers and equipment, laminated oak and composite wood flooring used in the trucking industry, dormitory furniture, wall systems, medical casework and marine panels, storage and transportation equipment for specialty gas, ornamental plants, fashion handbags and residential homes. The services group offers consumer and business services, such as leasing and management of manufactured housing communities, behavioral healthcare, concierge health programs, retail intelligence and management and technology consulting.

In October 2018, we acquired 90% of Brahmin Leather Works (Brahmin), a Massachusetts-based privately held creator of fashion leather handbags. Results attributable to Brahmin are included in our Markel Ventures segment.

In August 2017, we acquired 81% of Costa Farms, a Florida-based privately held grower of house and garden plants. Results attributable to Costa Farms are included in our Markel Ventures segment.

Our investment management operations are comprised of our Markel CATCo operations, and effective November 2018, the operations of Nephila Holdings Ltd.

Our Markel CATCo operations are conducted through Markel CATCo Investment Management Ltd. (MCIM). MCIM is an insurance-linked securities investment fund manager headquartered in Bermuda focused on building and managing highly diversified, collateralized retrocession and reinsurance portfolios covering global property catastrophe risks. MCIM serves as the insurance manager for Markel CATCo Re Ltd. (Markel CATCo Re), a Bermuda Class 3 reinsurance company, and as the investment manager for Markel CATCo Reinsurance Fund Ltd., a Bermuda exempted mutual fund company comprised of multiple segregated accounts (Markel CATCo Funds). MCIM also serves as the investment manager to CATCo Reinsurance Opportunities Fund Ltd. (CROF), a limited liability closed-end Bermuda exempted mutual fund company listed on a market operated by the London Stock Exchange and on the Bermuda Stock Exchange. CROF invests substantially all of its assets in Markel CATCo Reinsurance Fund Ltd. Both Markel CATCo Re and the Markel CATCo Funds are unconsolidated subsidiaries of Markel Corporation. As of December 31, 2018, MCIM's net assets under management were \$3.4 billion. See note 18 of the notes to consolidated financial statements for further details regarding recent developments within our Markel CATCo operations.

In November 2018, we completed the acquisition of all of the outstanding shares of Nephila Holdings Ltd. (together with its subsidiaries, Nephila). Through its subsidiaries, Nephila primarily serves as an insurance and investment fund manager headquartered in Bermuda that offers a broad range of investment products, including insurance-linked securities, catastrophe bonds, insurance swaps and weather derivatives.

Nephila serves as the investment manager to several Bermuda, Ireland and U.S. based private funds (the Nephila Funds). To provide access for the Nephila Funds to the insurance, reinsurance and weather markets, Nephila also acts as an insurance manager to certain Bermuda Class 3 and 3A reinsurance companies and as both a service company coverholder and agent with binding authority for Lloyd's Syndicate 2357 (Syndicate 2357) (collectively, the Nephila Reinsurers). The results of the Nephila Reinsurers are attributed to the Nephila Funds primarily through derivative transactions between these entities. Neither the Nephila Funds nor the Nephila Reinsurers are subsidiaries of Markel Corporation, and as such, these entities are not included in our consolidated financial statements. As of December 31, 2018, Nephila's net assets under management were \$11.6 billion .

Our program services business is conducted through our State National division and is separately managed from our underwriting operations. Our program services business generates fee income, in the form of ceding (program service) fees, by offering issuing carrier capacity to both specialty general agents and other producers who sell, control, and administer books of insurance business that are supported by third parties that assume reinsurance risk, including Syndicate 2357. Through our program services business, we write a wide variety of insurance products, principally including general liability insurance, commercial liability insurance, commercial multi-peril insurance, property insurance and workers compensation insurance, substantially all of which is ceded to third parties.

For further discussion of our underwriting, investing, Markel Ventures, investment management and program services operations, see the respective sections under Business Overview.

Critical Accounting Estimates

Critical accounting estimates are those estimates that both are important to the portrayal of our financial condition and results of operations and require us to exercise significant judgment. The preparation of financial statements in accordance with U.S. GAAP requires us to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues and expenses and the disclosure of material contingent assets and liabilities, including litigation contingencies. These estimates, by necessity, are based on assumptions about numerous factors.

We review the following critical accounting estimates and assumptions quarterly: evaluating the adequacy of reserves for unpaid losses and loss adjustment expenses and life and annuity reinsurance benefit reserves . Critical accounting estimates and assumptions for goodwill and intangible assets are reviewed in conjunction with an acquisition and goodwill and indefinite-lived intangible assets are reassessed at least annually for impairment. Actual results may differ materially from the estimates and assumptions used in preparing the consolidated financial statements.

Unpaid Losses and Loss Adjustment Expenses

Our consolidated balance sheets included estimated unpaid losses and loss adjustment expenses of \$14.3 billion and reinsurance recoverables on unpaid losses of \$5.1 billion at December 31, 2018 compared to \$13.6 billion and \$4.6 billion , respectively, at December 31, 2017 . Included in the December 31, 2018 and 2017 balances for both unpaid losses and loss adjustment expenses and reinsurance recoverable on unpaid losses were \$2.5 billion and \$2.2 billion , respectively, attributable to our program services business. Our consolidated balance sheets do not include reserves for losses and loss adjustment expenses attributed to unconsolidated subsidiaries or affiliates that we manage through our investment management operations, including Markel CATCo Re and the Nephila Reinsurers.

We accrue liabilities for unpaid losses and loss adjustment expenses based upon estimates of the ultimate amounts payable. We maintain reserves for specific claims incurred and reported (case reserves) and reserves for claims incurred but not reported (IBNR reserves).

Reported claims are in various stages of the settlement process, and the corresponding reserves for reported claims are based upon all information available to us. Case reserves consider our estimate of the ultimate cost to settle the claims, including investigation and defense of lawsuits resulting from the claims, and may be subject to adjustment for differences between costs originally estimated and costs subsequently re-estimated or incurred. Claims are settled based upon their merits, and some claims may take years to settle, especially if legal action is involved.

As of any balance sheet date, all claims have not yet been reported, and some claims may not be reported for many years. As a result, the liability for unpaid losses and loss adjustment expenses includes significant estimates for incurred but not reported claims.

There is normally a time lag between when a loss event occurs and when it is actually reported to us. The actuarial methods that we use to estimate losses have been designed to address the lag in loss reporting as well as the delay in obtaining information that would allow us to more accurately estimate future payments. There is also often a time lag between cedents establishing case reserves and re-estimating their reserves, and notifying us of the new or revised case reserves. As a result, the reporting lag is more pronounced in our reinsurance contracts than in our insurance contracts due to the reliance on ceding companies to report their claims to us. On reinsurance transactions, the reporting lag will generally be 60 to 90 days after the end of a reporting period, but can be longer in some cases. Based on the experience of our actuaries and management, we select loss development factors and trending techniques to mitigate the difficulties caused by reporting lags. At least annually, we evaluate and update our loss development and trending factor selections using cedent specific and industry data.

U.S. GAAP requires that IBNR reserves be based on the estimated ultimate cost of settling claims, including the effects of inflation and other social and economic factors, using past experience adjusted for current trends and any other factors that would modify past experience. IBNR reserves are generally calculated by subtracting paid losses and case reserves from estimated ultimate losses. IBNR reserves were 64% of total unpaid losses and loss adjustment expenses at both December 31, 2018 and December 31, 2017 .

Each quarter, our actuaries prepare estimates of the ultimate liability for unpaid losses and loss adjustment expenses based on established actuarial methods. Management reviews these estimates, supplements the actuarial analyses with information provided by claims, underwriting and other operational personnel and determines its best estimate of loss reserves, which is recorded in our consolidated financial statements. Our procedures for determining the adequacy of loss reserves at the end of the year are substantially similar to the procedures applied at the end of each interim period.

Any adjustments to reserves resulting from our interim or year-end reviews, including changes in estimates, are recorded as a component of losses and loss adjustment expenses in the period of the change. Reserve changes that increase previous estimates of ultimate claims cost are referred to as unfavorable or adverse development, or reserve strengthening. Reserve changes that decrease previous estimates of ultimate claims cost are referred to as favorable development.

Program Services

For our program services business, case reserves are generally established based on reports received from the general agents or reinsurers with whom we do business. Our actuaries review the case loss reserve data received for sufficiency, consistency with historical data and for consistency with other programs we write that have similar characteristics. IBNR reserves are calculated using either our program experience or, where the program data is not credible, industry experience for similar products or lines of business. Substantially all of the premium written in our program services business is ceded and net reserves for unpaid losses and loss adjustment expenses as of December 31, 2018 and December 31, 2017 were \$ 2.6 million and \$ 2.4 million , respectively.

Underwriting

For our insurance operations, we are generally notified of insured losses by our insureds or their brokers. Based on this information, we establish case reserves by estimating the expected ultimate losses from the claim (including any administrative costs associated with settling the claim). Our claims personnel use their knowledge of the specific claim along with internal and external experts, including underwriters, actuaries and legal counsel, to estimate the expected ultimate losses.

For our reinsurance operations, case reserves are generally established based on reports received from ceding companies or their brokers. For excess of loss contracts, we are typically notified of insurance losses on specific contracts and record a case reserve for the estimated expected ultimate losses from the claim. For quota share contracts, we typically receive aggregated claims information and record a case reserve based on that information. As with insurance business, we evaluate this information and estimate the expected ultimate losses.

Our liabilities for unpaid losses and loss adjustment expenses can generally be categorized into two distinct groups, short-tail business and long-tail business. Short-tail business refers to lines of business, such as property, accident and health, automobile, watercraft and marine hull exposures, for which losses are usually known and paid shortly after the loss actually occurs. Long-tail business describes lines of business for which specific losses may not be known and reported for some period and losses take much longer to emerge. Given the time frame over which long-tail exposures are ultimately settled, there is greater uncertainty and volatility in these lines than in short-tail lines of business. Our long-tail coverages consist of most casualty lines, including professional liability, directors' and officers' liability, products liability, general and excess liability and excess and umbrella exposures, as well as workers' compensation insurance. Some factors that contribute to the uncertainty and volatility of long-tail casualty programs, and thus require a significant degree of judgment in the reserving process, include the inherent uncertainty as to the length of reporting and payment development patterns, the possibility of judicial interpretations or legislative changes, including changes in workers' compensation benefit laws, that might impact future loss experience relative to prior loss experience and the potential lack of comparability of the underlying data used in performing loss reserve analyses.

Our ultimate liability may be greater or less than current reserves. Changes in our estimated ultimate liability for loss reserves generally occur as a result of the emergence of unanticipated loss activity, the completion of specific actuarial or claims studies or changes in internal or external factors. We closely monitor new information on reported claims and use statistical analyses prepared by our actuaries to evaluate the adequacy of our recorded reserves. We are required to exercise considerable judgment when assessing the relative credibility of loss development trends. Our philosophy is to establish loss reserves that are more likely redundant than deficient. This means that we seek to establish loss reserves that will ultimately prove to be adequate. As a result, if new information or trends indicate an increase in frequency or severity of claims in excess of what we initially anticipated, we generally respond quickly and increase loss reserves. If, however, frequency or severity trends are more favorable than initially anticipated, we often wait to reduce our loss reserves until we can evaluate experience in additional periods to confirm the credibility of the trend. In addition, for long-tail lines of business, trends develop over longer periods of time, and as a result, we give credibility to these trends more slowly than for short-tail or less volatile lines of business. As part of our acquisition of underwriting operations, to the extent the reserving philosophy of the acquired business is less conservative than our reserving philosophy, the post-acquisition loss reserves will be strengthened until total loss reserves are consistent with our target level of confidence.

In establishing our liabilities for unpaid losses and loss adjustment expenses, our actuaries estimate an ultimate loss ratio, by accident year or policy year, for each of our product lines with input from our underwriting and claims associates. For product lines in which loss reserves are established on a policy year basis, we have developed a methodology to convert from policy year to accident year for financial reporting purposes. In estimating an ultimate loss ratio for a particular line of business, our actuaries may use one or more actuarial reserving methods and select from these a single point estimate. To varying degrees, these methods include detailed statistical analysis of past claim reporting, settlement activity, claim frequency and severity, policyholder loss experience, industry loss experience and changes in market conditions, policy forms and exposures. The actuarial methods we use include:

Initial Expected Loss Ratio Method – This method multiplies earned premiums by an expected loss ratio. The expected loss ratio is selected utilizing industry data, our historical data, frequency-severity and rate level forecasts and professional judgment.

Paid Loss Development – This method uses historical loss payment patterns to estimate future loss payment patterns. Our actuaries use the historical loss patterns to develop factors that are applied to current paid loss amounts to calculate expected ultimate losses.

Incurred Loss Development – This method uses historical loss reporting patterns to estimate future loss reporting patterns. Our actuaries use the historical loss patterns to develop factors that are applied to current reported losses to calculate expected ultimate losses.

Bornhuetter-Ferguson Paid Loss Development – This method divides the projection of ultimate losses into the portion that has already been paid and the portion that has yet to be paid. The portion that has yet to be paid is estimated as the product of three amounts: the premium earned for the exposure period, the expected loss ratio and the percentage of ultimate losses that are still unpaid. The expected loss ratio is selected by considering historical loss ratios, adjusted for any known changes in pricing, loss trends, adequacy of case reserves, changes in administrative practices and other relevant factors.

Bornhuetter-Ferguson Incurred Loss Development – This method is identical to the Bornhuetter-Ferguson paid loss development method, except that it uses the percentage of ultimate losses that are still unreported, instead of the percentage of ultimate losses that are still unpaid.

Frequency/Severity – Under this method, expected ultimate losses are equal to the product of the expected ultimate number of claims and the expected ultimate average cost per claim. Our actuaries use historical reporting patterns and severity patterns to develop factors that are applied to the current reported amounts to calculate expected ultimate losses.

Outstanding to IBNR Ratio Method – Under this method, IBNR is based on a detailed review of remaining open claims. This method assumes that the estimated future loss development is indicated by the current level of case reserves.

Each actuarial method has its own set of assumptions and its own strengths and limitations, with no one method being better than the others in all situations. Our actuaries select the reserving methods that they believe will produce the most reliable estimate for the class of business being evaluated. Greater judgment may be required when we introduce new product lines or when there have been changes in claims handling practices, as the statistical data available may be insufficient. In these instances, we may rely upon assumptions applied to similar lines of business, rely more heavily on industry experience, take into account changes in underwriting guidelines and risk selection or review the impact of changes in claims reserving practices with claims personnel.

For example, in March 2017, we signed an agreement with a managing general agent and program administrator focused on meeting the needs of schools and colleges. This education insurance program in our specialty programs group features a comprehensive suite of property and casualty coverages and related services for K-12 private independent schools, public schools, and accredited colleges and universities. Because our existing schools program is substantially smaller and emphasizes a different type of educational entity, we supplement our limited data and loss experience with third party data. We receive regular updates of data from the managing general agent's prior carrier that enable us to compile loss development triangles and study trends by state and segment. We now aggregate that data with our own data for use in the pricing of and reserving for this managing general agent's portfolio of business.

A key assumption in most actuarial analyses is that past development patterns will repeat themselves in the future, absent a significant change in internal or external factors that influence the ultimate cost of our unpaid losses and loss adjustment expenses. Our estimates reflect implicit and explicit assumptions regarding the potential effects of external factors, including economic and social inflation, judicial decisions, changes in law, general economic conditions and recent trends in these factors. Our actuarial analyses are based on statistical analysis but also consist of reviewing internal factors that are difficult to analyze statistically, including underwriting and claims handling changes. In some of our markets, and where we act as a reinsurer, the timing and amount of information reported about underlying claims are in the control of third parties. This can also affect estimates and require re-estimation as new information becomes available.

As indicated above, we may use one or more actuarial reserving methods, which incorporate numerous underlying judgments and assumptions, to establish our estimate of ultimate loss reserves. While we use our best judgment in establishing our estimate for loss reserves, applying different assumptions and variables could lead to significantly different loss reserve estimates.

Loss frequency and loss severity are two key measures of loss activity that often result in adjustments to actuarial assumptions relative to ultimate loss reserve estimates. Loss frequency measures the number of claims per unit of insured exposure. When the number of newly reported claims is higher than anticipated, generally speaking, loss reserves are increased. Conversely, loss reserves are generally decreased when fewer claims are reported than expected. Loss severity measures the average size of a claim. When the average severity of reported claims is higher than originally estimated, loss reserves are typically increased. When the average claim size is lower than anticipated, loss reserves are typically decreased. For example, in each of the past three years, we experienced favorable development on prior years' loss reserves in our workers' compensation product lines as a result of decreases in loss severity. During 2016, we experienced unfavorable development on prior years' loss reserves related to our specified medical and medical malpractice product lines as a result of increases in loss frequency.

Changes in prior years' loss reserves, including the trends and factors that impacted loss reserve development, as well as the likelihood that such trends and factors could result in future loss reserve development, are discussed in further detail under "Results of Operations."

Loss reserves are established at management's best estimate, which is generally higher than the corresponding actuarially calculated point estimate. The actuarial point estimate represents our actuaries' estimate of the most likely amount that will ultimately be paid to settle the loss reserves we have recorded at a particular point in time; however, there is inherent uncertainty in the point estimate as it is the expected value in a range of possible reserve estimates. In some cases, actuarial analyses, which are based on statistical analysis, cannot fully incorporate all of the subjective factors that affect development of losses. In other cases, management's perspective of these more subjective factors may differ from the actuarial perspective. Subjective factors where management's perspective may differ from that of the actuaries include: the credibility and timeliness of claims information received from third parties, economic and social inflation, judicial decisions, changes in law, changes in underwriting or claims handling practices, general economic conditions, the risk of moral hazard and other current and developing trends within the insurance and reinsurance markets, including the effects of competition. As a result, the actuarially calculated point estimates for each of our lines of business represent starting points for management's quarterly review of loss reserves. Additionally, following an acquisition of insurance operations, to the extent the reserving philosophy of the acquired business is less conservative than our reserving philosophy, the percentage by which management's best estimate exceeds the actuarial point estimate will generally be lower until we build total loss reserves that are consistent with our historic level of confidence. Management's best estimate of net reserves for unpaid losses and loss adjustment expenses exceeded the actuarially calculated point estimate by \$578.1 million, or 6.7%, at December 31, 2018, compared to \$576.9 million, or 6.9%, at December 31, 2017.

The difference between management's best estimate and the actuarially calculated point estimate in both 2018 and 2017 is primarily associated with our long-tail business. Actuarial estimates can underestimate the adverse effects of a soft insurance market because the impact of changes in risk selection and terms and conditions can be difficult to quantify. In addition, the frequency of claims may increase in a recessionary environment. Similarly, the risk an insured will intentionally cause or be indifferent to loss may increase during an economic downturn, and the attention to loss prevention measures may decrease. These subjective factors affect the development of losses and represent instances where management's perspectives may differ from those of our actuaries. As a result, management has attributed less credibility than our actuaries to favorable trends experienced on our long-tail business during soft market periods and has not incorporated these favorable trends into its best estimate to the same extent as the actuaries.

See note 9 of the notes to consolidated financial statements for further details regarding the historical development of reserves for losses and loss adjustment expenses and changes in methodologies and assumptions used to calculate reserves for unpaid losses and loss adjustment expenses.

Management also considers the range, or variability, of reasonably possible losses determined by our actuaries when establishing its best estimate for loss reserves. The actuarial ranges represent our actuaries' estimate of a likely lowest amount and likely highest amount that will ultimately be paid to settle the loss reserves we have recorded at a particular point in time. The range determinations are based on estimates and actuarial judgments and are intended to encompass reasonably likely changes in one or more of the factors that were used to determine the point estimates. Using statistical models, our actuaries establish high and low ends of a range of reasonable reserve estimates for each of our operating segments.

The following table summarizes our reserves for net unpaid losses and loss adjustment expenses and the actuarially established high and low ends of a range of reasonable reserve estimates at December 31, 2018. As described in note 9 of the notes to consolidated financial statements, unpaid losses and loss adjustment expenses attributable to acquisitions are recorded at fair value as of the acquisition date, which generally consists of the present value of the expected net loss and loss adjustment expense payments plus a risk premium. The net loss reserves presented in this table represent our estimated future payments for losses and loss adjustment expenses, whereas the reserves for unpaid losses and loss adjustment expenses included in the consolidated balance sheet include the unamortized portion of fair value adjustments recorded in conjunction with an acquisition.

<i>(dollars in millions)</i>	Net Loss Reserves Held	Low End of Actuarial Range ⁽¹⁾	High End of Actuarial Range ⁽¹⁾
Insurance	\$ 5,957.0	\$ 5,081.6	\$ 6,487.4
Reinsurance	2,994.0	2,139.4	3,411.5
Other	222.6	177.4	254.4

⁽¹⁾ Due to the actuarial methods used to determine the separate ranges for each component of our business, it is not appropriate to aggregate the high or low ends of the separate ranges to determine the high and low ends of the actuarial range on a consolidated basis.

Undue reliance should not be placed on these ranges of estimates as they are only one of many points of reference used by management to determine its best estimate of ultimate losses. Further, actuarial ranges may not be a true reflection of the potential variability between loss reserves estimated at the balance sheet date and the ultimate cost of settling claims. Actuarial ranges are developed based on known events as of the valuation date, while ultimate losses are subject to events and circumstances that are unknown as of the valuation date.

Life and Annuity Benefits

We have a run-off block of life and annuity reinsurance contracts which subject us to mortality, longevity and morbidity risks. The related reserves are compiled by our actuaries on a reinsurance contract-by-contract basis and are computed on a discounted basis using standard actuarial techniques and cash flow models. Since the development of our life and annuity reinsurance reserves is based upon cash flow projection models, we must make estimates and assumptions based on cedent experience, industry mortality tables, and expense and investment experience, including a provision for adverse deviation. The assumptions used to determine policy benefit reserves are generally locked-in for the life of the contract unless an unlocking event occurs. To the extent existing policy reserves, together with the present value of future gross premiums and expected investment income earned thereon, are not adequate to cover the present value of future benefits, settlement and maintenance costs, the locked-in assumptions are revised to current best estimate assumptions and a charge to earnings for life and annuity benefits is recognized at that time. Our consolidated balance sheets at December 31, 2018 and 2017 included reserves for life and annuity benefits of \$1.0 billion and \$1.1 billion, respectively.

Because of the assumptions and estimates used in establishing reserves for life and annuity benefit obligations and the long-term nature of these reinsurance contracts, the ultimate liability may be greater or less than the estimates. The average discount rate for the life and annuity benefit reserves was 2.3% as of December 31, 2018. The accretion of this discount is recognized in the statement of income and comprehensive income within services and other expenses. Invested assets and the related investment income that support the life and annuity reinsurance contracts are reported in the Investing segment. We expect the results from our life and annuity business will continue to reflect losses in future periods due to the accretion of the discount on the life and annuity benefit reserves, which are forecast to pay out over the next 40 to 50 years. Services and other revenues attributable to the life and annuity business represent ongoing premium adjustments on existing contracts.

Goodwill and Intangible Assets

Our consolidated balance sheet as of December 31, 2018 included goodwill and intangible assets of \$4.0 billion. Goodwill and intangible assets are recorded as a result of business acquisitions. Goodwill represents the excess of the amount paid to acquire a business over the net fair value of assets acquired and liabilities assumed at the date of acquisition. Indefinite-lived and other intangible assets are recorded at fair value as of the acquisition date. The determination of the fair value of certain assets acquired and liabilities assumed involves significant judgment and the use of valuation models and other estimates, which require assumptions that are inherently subjective.

Intangible assets with definite lives are reviewed for impairment when events or circumstances indicate that their carrying value may not be recoverable. Goodwill and indefinite-lived intangible assets are tested for impairment at least annually. A significant amount of judgment is required in performing the annual impairment test, including whether to assess qualitative factors to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying amount. This assessment serves as a basis for determining whether it is necessary to perform a quantitative impairment test.

We completed our annual test for impairment as of October 1, 2018 based upon results of operations through September 30, 2018 and elected to perform a qualitative assessment for all of our reporting units. When performing the assessment, we considered macroeconomic factors such as industry and market conditions. We also considered reporting unit-specific events, actual financial performance versus expectations and management's future business expectations. As part of our qualitative assessment of certain reporting units with material goodwill, we considered the fact that some of the businesses had been recently acquired in orderly transactions between market participants, and our purchase price represented fair value at acquisition. There were no events since acquisition that had a significant impact on the fair value of these reporting units as of the assessment date.

We also assess goodwill and indefinite-lived intangible assets for impairment when events or circumstances indicate that their carrying value may not be recoverable. In light of governmental inquiries into loss reserves recorded in late 2017 and early 2018 at Markel CATCo Re, an entity managed by MCIM, and taking into consideration the departure of two senior MCIM executives and special redemption rights that are now being offered to investors in the Markel CATCo Funds, management concluded MCIM's ability to maintain or raise capital has been adversely impacted. As a result, we performed an assessment of the recoverability of goodwill and intangible assets at the MCIM reporting unit as of December 31, 2018. As a result of the assessment, we reduced the carrying value of the goodwill and intangible assets of the MCIM reporting unit to zero, which resulted in a goodwill impairment charge of \$91.9 million and an intangible asset impairment charge of \$87.1 million, both of which were recorded to impairment of goodwill and intangible assets in the consolidated statement of loss and comprehensive loss for the year ended December 31, 2018. See note 7 and note 18 of the notes to consolidated financial statements for further details around these impairment charges and recent developments in our Markel CATCo operations.

Except as discussed above, based on the results of our qualitative assessment, and because there were no other indicators of impairment between the assessment date and December 31, 2018, we believe the fair value of each of our other reporting units exceeded its respective carrying amount as of the assessment date and December 31, 2018.

Recent Changes to Significant Accounting Policies

Effective January 1, 2018, as a result of recent significant changes in economic facts and circumstances, management reassessed its functional currency determination as required by FASB Accounting Standards Codification (ASC) 830, *Foreign Currency Matters*. As a result of the reassessment, the U.S. Dollar is the only functional currency for most of our foreign underwriting operations. Consequently, more foreign currency denominated transactions are designated as non-functional, with related remeasurement gains and losses included in net foreign exchange gains within net income. However, available-for-sale securities denominated in non-functional currencies are recorded at fair value with resulting gains and losses, including the portion attributable to movements in exchange rates, included in the change in net unrealized gains on available-for-sale investments, net of taxes, within other comprehensive income. As a result, while we attempt to naturally hedge our exposure to foreign currency fluctuations by matching assets and liabilities in the same currencies, there is a financial statement mismatch between the gains or losses recorded in net income related to insurance reserves denominated in non-functional currencies and the gains or losses recorded in other comprehensive income related to the available-for-sale securities held in non-functional currencies supporting the insurance reserves. The change in our functional currency determination has been applied on a prospective basis in accordance with ASC 830. Therefore, any translation gains and losses that were previously recorded in accumulated other comprehensive income remain unchanged through December 31, 2017. The year ended December 31, 2018 included a pre-tax foreign exchange gain of \$106.6 million (\$84.2 million , net of taxes) compared to a pre-tax foreign exchange gain of \$3.1 million (\$2.0 million, net of taxes) for the year ended December 31, 2017 . See further details of our change in functional currency determination in note 1(r) of the notes to consolidated financial statements.

Recent Accounting Pronouncements

Beginning January 1, 2019, upon adoption of ASU No. 2016-02, *Leases (Topic 842)* and ASU No. 2018-11, *Leases (Topic 842): Targeted Improvements*, most leases are required to be recorded on our balance sheet as a lease liability with a corresponding right-of-use asset. We will continue to recognize the related leasing expense within net income. Short term leases will not be recorded on the balance sheet. Our future minimum lease payments for noncancelable operating leases, which represent minimum annual rental commitments excluding taxes, insurance and other operating costs, and which will be subject to this new guidance, totaled \$305.9 million at December 31, 2018. We are currently finalizing our evaluation of the impacts that the adoption of this accounting guidance will have on the consolidated financial statements. We estimate a right-of-use asset and a lease liability of approximately \$250.0 million and \$275.0 million, respectively, will be recognized in the consolidated balance sheet upon adoption. Adoption of this standard will not have a material impact on our results of operations and will not impact our cash flows.

Other ASUs that we expect have the most potential to significantly impact our consolidated financial position, results of operations or cash flows upon adoption and are currently evaluating are as follows:

- ASU No. 2016-13, *Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments*
- ASU No. 2018-12, *Financial Services-Insurance (Topic 944): Targeted Improvements to the Accounting for Long-Duration Contracts*
- ASU No. 2018-15, *Intangibles-Goodwill and Other- Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract*

See note 1(w) of the notes to consolidated financial statements for discussion of all of these ASUs and the expected effects on our consolidated financial position, results of operations and cash flows.

Results of Operations

The following table presents the components of net income to shareholders.

	Years Ended December 31,		
	2018	2017	2016
<i>(dollars in thousands)</i>			
Insurance segment underwriting profit	\$ 228,773	\$ 85,097	\$ 199,045
Reinsurance segment underwriting profit (loss)	(118,287)	(300,018)	109,205
Net investment income	433,702	405,377	373,121
Net investment gains (losses) ⁽¹⁾	(437,596)	(5,303)	65,147
Markel Ventures segment profit ⁽²⁾	77,479	115,250	113,298
Other ⁽³⁾	(144,312)	(83,797)	(54,647)
Interest expense	(154,212)	(132,451)	(129,896)
Net foreign exchange gains (losses)	106,598	3,140	(1,253)
Loss on early extinguishment of debt	—	—	(44,100)
Income tax benefit (expense)	(122,498)	313,463	(169,477)
Net loss (income) attributable to noncontrolling interests	2,173	(5,489)	(4,754)
Net income (loss) to shareholders	\$ (128,180)	\$ 395,269	\$ 455,689

- (1) Effective January 1, 2018, we adopted ASU No. 2016-01, *Financial Instruments (Topic 825): Recognition and Measurement of Financial Assets and Financial Liabilities*, and equity securities are no longer classified as available-for-sale with unrealized gains and losses recognized in other comprehensive income, rather, changes in the fair value of equity securities are now recognized in net income. Prior periods have not been restated to conform to the current presentation. See note 1 of the notes to consolidated financial statements.
- (2) Segment profit for the Markel Ventures segment includes amortization of intangible assets attributable to Markel Ventures. Amortization of intangible assets is not allocated to any other reportable segments.
- (3) Other represents the total profit (loss) attributable to the Company's operations that are not included in a reportable segment as well as any amortization of intangible assets and impairment of goodwill and intangible assets that is not allocated to a reportable segment.

Net loss to shareholders was \$128.2 million in 2018, compared to net income to shareholders of \$395.3 million in 2017. The decrease was primarily due to the impact of a one-time tax benefit in 2017 and an increase in net investment losses in 2018 compared to 2017. Partially offsetting these unfavorable movements was underwriting profit of \$113.8 million in 2018 compared to an underwriting loss of \$207.2 million in 2017. The income tax benefit in 2017 was primarily a result of the enactment of the Tax Cuts and Jobs Act (TCJA) in 2017. The TCJA made significant modifications to U.S. income tax law, most of which became effective January 1, 2018. As a result, we recorded a one-time tax benefit of \$339.9 million in 2017 primarily related to the remeasurement of our U.S. net deferred tax liability at the lower enacted U.S. corporate tax rate. See further discussion of the impact of the TCJA in note 8 of the notes to consolidated financial statements. The increase in net foreign exchange gains (losses) in 2018 compared to 2017 is primarily attributable to the change in our functional currency determination, which was effective January 1, 2018. See further discussion of our change in functional currency determination in note 1 of the notes to consolidated financial statements. Net income to shareholders decreased 13% from 2016 to 2017 due to an underwriting loss and net realized investment losses in 2017 compared to an underwriting profit and net realized investment gains in 2016. These decreases were partially offset by recording the one-time tax benefit in 2017 described above. The components of net income to shareholders are discussed in further detail under "Underwriting Results," "Life and Annuity Benefits," "Investing Results," "Markel Ventures" and "Interest Expense, Loss on Early Extinguishment of Debt and Income Taxes."

Underwriting Results

Underwriting profits are a key component of our strategy to build shareholder value. We believe that the ability to achieve consistent underwriting profits demonstrates knowledge and expertise, commitment to superior customer service and the ability to manage insurance risk. The property and casualty insurance industry commonly defines underwriting profit or loss as earned premiums net of losses and loss adjustment expenses and underwriting, acquisition and insurance expenses. We use underwriting profit or loss and the combined ratio as a basis for evaluating our underwriting performance. The combined ratio is a measure of underwriting performance and represents the relationship of incurred losses, loss adjustment expenses and underwriting, acquisition and insurance expenses to earned premiums. The combined ratio is the sum of the loss ratio and the expense ratio. A combined ratio less than 100% indicates an underwriting profit, while a combined ratio greater than 100% reflects an underwriting loss. The loss ratio represents the relationship of incurred losses and loss adjustment expenses to earned premiums. The expense ratio represents the relationship of underwriting, acquisition and insurance expenses to earned premiums.

The following table presents selected data from our underwriting operations.

<i>(dollars in thousands)</i>	Years Ended December 31,		
	2018	2017	2016
Gross premium volume ⁽¹⁾	\$ 5,798,996	\$ 5,253,107	\$ 4,796,645
Net written premiums	\$ 4,785,590	\$ 4,417,787	\$ 4,001,020
Net retention ⁽¹⁾	83%	84%	83%
Earned premiums	\$ 4,712,060	\$ 4,247,978	\$ 3,865,870
Losses and loss adjustment expenses	\$ 2,820,715	\$ 2,865,761	\$ 2,050,744
Underwriting, acquisition and insurance expenses	\$ 1,777,511	\$ 1,589,464	\$ 1,497,125
Underwriting profit (loss)	\$ 113,834	\$ (207,247)	\$ 318,001

U.S. GAAP Combined Ratios

Insurance	94%	97%	93%
Reinsurance	113%	132%	87%
Markel Corporation (Consolidated)	98%	105%	92%

(1) Gross premium volume and net retention for the years ended December 31, 2018 and December 31, 2017 exclude \$2.1 billion and \$253.9 million, respectively of gross written premiums attributable to our program services business, substantially all of which was ceded.

Underwriting results in 2018 included \$287.3 million, or six points, of underwriting loss from Hurricanes Florence and Michael, Typhoon Jebi and wildfires in California (2018 Catastrophes). Underwriting results in 2017 included \$565.3 million, or 13 points, of underwriting loss from Hurricanes Harvey, Irma, Maria and Nate as well as the earthquakes in Mexico and wildfires in California (2017 Catastrophes). Underwriting results in 2016 included \$68.7 million, or two points, of underwriting loss from Hurricane Matthew and the Canadian wildfires (2016 Catastrophes).

The following table summarizes, by segment, the components of the underwriting losses related to the 2018 and 2017 Catastrophes.

<i>(dollars in thousands)</i>	Years Ended December 31,					
	2018			2017		
	2018 Catastrophes			2017 Catastrophes		
	Insurance	Reinsurance	Consolidated	Insurance	Reinsurance	Consolidated
Losses and loss adjustment expenses	\$ 105,265	\$ 187,490	\$ 292,755	\$ 254,976	\$ 330,384	\$ 585,360
Ceded (assumed) reinstatement premiums	5,142	(10,583)	(5,441)	12,391	(32,465)	(20,074)
Underwriting loss	\$ 110,407	\$ 176,907	\$ 287,314	\$ 267,367	\$ 297,919	\$ 565,286
Impact on combined ratio	3%	19%	6%	8%	32%	13%

The estimated net losses and loss adjustment expenses on the 2018 and 2017 Catastrophes were net of estimated ceded losses of \$244.1 million and \$490.3 million, respectively. Both the gross and net loss estimates on the 2018 and 2017 Catastrophes as of December 31, 2018 represent our best estimate of losses based upon information currently available. Our estimate for these losses is based on claims received to date, detailed policy level reviews, industry loss estimates, output from both industry and proprietary models as well as a review of in-force contracts. The estimates are dependent on broad assumptions about coverage, liability and reinsurance. While we believe our reserves for the 2018 and 2017 Catastrophes as of December 31, 2018 are adequate, we continue to closely monitor reported claims and will adjust our estimates of gross and net losses as new information becomes available. The net losses and loss adjustment expenses for the 2018 and 2017 Catastrophes were within our risk tolerance for events of this magnitude.

The decrease in the consolidated combined ratio for 2018 compared to 2017 was primarily attributable to lower catastrophe losses in 2018 compared to 2017. Excluding the impact of underwriting losses related to the 2018 Catastrophes and 2017 Catastrophes described above, the combined ratio was flat compared to 2017. The increase in the consolidated combined ratio in 2017 compared to 2016 was driven by the impact of the 2017 Catastrophes. Excluding the impact of underwriting losses related to the 2017 Catastrophes and 2016 Catastrophes described above, the combined ratio increased due to a higher current accident year loss ratio and less favorable prior accident year loss ratio, partially offset by a lower expense ratio.

The 2018, 2017 and 2016 combined ratio included \$551.0 million, \$501.5 million and \$505.2 million, respectively, of favorable development on prior years' loss reserves. Although favorable development on prior years' loss reserves increased in 2018 compared to 2017, development on prior years' loss reserves had a less favorable impact on the combined ratio in 2018 due to higher earned premium volume in 2018 compared to 2017. Favorable development on prior years' loss reserves in 2017 was comparable to 2016, however development on prior years' loss reserves had a less favorable impact on the combined ratio in 2017 due to higher earned premium volume in 2017 compared to 2016. In 2017, prior years' loss reserves in our Reinsurance segment included \$85.0 million, or two points on the consolidated combined ratio, of adverse development on prior years' loss reserves resulting from a decrease in the discount rate, known as the Ogden Rate, required in the calculation of lump sum awards in United Kingdom (U.K.) bodily injury cases. In 2017, the Ogden Rate decreased from plus 2.5% to minus 0.75%, which represented the first rate change since 2001. The effect of the rate change was most impactful to our U.K. auto casualty exposures through reinsurance contracts written in our Reinsurance segment. We ceased writing new U.K. auto business in late 2014. The reduction in the Ogden Rate increased the expected claims payments on these exposures, and management increased loss reserves accordingly. There was no significant development on our auto product lines in 2018. Our estimate of the ultimate cost of settling these claims is based on many factors, and is subject to increase or decrease as the effect of changes in these factors becomes known over time. In 2016, favorable development on prior years' loss reserves in our Insurance segment was net of \$71.2 million, or two points on the consolidated combined ratio, of adverse development on our medical malpractice and specified medical product lines. There was no significant development on these lines in 2017 or 2018.

In connection with our quarterly reviews of loss reserves, the actuarial methods we used have exhibited a favorable trend for the 2010 to 2017 accident years during 2018. This trend was observed using statistical analysis of actual loss experience for those years, particularly with regard to most of our long-tail books of business within the Insurance segment, which developed more favorably than we had expected. As actual losses experienced on these accident years have continued to be lower than anticipated, it has become more likely that the underwriting results will prove to be better than originally estimated. Additionally, as most actuarial methods rely upon historical reporting patterns, the favorable trends experienced on earlier accident years have resulted in a re-estimation of our ultimate incurred losses on more recent accident years. When we experience loss frequency or loss severity trends that are more favorable than we initially anticipated, we often evaluate the loss experience over a period of several years in order to assess the relative credibility of loss development trends. In each of the past three years, based upon our evaluations of claims development patterns in our long-tail, and often volatile, lines of business, we gave greater credibility to the favorable trend. As a result, our actuaries reduced their estimates of ultimate losses, and management incorporated this favorable trend into its best estimate and reduced prior years' loss reserves accordingly.

While we believe it is possible that there will be additional favorable development on prior years' loss reserves in 2019, we caution readers not to place undue reliance on this favorable trend.

The following discussion provides more detail by segment of the underwriting results described above. Following this segment-based discussion is a summary table of prior years' loss reserve development.

Insurance Segment

The combined ratio for the Insurance segment for 2018 was 94% (including three points for the underwriting loss on the 2018 Catastrophes) compared to 97% (including eight points for the underwriting loss on the 2017 Catastrophes) in 2017 and 93% (including one point for the underwriting loss on the 2016 Catastrophes) in 2016. The decrease in the 2018 combined ratio was driven by lower catastrophe losses, partially offset by a less favorable prior accident years' loss ratio compared to 2017. Although favorable development on prior years' loss reserves in 2018 was comparable to 2017, the benefit to our prior years' loss ratio was reduced given the impact of higher earned premiums in 2018 compared to 2017. The increase in the 2017 combined ratio was due to the impact of the 2017 Catastrophes, partially offset by more favorable development of prior years' loss reserves in 2017 compared to 2016.

The Insurance segment's 2018 combined ratio included \$502.3 million of favorable development on prior years' loss reserves compared to \$500.6 million in 2017 and \$369.6 million in 2016. In 2018, more favorable development on our workers' compensation and marine and energy product lines was offset by less favorable development on our professional liability and property product lines compared to 2017. The increase in favorable development on the marine and energy product lines was largely attributable to favorable development in 2018 related to the 2017 Catastrophes.

The increase in favorable development on prior years' loss reserves in 2017 compared to 2016 was primarily due to adverse development on our medical malpractice and specified medical product lines in 2016, which totaled \$71.2 million or two points on the segment combined ratio. There was no significant development on these product lines in 2017 or 2018. Also contributing to the increase in favorable development on prior years' loss reserves was favorable development on our specialty programs business in 2017 compared to slightly adverse development on this business in 2016 and more favorable development on our workers' compensation product line in 2017 compared to 2016. These increases in favorable development were partially offset by less favorable development on our property product lines in 2017 compared to 2016.

The following is a discussion of the product lines with the most significant development on prior years' loss reserves in the Insurance segment during the last three years.

In 2018, 2017 and 2016, we experienced \$143.0 million, \$144.1 million and \$127.1 million, respectively, of favorable development on various long-tail general and excess liability lines. The favorable development in 2018 occurred across several accident years, but was most significant on the 2012 to 2017 accident years. The favorable development in 2017 occurred across several accident years, but was most significant on the 2011 to 2016 accident years. The favorable development in 2016 occurred across several accident years, but was most significant on the 2013 to 2015 accident years. In 2018, the favorable development was due in part to lower than expected claim frequency. In 2017, the favorable development was due in part to favorable case incurred loss development on certain of our general liability product lines as well as a decrease in the frequency and severity of claims in other general liability product lines. In 2016, the favorable development was due in part to lower loss severity than originally anticipated. Our casualty business includes product lines that are long-tail and volatile in nature. For example, during 2018, 2017 and 2016, actual incurred losses and loss adjustment expenses on prior accident years for reported claims on certain of our casualty lines were \$81.3 million, \$52.3 million and \$51.8 million, respectively, less than we anticipated in our actuarial analyses. As a result, our actuaries reduced their estimates of ultimate losses in 2018, 2017 and 2016, and management assigned greater credibility to this favorable experience and reduced prior years' loss reserves accordingly.

The favorable development on prior years' loss reserves in the Insurance segment in 2018, 2017 and 2016 also included \$100.1 million, \$65.6 million and \$41.1 million, respectively, of favorable development in our workers' compensation product line. In 2018, the favorable development was most significant on the 2013 to 2017 accident years. In 2017, the favorable development was most significant on the 2012 to 2016 accident years. In 2016, the favorable development was most significant on the 2012 to 2015 accident years. In all three years, actual incurred losses and loss adjustment expenses on prior accident years for reported claims on our workers' compensation product lines were less than we anticipated in our actuarial analyses due in part to lower loss severity than originally anticipated and improvement in the claim closure ratios. As a result, our actuaries reduced their estimates of ultimate losses and management assigned greater credibility to this favorable experience and reduced prior years' loss reserves accordingly.

In 2018, 2017 and 2016, we also experienced favorable development in certain of our professional liability product lines. In 2018, we experienced \$68.5 million of favorable development on our professional liability product lines. The favorable development occurred across several accident years, but was most significant on the 2016 and 2017 accident years. In 2017, we experienced \$100.4 million of favorable development on our professional liability product lines, primarily on the 2013 to 2016 accident years. In 2018 and 2017, the favorable development occurred across multiple professional liability lines and was driven primarily by favorable case incurred loss development. Actual case incurred losses were less than expected. As a result of these factors, our actuarial estimates of the ultimate liability for unpaid losses and loss adjustment expenses were reduced, and management reduced prior years' loss reserves accordingly. In 2016, favorable development on our professional liability product lines was more than offset by adverse development of \$71.2 million on our medical malpractice and specified medical product lines, primarily on the 2010 through 2015 accident years. The adverse development on both of these product lines was driven by an increase in the proportion of business written on classes with higher claim frequencies relative to other classes of business within these product lines over the last several years, including correctional facilities, locum tenens and contract staffing. Beginning in late 2015, we saw an increase in claim frequencies on these classes, which was inconsistent with the historical trends indicated by our actuarial analyses. In 2016, we continued to see steady increases in claim frequencies, as well as increases in claims payments on these classes of business. As a result, we gave more credibility to this new trend and management increased loss reserves accordingly. In response, we took corrective actions for business written in the affected classes. Excluding the adverse development on our medical malpractice and specified medical product lines, we experienced \$104.6 million of favorable development on our other professional liability product lines during 2016, primarily on the 2014 and 2015 accident years. The favorable development occurred across multiple professional liability lines and was driven by a combination of factors, including lower loss severity than was originally anticipated and a decrease in the frequency of claims and large losses. As a result of these factors, our actuarial estimates of the ultimate liability for unpaid losses and loss adjustment expenses were reduced, and management reduced prior years' loss reserves accordingly.

In 2018, 2017 and 2016, we also experienced favorable development on our marine and energy product lines of \$70.7 million, \$42.5 million and \$50.2 million, respectively. In 2018, the favorable development was driven primarily by favorable development related to the 2017 Catastrophes and lower than expected development on known claims. In 2017 and 2016, the favorable development was driven primarily by lower than expected claims activity on prior accident years and favorable claims settlements. In 2018, the favorable development on prior years' loss reserves was most significant on the 2013 to 2017 accident years. In 2017, the favorable development on prior years' loss reserves was most significant on the 2014 and 2015 accident years. In 2016, the favorable development on prior year loss reserves was most significant on the 2013 to 2015 accident years.

In 2017 we experienced \$29.1 million of favorable development in our personal lines business, primarily on the 2013 to 2016 accident years. The favorable development occurred across multiple personal lines products and was driven primarily by a decrease in claim severity, as well as claim frequency. As a result, our actuaries reduced their estimates of ultimate losses in 2017 and management assigned greater credibility to this favorable experience and reduced prior years' loss reserves accordingly.

In 2016, we experienced favorable development on prior years' loss reserves on our property product lines, primarily our inland marine and commercial property lines. Favorable development on our inland marine business totaled \$20.1 million in 2016, primarily on the 2014 and 2015 accident years and was attributable to lower than expected frequency of large loss events. Favorable development on our commercial property product lines totaled \$35.3 million in 2016 and was due to lower than expected losses and development on known claims, primarily on the 2012 to 2014 accident years. As a result of these factors, our actuarial estimates of the ultimate liability for unpaid losses and loss adjustment expenses decreased, and management reduced prior years' loss reserves accordingly.

Reinsurance Segment

The combined ratio for the Reinsurance segment for 2018 was 113% (including 19 points for the underwriting loss on the 2018 Catastrophes) compared to 132% (including 32 points for the underwriting loss on the 2017 Catastrophes) for 2017 and 87% (including four points for the underwriting loss on the 2016 Catastrophes) for 2016. The decrease in the 2018 combined ratio was driven by lower catastrophe losses in 2018 compared to 2017 and favorable development on prior accident years' loss reserves in 2018 compared to adverse development in 2017. These decreases were partially offset by a higher expense ratio in 2018 compared to 2017. Excluding the impact of underwriting losses related to the 2018 and 2017 Catastrophes described above, the current accident year loss ratio decreased, primarily due to net favorable premium adjustments in 2018 compared to net unfavorable premium adjustments in 2017. The increase in the expense ratio was driven by the impact of lower net assumed reinstatement premiums related to the 2018 Catastrophes compared to the 2017 Catastrophes and a lower benefit from ceding commissions in 2018, partially offset by lower profit sharing expenses in 2018 compared to 2017.

The increase in the 2017 combined ratio compared to 2016 was driven by the impact of the 2017 Catastrophes and adverse development on prior years' loss reserves attributable to the decrease in the Ogden rate in 2017. These increases were partially offset by a lower expense ratio in 2017 compared to 2016. Excluding the impact of underwriting losses related to the 2017 Catastrophes and 2016 Catastrophes described above, the current accident year loss ratio increased, primarily due to higher unfavorable premium adjustments in 2017 compared to 2016. The decrease in the expense ratio in 2017 compared to 2016 was primarily due to lower profit sharing expenses and a favorable impact from higher earned premium in 2017, including reinstatement premiums related to the 2017 Catastrophes. These decreases in the expense ratio were partially offset by the impact of higher earned premiums on our quota share business in 2017 compared to 2016, which carries a higher commission rate than other business in the Reinsurance segment.

The Reinsurance segment's 2018 combined ratio included \$43.0 million of favorable development on prior years' loss reserves compared to \$7.8 million of adverse development in 2017 and \$125.5 million of favorable development in 2016. In 2017, prior years' loss reserves included \$85.0 million of adverse development, or nine points on the 2017 Reinsurance segment combined ratio, related to the decrease in the Ogden Rate. Excluding the impact of the 2017 change in the Ogden Rate, favorable development on prior years' loss reserves decreased in 2018 compared to 2017 due to less favorable development on our property product lines in 2018, including adverse development related to the 2017 Catastrophes. Favorable development in 2018 was most significant on our marine and energy and surety product lines. Partially offsetting this favorable development was adverse development on our professional liability product lines in 2018. In 2017, adverse development resulting from the Ogden Rate change described above and on our professional liability product lines was largely offset by favorable development on our property product lines. In 2016, favorable development on prior years' loss reserves was most significant on our property product lines, with the remaining favorable development occurring across several product lines.

The favorable development on prior years' loss reserves in the Reinsurance segment in 2018 included \$23.9 million of favorable development on our surety product lines, across several accident years. The favorable development in 2018 was driven primarily by lower than expected development on known claims. As a result of these factors, our actuarial estimates of the ultimate liability for unpaid losses and loss adjustment expenses were reduced, and management reduced prior years' loss reserves accordingly.

In 2018, we also experienced \$18.0 million of favorable development on our marine and energy product lines, primarily driven by lower loss severity and lower claims frequency. As a result of these factors, our actuarial estimates of the ultimate liability for unpaid losses and loss adjustment expenses were reduced, and management reduced prior years' loss reserves accordingly.

The favorable development occurred across several accident years, but was most significant on the 2012 to 2016 accident years.

Prior years' loss reserves in the Reinsurance segment in 2018 also included \$16.2 million of adverse development on our professional liability product lines. In 2018, we experienced adverse claims activity on certain of our professional liability product lines and recognized \$35.7 million of adverse development. Partially offsetting the adverse development on certain of our professional liability product lines, was \$19.6 million of favorable development on our medical product lines during 2018, primarily on the 2009 to 2013 accident years. The favorable development was driven by a combination of factors, including lower loss severity than was originally anticipated and a decrease in the frequency of claims. As a result of these factors, our actuarial estimates of the ultimate liability for unpaid losses and loss adjustment expenses were reduced, and management reduced prior years' loss reserves accordingly.

Favorable development on prior years' loss reserves on our property lines of business in 2017 and 2016 were \$41.2 million and \$67.6 million, respectively. In both years, the favorable development on prior years' loss reserves was most significant on the 2013 to 2015 accident years and was due in part to lower than expected development on reported events, favorable claims settlements and lower than expected claims activity. As a result of these factors, our actuaries reduced their estimates of ultimate losses, and management reduced prior years' loss reserves accordingly.

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The following tables summarize the increases (decreases) in prior years' loss reserves, as discussed above.

<i>(dollars in millions)</i>	Year Ended December 31, 2018			
	Insurance Segment	Reinsurance Segment	Other	Total
Insurance segment:				
General liability	\$ (143.0)			\$ (143.0)
Workers' compensation	(100.1)			(100.1)
Professional liability	(68.5)			(68.5)
Marine and energy	(70.7)			(70.7)
Reinsurance segment:				
Surety		\$ (23.9)		(23.9)
Marine and energy		(18.0)		(18.0)
Professional liability		16.2		16.2
Net other prior years' redundancy	(120.0)	(17.3)	\$ (5.7)	(143.0)
Decrease	<u>\$ (502.3)</u>	<u>\$ (43.0)</u>	<u>\$ (5.7)</u>	<u>\$ (551.0)</u>

<i>(dollars in millions)</i>	Year Ended December 31, 2017			
	Insurance Segment	Reinsurance Segment	Other	Total
Insurance segment:				
General liability	\$ (144.1)			\$ (144.1)
Workers' compensation	(65.6)			(65.6)
Professional liability	(100.4)			(100.4)
Marine and energy	(42.5)			(42.5)
Personal Lines	(29.1)			(29.1)
Reinsurance segment:				
Ogden rate decrease		\$ 85.0		85.0
Property		(41.2)		(41.2)
Net other prior years' redundancy	(118.9)	(36.0)	\$ (8.7)	(163.6)
Increase (decrease)	<u>\$ (500.6)</u>	<u>\$ 7.8</u>	<u>\$ (8.7)</u>	<u>\$ (501.5)</u>

<i>(dollars in millions)</i>	Year Ended December 31, 2016			
	Insurance Segment	Reinsurance Segment	Other	Total
Insurance segment:				
General liability	\$ (127.1)			\$ (127.1)
Workers' compensation	(41.1)			(41.1)
Property:				
Commercial property	(35.3)			(35.3)
Inland marine	(20.1)			(20.1)
Professional liability:				
Medical malpractice and specified medical	71.2			71.2
All other	(104.6)			(104.6)
Marine and energy	(50.2)			(50.2)
Reinsurance segment:				
Property		\$ (67.6)		(67.6)
Net other prior years' redundancy	(62.4)	(57.9)	\$ (10.1)	(130.4)
Decrease	<u>\$ (369.6)</u>	<u>\$ (125.5)</u>	<u>\$ (10.1)</u>	<u>\$ (505.2)</u>

Over the past three years, we have experienced favorable development on prior years' loss reserves of 6% of beginning of year net loss reserves. It is difficult for management to predict the duration and magnitude of an existing trend and, on a relative basis, it is even more difficult to predict the emergence of factors or trends that are unknown today but may have a material impact on loss reserve development. In assessing the likelihood of whether the above favorable trends will continue and whether other trends may develop, we believe that a reasonably likely movement in prior years' loss reserves during 2019 would range from favorable development of less than 1%, or \$50 million, to favorable development of approximately 7%, or \$650 million, of December 31, 2018 net loss reserves.

Premiums

The following table summarizes gross premium volume.

Gross Premium Volume

<i>(dollars in thousands)</i>	Years Ended December 31,		
	2018	2017	2016
Insurance segment	\$ 4,749,166	\$ 4,141,201	\$ 3,755,081
Reinsurance segment	1,050,870	1,112,101	1,041,055
Other	(1,040)	(195)	509
Total Underwriting	5,798,996	5,253,107	4,796,645
Other - Program services	2,065,473	253,853	—
Total	\$ 7,864,469	\$ 5,506,960	\$ 4,796,645

Gross premium volume in our underwriting segments increased 10% in 2018 compared to 2017. The increase in gross premium volume was attributable to an increase in gross premium volume in our Insurance segment, partially offset by a decrease in gross premium volume in our Reinsurance segment. Also impacting consolidated gross premium volume in 2018 was \$2.1 billion of gross premium written through our program services business acquired as part of the State National transaction, which is not included in our underwriting segments. Substantially all gross premium written in our program services business was ceded in 2018 and 2017.

Gross premium volume in our Insurance segment increased 15% in 2018 compared to 2017 driven by increased premiums from our surety and collateral protection businesses, both of which were acquired in 2017, as well as growth within our general and professional liability product lines and personal lines business.

Gross premium volume in our Reinsurance segment decreased 6% in 2018 compared to 2017, primarily due to a large specialty quota share treaty entered into in the first quarter of 2017 that did not renew in 2018, as well as lower gross premium volume in our property product lines, primarily due to contracts that did not renew. These decreases were partially offset by growth in 2018 in our surety product lines as well as higher gross premium volume in our general liability, professional liability and worker's compensation product lines resulting from favorable premium adjustments and timing of renewals. Significant variability in gross premium volume can be expected in our Reinsurance segment due to the timing of individually significant contracts and multi-year contracts.

Gross premium volume in our underwriting segments increased 10% in 2017 compared to 2016. The increase in gross premium volume was attributable to an increase in gross premium volume across both of our underwriting segments. Also impacting consolidated gross premium volume in 2017 was \$253.9 million of gross premium written through our program services business.

Gross premium volume in our Insurance segment increased 10% in 2017 compared to 2016 driven by growth within our marine and energy and general liability product lines, personal lines and specialty programs business as well the contribution of premiums from our surety and collateral protection product lines, both of which were acquired in 2017.

Gross premium volume in our Reinsurance segment increased 7% in 2017 compared to 2016 driven by \$136.5 million of premium related to two large specialty quota share treaties entered into in the first quarter of 2017, as well as a favorable impact from assumed reinstatement premiums in our property product lines resulting from the 2017 Catastrophes. These increases were partially offset by lower gross premium volume in our auto and general liability product lines.

We experienced soft insurance market conditions across most of our property product lines, as well as on our marine and energy line beginning in 2013 and continuing through 2017. Our large account business has also been subject to more pricing pressure and competition remains strong in the reinsurance market. Following the high level of natural catastrophes that occurred in the third and fourth quarters of 2017, in 2018, we experienced slightly more favorable rates, particularly on our catastrophe exposed and loss affected product lines. However, we also experienced rate decreases on other product lines and the market remains competitive. When we believe the prevailing market price will not support our underwriting profit targets, the business is not written. As a result of our underwriting discipline, gross premium volume may vary when we alter our product offerings to maintain or improve underwriting profitability.

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The following table summarizes net written premiums.

Net Written Premiums

<i>(dollars in thousands)</i>	Years Ended December 31,		
	2018	2017	2016
Insurance segment	\$ 3,904,773	\$ 3,439,796	\$ 3,101,657
Reinsurance segment	882,285	978,160	898,728
Other	(1,468)	(169)	635
Total Underwriting	4,785,590	4,417,787	4,001,020
Other - Program services	1,988	—	—
Total	\$ 4,787,578	\$ 4,417,787	\$ 4,001,020

Substantially all gross premium written in our program services business was ceded in 2018, resulting in \$2.0 million of net written premiums. All gross premium written in our program services business was ceded in 2017, resulting in zero net written premiums. Within our underwriting operations, we purchase reinsurance and retrocessional reinsurance in order to manage our net retention on individual risks and enable us to write policies with sufficient limits to meet policyholder needs.

Net retention of gross premium volume for our underwriting operations was 83% in 2018 , 84% in 2017 and 83% in 2016 . The decrease in net retention in 2018 was primarily driven by lower retention on our personal lines business within the Insurance segment and an increase in catastrophe reinsurance coverage purchases in 2018 compared to 2017.

In 2017, the increase in net retention was driven by higher retention in our Reinsurance segment compared to 2016, primarily due to changes in the mix of business. Net retention in the Insurance segment was flat in 2017 compared to 2016 due to lower retention on our specialty programs and personal lines business, offset by higher retention on our casualty and professional liability product lines.

The following table summarizes earned premiums.

Earned Premiums

<i>(dollars in thousands)</i>	Years Ended December 31,		
	2018	2017	2016
Insurance segment	\$ 3,783,939	\$ 3,314,033	\$ 3,028,844
Reinsurance segment	928,574	934,114	836,264
Other	(1,468)	(169)	762
Total Underwriting	4,711,045	4,247,978	3,865,870
Other - Program services	1,015	—	—
Total	\$ 4,712,060	\$ 4,247,978	\$ 3,865,870

Earned premiums in our underwriting operations increased 11% in 2018 compared to 2017. The increase in earned premiums was attributable to higher earned premiums in our Insurance segment, primarily driven by growth in gross premium volume in our general liability, professional liability and marine and energy product lines. The increase was also attributable to earned premiums within our new surety and collateral protection product lines acquired in 2017. These increases were partially offset by the impact of lower net assumed reinstatement premiums related to the 2018 Catastrophes compared to the 2017 Catastrophes.

Earned premiums in our underwriting operations increased 10% in 2017 compared to 2016. The increase in earned premiums was attributable to higher earned premiums across both of our underwriting segments and the favorable impact of net assumed reinstatement premiums in 2017 compared to 2016. The increase in earned premiums in our Insurance segment was primarily due to an increase in gross premium volume in our marine and energy and general liability product lines as well as higher retention in our general liability product lines. The increase was also attributable to earned premiums within our new surety and collateral protection product lines, as previously discussed. The increase in earned premiums in our Reinsurance segment was primarily due to higher earned premiums in our property product lines due to the favorable impact of reinstatement premiums related to the 2017 Catastrophes, higher earned premium from the two large specialty quota share treaties previously discussed, as well as higher earned premiums in our professional liability and general liability product lines. These increases were partially offset by lower earned premiums in our auto product line.

Investing Results

Our business strategy recognizes the importance of both consistent underwriting and operating profits and superior investment returns to build shareholder value. We rely on sound underwriting practices to produce investable funds while minimizing underwriting risk. We measure investing results by our net investment income and net investment gains as well as our taxable equivalent total investment return.

The following table summarizes our investment performance.

<i>(dollars in thousands)</i>	Years Ended December 31,		
	2018	2017	2016
Net investment income	\$ 434,215	\$ 405,709	\$ 373,230
Net investment gains (losses) ⁽¹⁾	\$ (437,596)	\$ (5,303)	\$ 65,147
Change in net unrealized investment gains on available-for-sale securities ⁽¹⁾	\$ (299,446)	\$ 1,125,440	\$ 342,111
Investment yield ⁽²⁾	2.7 %	2.6%	2.4%
Taxable equivalent total investment return, before foreign currency effect	(0.7)%	9.2%	5.0%
Taxable equivalent total investment return	(1.0)%	10.2%	4.4%
Invested assets, end of year	\$ 19,238,261	\$ 20,570,337	\$ 19,058,666

(1) Effective January 1, 2018, we adopted ASU No. 2016-01 and equity securities are no longer classified as available-for-sale with unrealized gains and losses recognized in other comprehensive income, rather, changes in the fair value of equity securities are now recognized in net income. Prior periods have not been restated to conform to the current presentation. See note 1 of the notes to consolidated financial statements.

(2) Investment yield reflects net investment income as a percentage of monthly average invested assets at amortized cost.

Investments, cash and cash equivalents and restricted cash and cash equivalents (invested assets) decreased 6% in 2018. The decrease in the investment portfolio in 2018 was attributable to a decrease in short-term investments of \$1.1 billion and decreases in the fair value of equity securities of \$425.6 million, offset by cash flows from operations of \$892.9 million. Invested assets increased 8% in 2017 compared to 2016. The increase in the investment portfolio in 2017 was attributable to an increase in the fair value of the investment portfolio of \$1.1 billion, net proceeds from our net issuance of long-term debt of \$592.9 million and cash flows from operations of \$858.5 million, partially offset by cash flows used by investing activities of \$744.5 million.

During 2018, 2017 and 2016, we increased our holdings of equity securities in order to achieve higher long-term investment returns. The net increase in our holdings of equity securities in 2018 was more than offset by declines in the fair value of the securities. During 2018, we also used cash and cash equivalents and short-term investments to purchase fixed maturities. In 2017, our holdings of cash and cash equivalents increased primarily due to operating cash inflows, the issuance of long-term debt and maturities of fixed maturities held for anticipated claim payments for the 2017 Catastrophes. In 2017 and 2018, we also decreased our holdings of short-term investments to fund acquisitions. In 2016, we also increased our holdings of fixed maturities and decreased our holdings of cash and cash equivalents and short-term investments to more closely match the duration of our fixed maturity portfolio with our insurance liabilities. Short-term investments, cash and cash equivalents and restricted cash and cash equivalents represented 18% of our invested assets at December 31, 2018 compared to 23% at December 31, 2017. Fixed maturities represented 52% of our invested assets at December 31, 2018 compared to 48% at December 31, 2017. Equity securities at December 31, 2018 represented 30% of our invested assets compared to 29% at December 31, 2017.

Net investment income increased 7% in 2018 compared to 2017. The increase in 2018 was driven by an increase in short-term investment income, primarily due to higher short-term interest rates, and higher dividend income due to increased equity holdings. Net investment income increased 9% in 2017 compared to 2016. Net investment income in 2017 included higher short-term investment income compared to 2016, driven by higher short-term interest rates, and higher dividend income due to increased equity holdings. See note 3 (d) of the notes to consolidated financial statements for further details on the components of net investment income.

Net investment losses were \$437.6 million in 2018 compared \$5.3 million in 2017 and net investment gains of \$65.1 million in 2016. See note 3 (f) of the notes to consolidated financial statements for further details on the components of net investment gains (losses). Net investment losses in 2018 were primarily attributable to a decrease in the fair value of equity securities of \$425.6 million in 2018, which was driven by unfavorable market value movements and a decline in the fair value of our investments in the Markel CATCo Funds. Net investment losses in 2018 and 2017 included losses of \$108.6 million and \$52.0 million, respectively, attributable to the decline in fair value of our investments in the Markel CATCo Funds compared to net investment gains of \$21.0 million on our investments in the Markel CATCo Funds in 2016. The decrease in fair value in 2018 and 2017 primarily resulted from decreases in the net asset value of the Markel CATCo Funds, which were driven by the impact of losses from Hurricanes Harvey, Irma and Maria and the 2017 wildfires in California on the underlying reinsurance contracts in which the Markel CATCo Funds are invested. Net investment losses in 2018 also included a loss of \$16.0 million related to our investment in CROF. In 2017, the Company's investment in CROF was considered an available-for-sale security, with changes in fair value included in other comprehensive income. Other comprehensive income for 2017 included a loss of \$5.8 million attributable to our investment in CROF. At December 31, 2018 and 2017, the fair value of our investments in the Markel CATCo Funds and CROF totaled \$58.2 million and \$189.3 million, respectively, which is included in equity securities on our consolidated balance sheets. These investments remain exposed to adverse development on loss events that occurred in 2018 and 2017, which may result in further declines in fair value.

Net realized investment gains (losses) in 2018, 2017 and 2016 included \$16.3 million, \$4.5 million and \$8.2 million, respectively, of realized losses from sales of available-for-sale securities. Proceeds received on available-for-sale securities sold at a loss were \$88.7 million in 2018, \$306.1 million in 2017 and \$138.3 million in 2016. See note 3 (b) of the notes to consolidated financial statements for further discussion of unrealized losses on available-for-sale securities.

In 2018, the decrease in net unrealized gains on available-for-sale investments was \$299.4 million, which was attributable to a decrease in the estimated fair value of our fixed maturity portfolio in 2018 as a result of an increase in interest rates. In 2017, net unrealized gains on available-for-sale investments increased \$1.1 billion primarily due to an increase in the estimated fair value of our equity portfolio as a result of strong overall equity market performance. In 2016, net unrealized gains on available-for-sale investments increased \$342.1 million due to an increase in the estimated fair value of our equity portfolio, as a result of strong overall equity market performance, partly offset by a decrease in the fair value of our fixed maturity portfolio, as interest rates increased during 2016.

We also evaluate our investment performance by analyzing taxable equivalent total investment return, which is a non-GAAP financial measure. Taxable equivalent total investment return includes items that impact net income, such as coupon interest on fixed maturities, dividends on equity securities and investment gains or losses, as well as changes in unrealized gains or losses on available-for-sale securities, which do not impact net income. Certain items that are included in net investment income have been excluded from the calculation of taxable equivalent total investment return, such as amortization and accretion of premiums and discounts on our fixed maturity portfolio, to provide a comparable basis for measuring our investment return against industry investment returns. The calculation of taxable equivalent total investment return also includes the current tax benefit associated with income on certain investments that is either taxed at a lower rate than the statutory income tax rate or is not fully included in U.S. taxable income. We believe the taxable equivalent total investment return is a better reflection of the economics of our decision to invest in certain asset classes. We focus on our long-term investment return, understanding that the level of realized and unrealized investment gains or losses may vary from one period to the next.

The following table reconciles investment yield to taxable equivalent total investment return.

	Years Ended December 31,		
	2018	2017	2016
Investment yield ⁽¹⁾	2.7 %	2.6 %	2.4 %
Adjustment of investment yield from amortized cost to fair value	(0.6)%	(0.5)%	(0.4)%
Net amortization of net premium on fixed maturities	0.4 %	0.4 %	0.4 %
Net investment gains (losses) and change in net unrealized investment gains on available-for-sale securities	(3.4)%	5.9 %	2.3 %
Taxable equivalent effect for interest and dividends ⁽²⁾	0.1 %	0.4 %	0.4 %
Other ⁽³⁾	(0.2)%	1.4 %	(0.7)%
Taxable equivalent total investment return	(1.0)%	10.2 %	4.4 %

(1) Investment yield reflects net investment income as a percentage of monthly average invested assets at amortized cost.

(2) Adjustment to tax-exempt interest and dividend income to reflect a taxable equivalent basis.

(3) Adjustment to reflect the impact of changes in foreign currency exchange rates and time-weighting the inputs to the calculation of taxable equivalent total investment return.

Markel Ventures

We report the results of our Markel Ventures operations in our Markel Ventures segment. This segment includes a diverse portfolio of businesses from different industries that offer various types of products and services to businesses and consumers, predominately in the United States. Our products group manufactures, builds or produces consumer and industrial products, such as equipment used in baking systems and food processing, portable dredges, over-the-road car haulers and equipment, laminated oak and composite wood flooring used in the trucking industry, dormitory furniture, wall systems, medical casework and marine panels, storage and transportation equipment for specialty gas, ornamental plants, fashion handbags and residential homes. The services group offers consumer and business services, such as leasing and management of manufactured housing communities, behavioral healthcare, concierge health programs, retail intelligence and management and technology consulting.

We measure Markel Ventures' results, by its operating income and net income, as well as earnings before interest, income taxes, depreciation and amortization (EBITDA). We consolidate the results of our Markel Ventures subsidiaries on a one-month lag, with the exception of significant transactions or events that occur during the intervening period.

The following tables summarize the amounts recognized in the consolidated balance sheets and consolidated statements of income related to Markel Ventures.

<i>(dollars in thousands)</i>	December 31,	
	2018	2017
ASSETS		
Cash and cash equivalents	\$ 164,336	\$ 165,172
Receivables	188,048	190,208
Goodwill	497,338	424,982
Intangible assets	431,457	400,589
Other assets:		
Inventory	298,729	227,773
Property, plant and equipment, net	407,834	369,433
Other	136,764	122,571
Total Other assets	843,327	719,777
Total Assets	\$ 2,124,506	\$ 1,900,728
LIABILITIES AND EQUITY		
Accounts payable and accrued liabilities	\$ 149,907	\$ 101,526
Senior long-term debt and other debt ⁽¹⁾	684,099	554,282
Other liabilities	258,843	244,082
Total Liabilities	1,092,849	899,890
Redeemable noncontrolling interests	174,062	166,270
Shareholders' equity ⁽²⁾	860,931	837,060
Noncontrolling interests	(3,336)	(2,492)
Total Equity	857,595	834,568
Total Liabilities and Equity	\$ 2,124,506	\$ 1,900,728

(1) Senior long-term debt and other debt as of December 31, 2018 and 2017 included \$606.0 million and \$476.0 million, respectively, of debt due to other subsidiaries of Markel Corporation, which was eliminated in consolidation.

(2) Shareholders' equity as of December 31, 2018 and 2017 included \$658.6 million and \$663.6 million, respectively, of common stock, which represents Markel Corporation's investment in Markel Ventures, which was eliminated in consolidation.

<i>(dollars in thousands)</i>	Years ended December 31,		
	2018	2017	2016
OPERATING REVENUES			
Net investment income	\$ 513	\$ 332	\$ 109
Products revenues	1,497,523	951,012	885,473
Services and other revenues ⁽¹⁾	417,461	385,808	328,976
Total Operating Revenues	1,915,497	1,337,152	1,214,558
OPERATING EXPENSES			
Products expenses	1,413,248	850,449	755,591
Services and other expenses	366,739	336,484	297,841
Amortization of intangible assets	40,208	31,429	29,105
Impairment of goodwill and intangible assets	14,904	—	18,723
Total Operating Expenses	1,835,099	1,218,362	1,101,260
Operating Income	80,398	118,790	113,298
Net foreign exchange gains	(21)	(1,090)	(212)
Interest expense ⁽²⁾	28,423	20,009	15,718
Income Before Income Taxes	51,996	99,871	97,792
Income tax expense (benefit)	18,579	(9,303)	36,005
Net Income	33,417	109,174	61,787
Net income (loss) attributable to noncontrolling interests	(1,841)	5,615	5,615
Net Income to Shareholders	\$ 35,258	\$ 103,559	\$ 56,172

(1) Services and other revenues for the years ended December 31, 2018 and 2017 included intercompany revenues of \$2.9 million and \$3.5 million, respectively, which were eliminated in consolidation. There were no intercompany revenues in 2016.

(2) Interest expense for the years ended December 31, 2018, 2017 and 2016 included intercompany interest expense of \$18.1 million, \$12.3 million and \$9.7 million, respectively, which was eliminated in consolidation.

Revenues from our Markel Ventures segment increased in 2018 compared to 2017, primarily due to the acquisition of Costa Farms in the third quarter of 2017 and Brahmin in the fourth quarter of 2018. The increase was also attributable to higher sales volumes from certain of our equipment-manufacturing and transportation-related businesses as well as one of our consulting services businesses.

The increase in revenues in 2017 compared to 2016 was partially attributable to the acquisition of Costa Farms. In 2017, we also experienced higher sales volumes from certain of our consulting services and healthcare businesses as well as one of our consumer and building products businesses, partially offset by lower sales volumes at one of our transportation-related businesses.

For the year ended December 31, 2018, operating expenses for Markel Ventures included a \$33.5 million accrual related to the internal investigation and remediation associated with the manufacture of products at one of our businesses and a \$14.9 million impairment charge related to intangible assets at this business. The amount accrued related to this matter represented management's best estimate of amounts considered probable including: remediation costs associated with the manufacture of products, costs associated with the investigation of this matter, a write down of inventory on hand and settlement costs related to pre-existing litigation. As of December 31, 2018, \$33.5 million remained accrued for remediation efforts which are continuing into 2019. Final resolution of this matter could ultimately result in additional remediation and other costs, the amount of which cannot be estimated at this time, but which could have a material impact on our net income to shareholders. However, management does not expect this matter ultimately will have a material adverse effect on our results of operations or financial condition. If a determination is made that additional costs associated with this matter are considered probable, these additional costs will be recognized as an expense in our results of operations.

For the year ended December 31, 2017, operating expenses included \$64.0 million of insurance recoveries, net of \$19.6 million of storm losses, at one of our consumer and building products businesses attributable to Hurricane Irma. Insurance recoveries included payments for the replacement cost of damaged structures and expected profits from damaged inventory that would have otherwise been sold in 2017 and 2018. Operating expenses for the year ended December 31, 2017 also included \$19.0 million of expense attributable to an increase in our estimate of the contingent consideration obligation related to our acquisition of Costa Farms, which is further described below.

Operating expenses in 2016 included \$18.7 million of goodwill impairment charges related to one of our industrial manufacturing reporting units and \$10.3 million of expense attributable to an increase in our estimate of the contingent consideration obligation related to our 2015 acquisition of CapTech, which is further described below.

A portion of the purchase consideration for the Costa Farms and CapTech acquisitions was based on post-acquisition earnings, as defined in the respective purchase agreements. Our initial estimate of the contingent consideration we expected to pay was included in the allocation of the purchase price at the respective acquisition dates. Subsequent increases in our expectation of the contingent consideration obligation resulted in charges to operating expenses. As of December 31, 2018, the fair value of our outstanding contingent consideration obligation for Costa Farms and CapTech was \$39.0 million and \$9.4 million, respectively, which reflects the maximum amount remaining unpaid under the respective purchase agreements. Contingent consideration for CapTech of \$5.0 million was paid in both 2018 and 2017. Contingent consideration for Costa Farms of \$15.2 million was paid in 2018. Contingent consideration for Cottrell of \$44.7 million was paid in 2016.

Net income to shareholders in 2017 included a one-time tax benefit of \$37.1 million related to the remeasurement of Markel Ventures' net deferred tax liabilities at the lower enacted U.S. corporate tax rate as a result of the TCJA. See note 8 of the notes to consolidated financial statements for further discussion of the TCJA.

After considering the impact of the amounts quantified and discussed above, operating income and net income to shareholders increased from 2017 to 2018 and decreased from 2016 to 2017. The increase in net income to shareholders in 2018 was due to having a full year of Costa Farms operations and higher sales volumes from certain of our businesses in 2018 compared to 2017, as described above. The decrease in 2017 compared to 2016 was primarily due to higher materials costs and lower sales volumes at one of our transportation-related businesses, partially offset by higher sales volumes in both our products and services groups, as discussed above.

The following table summarizes the cash flows attributable to Markel Ventures for the years ended December 31, 2018, 2017 and 2016.

<i>(dollars in thousands)</i>	Years ended December 31,		
	2018	2017	2016
Cash, cash equivalents, restricted cash and restricted cash equivalents, beginning of year	\$ 165,172	\$ 105,316	\$ 120,889
Net cash provided by operating activities	163,572	195,054	100,105
Net cash used by investing activities	(256,533)	(456,586)	(55,293)
Net cash provided (used) by financing activities ^(1,2)	92,125	321,388	(60,385)
Increase (decrease) in cash, cash equivalents, restricted cash and restricted cash equivalents	(836)	59,856	(15,573)
Cash, cash equivalents, restricted cash and restricted cash equivalents, end of year	\$ 164,336	\$ 165,172	\$ 105,316

(1) Net cash provided (used) by financing activities for the years ended December 31, 2017 included capital contributions from our holding company (Markel Corporation) of \$145.0 million, which were eliminated in consolidation. There were no capital contributions from our holding company for the years ended December 31, 2018 and 2016.

(2) Net cash provided (used) by financing activities for the year and ended December 31, 2018 and 2017 included net additions to debt of \$130.0 million and \$265.0 million, respectively, which were eliminated in consolidation. Net cash provided (used) by financing activities for the year ended December 31, 2016 includes net repayments of debt of \$5.9 million, which were eliminated in consolidation.

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Markel Ventures earnings before interest, income taxes, depreciation and amortization (EBITDA) is a non-GAAP financial measure. We use Markel Ventures EBITDA as an operating performance measure in conjunction with U.S. GAAP measures, including revenues, operating income and net income, to monitor and evaluate the performance of our Markel Ventures segment. Because EBITDA excludes interest, income taxes, depreciation and amortization, it provides an indicator of economic performance that is useful to both management and investors in evaluating our Markel Ventures businesses as it is not affected by levels of debt, interest rates, effective tax rates, levels of depreciation or amortization resulting from purchase accounting. The following table reconciles Markel Ventures operating income to Markel Ventures EBITDA.

<i>(dollars in thousands)</i>	Years ended December 31,		
	2018	2017	2016
Markel Ventures operating income ⁽¹⁾	\$ 77,479	\$ 115,250	\$ 113,298
Depreciation expense	52,207	41,704	35,498
Amortization of intangible assets	40,208	31,429	29,105
Markel Ventures EBITDA	\$ 169,894	\$ 188,383	\$ 177,901

(1) Operating income for the years ended December 31, 2018 and 2017 excluded intercompany revenues of \$2.9 million and \$3.5 million, respectively. There were no intercompany revenues in 2016.

For the years ended December 31, 2018, 2017 and 2016, Markel Ventures EBITDA was impacted by the significant operating expense items previously discussed. Excluding the impact of the significant operating expense items in all three years, EBITDA increased from 2017 to 2018 and decreased from 2016 to 2017. The increase in 2018 was a result of having a full year of Costa Farms operations and higher sales volumes at certain businesses in our products group, partially offset by higher sales volumes in both our products and services groups, as discussed above.

Other Operations

The following table presents the components of operating revenues and operating expenses that are not included in a reportable segment.

<i>(dollars in thousands)</i>	Years Ended December 31,					
	2018		2017		2016	
	Operating Revenues	Operating Expenses	Operating Revenues	Operating Expenses	Operating Revenues	Operating Expenses
Service and other revenues and expenses						
Investment management	\$ 91,527	\$ 21,417	\$ 28,740	\$ 52,636	\$ 56,455	\$ 46,190
Program services	95,688	24,298	15,328	6,508	—	—
Life and annuity	1,660	27,855	2,022	28,218	1,891	26,504
Other	31,666	34,615	33,905	34,775	34,984	45,606
	220,541	108,185	79,995	122,137	93,330	118,300
Amortization of intangible assets ⁽¹⁾		75,722		49,329		39,428
Impairment of goodwill and intangible assets ⁽²⁾		184,294		—		—
Total	\$ 220,541	\$ 368,201	\$ 79,995	\$ 171,466	\$ 93,330	\$ 157,728

(1) Excludes amortization of intangible assets attributable to Markel Ventures, which is included in the Markel Ventures segment. Amortization of intangible assets is not allocated to any other reportable segments.

(2) Excludes impairment of goodwill and intangible assets attributable to Markel Ventures, which is included in the Markel Ventures segment.

Markel CATCo

Late in the fourth quarter of 2018, we were contacted by and received inquiries from the U.S. Department of Justice, U.S. Securities and Exchange Commission and Bermuda Monetary Authority into loss reserves recorded in late 2017 and early 2018 at Markel CATCo Re (the Markel CATCo Inquiries), an unconsolidated subsidiary managed by MCIM. As a result, we engaged outside counsel to conduct an internal review, through which we discovered violations of Markel policies by two senior executives of MCIM that existed as of December 31, 2018. As a result, these two executives are no longer with the Company (the MCIM Executive Departures).

As of December 31, 2017, we had accrued incentive and retention compensation for the two executives totaling \$34.9 million which remained unpaid as of December 31, 2018. This amount was reversed in the fourth quarter of 2018 and reflected as a reduction to services and other expenses. All accruals for retention and incentive compensation recorded earlier in 2018 for the two executives were also reversed in the fourth quarter of 2018. In conjunction with the Markel CATCo acquisition in December 2015, certain incentive and retention compensation arrangements were established for employees of MCIM, a portion of which was based on expected management fees over the three year period following the acquisition. Our initial estimate of the amounts payable under the incentive and retention compensation arrangements totaled \$100 million, portions of which were paid in 2018, 2017 and 2016. After considering the reversal of accruals discussed above, our total expected payments under these arrangements across all years is \$52.9 million. As of December 31, 2018, accrued and unpaid incentive and retention expense for other employees of MCIM totaled \$19.2 million, of which \$12.3 million was expensed during the year ended December 31, 2018. Compensation expense for the years ended December 31, 2017 and 2016 included \$38.1 million and \$33.2 million, respectively, for these incentive and retention compensation arrangements.

As a result of the governmental inquiries into loss reserves at Markel CATCo Re, and taking into consideration the departure of two senior MCIM executives and special redemption rights that are now being offered to investors in the Markel CATCo Funds management concluded MCIM's ability to maintain or raise capital has been adversely impacted. Therefore, we performed an assessment of the recoverability of goodwill and intangible assets at the MCIM reporting unit as of December 31, 2018. As a result of the assessment, we reduced the carrying value of the goodwill and intangible assets of the MCIM reporting unit to zero, which resulted in a goodwill impairment charge of \$91.9 million and an intangible asset impairment charge of \$87.1 million, both of which were recorded to impairment of goodwill and intangible assets in the consolidated statement of loss and comprehensive loss for the year ended December 31, 2018. See note 7 of the notes to consolidated financial statements for further details around these impairment charges.

See note 18 of the notes to consolidated financial statements for further details around recent developments in our Markel CATCo operations.

Interest Expense, Loss on Early Extinguishment of Debt and Income Taxes

Interest Expense and Loss on Early Extinguishment of Debt

Interest expense was \$154.2 million in 2018 compared to \$132.5 million in 2017 and \$129.9 million in 2016. The increase in interest expense in 2018 compared to 2017 was primarily due to interest associated with our 4.30% unsecured senior notes and our 3.50% unsecured senior notes issued in the fourth quarter of 2017, partially offset by the repayment of our 7.20% unsecured notes in the second quarter of 2017. The increase in interest expense in 2017 compared to 2016 was due to interest expense associated with our 5.0% unsecured senior notes issued in the second quarter of 2016 and our 3.50% and 4.30% unsecured senior notes issued during the fourth quarter of 2017, partially offset by the partial purchase of our 7.125% unsecured senior notes and our 7.35% unsecured senior notes in the second quarter of 2016 and the repayment of our 7.20% unsecured senior notes in the second quarter of 2017.

In the second quarter of 2016, we issued \$500 million of 5.0% unsecured senior notes due April 5, 2046. Net proceeds were \$493.1 million. We used a portion of these proceeds to purchase \$70.2 million of principal on our 7.35% unsecured senior notes due 2034 and \$108.8 million of principal on our 7.125% unsecured senior notes due 2019 through a tender offer at a total purchase price of \$95.0 million and \$126.4 million, respectively.

In connection with the tender offer and purchase, we recognized a loss on early extinguishment of debt of \$44.1 million during 2016. Replacing this debt with our 5.0% unsecured senior notes due April 5, 2046 extended the average term of our unsecured senior notes at a more favorable interest rate.

Income Taxes

The effective tax rate for 2018 and 2017 is not meaningful due to large non-recurring items in both periods and the small pre-tax income in 2018.

Income tax expense was \$122.5 million in 2018 compared to an income tax benefit of \$313.5 million in 2017. In 2017, as a result of the enactment of the TCJA, we recorded a one-time tax benefit of \$339.9 million (the TCJA Benefit). The TCJA Benefit was attributable to the remeasurement of our U.S. deferred tax assets and liabilities on temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and their tax bases at the lower enacted U.S. corporate tax rate, offset in part by the tax on the deemed repatriation of foreign earnings. After extensive discussions and analysis of our capital and tax profile resulting from the enactment of the TCJA, in 2018 we decided to elect to treat our most significant U.K. subsidiaries as domestic corporations for U.S. tax purposes. Therefore, the earnings and profits from those subsidiaries are no longer considered to be indefinitely reinvested and we recorded a one-time deferred tax charge of \$103.3 million related to the book and tax basis differences attributable to those subsidiaries.

In addition to the large non-recurring item mentioned above, our income tax expense in 2018 differs from the tax benefit calculated at the statutory rate of 21% primarily as a result of nondeductible losses of \$124.6 million on our investments in the Markel CATCo Funds and CROF in 2018, partially offset by the impact of tax-exempt investment income. The increase in our tax expense in 2018 compared to our tax benefit in 2017 was primarily due to the large non-recurring item in each year.

In 2017, our income tax benefit differs significantly from tax expense calculated at the statutory rate of 35% primarily due to the TCJA Benefit as well as the impact of tax benefits provided by tax-exempt investment income, partially offset by the impact of a lower tax benefit from losses attributable to our foreign operations, which are taxed at a lower rate than the U.S. statutory rate. In 2016, our income tax expense was lower than the tax expense calculated at the statutory rate of 35% primarily as a result of tax exempt investment income. Excluding the impact of the TCJA Benefit, the decrease in tax expense in 2017 compared to 2016 was primarily due to lower earnings in 2017, offset in part by the impact of losses attributable to our foreign operations.

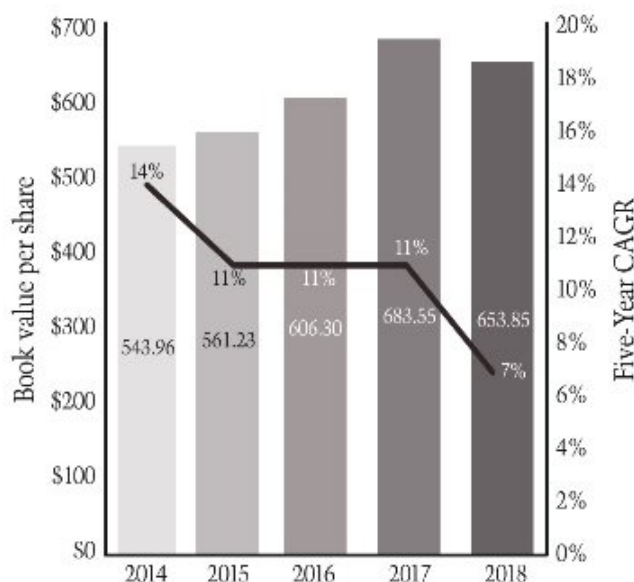
Comprehensive Income (Loss) to Shareholders

Comprehensive loss to shareholders was \$375.8 million in 2018 compared to comprehensive income of \$1.2 billion and \$667.0 million in 2017 and 2016, respectively. Comprehensive loss to shareholders for 2018 included a decrease in net unrealized gains on available-for-sale investments, net of taxes, of \$233.5 million and net loss to shareholders of \$128.2 million. Comprehensive income to shareholders for 2017 included an increase in net unrealized gains on investments, net of taxes, of \$763.0 million and net income to shareholders of \$395.3 million. Comprehensive income to shareholders for 2016 included net income to shareholders of \$455.7 million and an increase in net unrealized gains on investments, net of taxes, of \$242.2 million.

Effective January 1, 2018, we adopted ASU No. 2016-01 and as a result, equity securities are no longer classified as available-for-sale with unrealized gains and losses recognized in other comprehensive income. Rather, all changes in fair value of equity securities are now recognized in net income. For the year ended December 31, 2018, the change in fair value of equity securities was a loss of \$425.6 million included in net loss compared to a gain of \$1.1 billion for the year ended December 31, 2017, of which, \$1.0 billion was included in other comprehensive income. This change in presentation has no impact on comprehensive income to shareholders, however, will result in more volatility in net income.

Book value per share decreased 4% for the year ended December 31, 2018 and increased 13% for the year ended December 31, 2017, primarily due to changes in comprehensive income to shareholders, as described above.

The following graph presents book value per share and the five-year compound annual growth rate (CAGR) in book value per share for the past five years as of December 31.



Liquidity and Capital Resources

Holding Company

We seek to maintain prudent levels of liquidity and financial leverage for the protection of our policyholders, creditors and shareholders. Our debt to capital ratio was 25% at both December 31, 2018 and December 31, 2017 .

At December 31, 2018 , our holding company (Markel Corporation) held \$2.6 billion of invested assets compared to \$2.7 billion at December 31, 2017 . The decrease in holding company invested assets was primarily due to cash used for acquisitions, interest payments associated with our unsecured senior notes and loans and capital contributions made to our subsidiaries, partially offset by dividends received from our subsidiaries. At December 31, 2018 , invested assets approximated 18 times annual interest expense of the holding company. Excess liquidity at Markel Corporation is available, among other things, to increase capital at our insurance subsidiaries, complete acquisitions, repurchase shares of our common stock or retire debt.

Our Board of Directors approved a new share repurchase program (the 2018 Program) to replace the previous share repurchase program. The 2018 Program provides for the repurchase of up to \$300 million of common stock and has no expiration date but may be terminated by the Board of Directors at any time. As of December 31, 2018, we had repurchased 19,665 shares of common stock under the 2018 Program at a cost of \$21.4 million .

Our underwriting operations collect premiums and pay claims, reinsurance costs and operating expenses. Premiums collected and positive cash flows from the underwriting operations are invested primarily in short-term investments and long-term fixed maturities. Short-term investments held by our insurance subsidiaries provide liquidity for projected claims, reinsurance costs and operating expenses. As a holding company, Markel Corporation receives cash from its subsidiaries as reimbursement for operating and other administrative expenses it incurs. The reimbursements are made within the guidelines of various management agreements between the holding company and its subsidiaries.

The holding company relies on dividends from its subsidiaries to meet debt service obligations. Under the insurance laws of the various states in which our domestic insurance subsidiaries are incorporated, an insurer is restricted in the amount of dividends it may pay without prior approval of regulatory authorities. There are also regulatory restrictions on the amount of dividends that certain of our foreign subsidiaries may pay based on applicable laws in Bermuda and the U.K. At December 31, 2018 , our domestic insurance subsidiaries and Markel Bermuda Limited could pay ordinary dividends of \$839.9 million during the following twelve months under these laws. Dividends available for distribution from our U.K. insurance subsidiaries to the holding company will be determined during 2019.

At December 31, 2018, certain of our foreign subsidiaries are considered reinvested indefinitely and no provision for deferred U.S. income taxes has been recorded. At December 31, 2018, cash and cash equivalents, restricted cash and cash equivalents and short-term investments of \$139.7 million were held by these foreign subsidiaries. We do not expect the amount of cash and cash equivalents, restricted cash and cash equivalents and short-term investments that are attributable to these foreign subsidiaries and are not available for distributions to the holding company, to have a material effect on our liquidity or capital resources.

We maintain a revolving credit facility, which provides \$300 million of capacity for future acquisitions, investments, repurchases of our capital stock and for general corporate purposes. At our discretion, \$200 million of the total capacity may be used for secured letters of credit. We may increase the capacity of the facility to \$500 million subject to certain terms and conditions. This facility expires in August 2019. As of December 31, 2018 and 2017, there were no borrowings outstanding under our revolving credit facility.

On February 5, 2019, we amended our revolving credit facility to increase its leverage ratio covenant from “0.375 to 1.00” to “0.40 to 1.00” effective on and after December 31, 2018. This change addresses the impact to the consolidated net worth calculation under the facility from the purchase of Nephila in November 2018 and 2018 Catastrophe and investment losses that occurred in the fourth quarter of 2018. Under the facility, consolidated net worth serves as the denominator for the leverage ratio and excludes, among other things, the net worth associated with the Nephila acquisition. The change also provides additional flexibility through the maturity date of the facility on August 1, 2019 for unanticipated future developments, including additional catastrophe events, or greater than anticipated effects from known events.

We were in compliance with all covenants contained in our revolving credit facility, as amended, at December 31, 2018. To the extent that we are not in compliance with our covenants, our access to the revolving credit facility could be restricted. While we believe this to be unlikely, the inability to access the revolving credit facility could adversely affect our liquidity. See note 11 of the notes to consolidated financial statements for further discussion of our revolving credit facility.

We have access to various capital sources, including dividends from certain of our insurance and Markel Ventures subsidiaries, holding company invested assets, undrawn capacity under our revolving credit facility and access to the debt and equity capital markets. We believe that we have sufficient liquidity to meet our capital needs. However, the availability and terms of future financings will depend on a variety of factors, and could be adversely affected by, among other things, risks and uncertainties related to recent developments at our Markel CATCo operations. For example, we may not be able to refinance our 7.125% unsecured senior notes that come due September 30, 2019, if we choose to do so, or renew our revolving credit facility, which matures on August 1, 2019, on terms favorable to us. See note 18 of the notes to consolidated financial statements for more details regarding the Markel CATCo developments.

Cash Flows and Invested Assets

Net cash provided by operating activities was \$892.9 million in 2018 compared to \$858.5 million in 2017. Net cash flows from operating activities for the year ended December 31, 2018 reflected higher net premium collections in the Insurance segment and lower payments for employee profit sharing compared to 2017. Also reflected in net cash provided by operating activities for 2018 was higher claims settlement activity in both of our underwriting segments compared to 2017, due in part to the 2017 Catastrophes. As of December 31, 2017 and 2018, we had paid 27% and 65%, respectively, of our total estimated net losses on the 2017 Catastrophes. We also experienced claims settlement activity related to the 2018 Catastrophes and as of December 31, 2018 we had paid 14% of our total estimated net losses on the 2018 Catastrophes.

Net cash used by investing activities was \$797.2 million, \$744.5 million and \$1.6 billion in 2018, 2017 and 2016, respectively. In 2018, net cash used for acquisitions of \$1.2 billion was partially offset by reductions in our holdings of short-term investments totaling \$1.1 billion. Net cash used by investing activities in 2018 also included \$574.9 million of purchases of fixed maturities and equity securities, net of proceeds from maturities and sales of fixed maturities and sales of equity securities. Net cash used by investing activities in 2017 included \$1.4 billion of net cash used for acquisitions, offset by \$531.3 million of proceeds from maturities and sales of fixed maturities and sales of equity securities, net of purchases. In 2018 and 2017, we reduced our holdings of short-term investments to fund acquisitions. Net cash used by investing activities in 2016 included purchases of fixed maturities and equity securities, net of proceeds from sales, of \$877.0 million. We also allocated more cash and cash equivalents in 2016 to short-term investments to achieve higher returns while still maintaining adequate liquidity. See "Investing Results" for further discussion of changes in our allocation of funds within the investment portfolio in 2016, 2017 and 2018. Cash flow from investing activities is affected by various factors such as anticipated payment of claims, financing activity, acquisition opportunities and individual buy and sell decisions made in the normal course of our investment portfolio management.

Invested assets decreased to \$19.2 billion at December 31, 2018 from \$20.6 billion at December 31, 2017. The decrease was primarily attributable to cash used for acquisitions and a decrease in the fair value of our investment portfolio driven by increases in interest rates and unfavorable movements in the equity markets during 2018.

Net cash used by financing activities was \$179.0 million, \$256.3 million and \$152.0 million in 2018, 2017 and 2016, respectively. In 2018, cash used by financing activities included \$82.3 million of net repayments of debt. During 2017, we issued \$300 million of 3.50% unsecured senior notes due November 1, 2027 and \$300 million of 4.30% unsecured senior notes due November 1, 2047. Net proceeds were \$297.4 million and \$295.5 million, respectively, to be used for general corporate purposes. Also in 2017, we used cash of \$90.6 million to repay the remaining outstanding balance of our 7.20% unsecured senior notes due April 14, 2017 and also used cash of \$84.3 million to repay debt assumed in connection with acquisitions. During 2016, we issued \$500 million of 5.0% unsecured senior notes due April 5, 2046. Net proceeds were \$493.1 million. We used a portion of these proceeds to purchase \$70.2 million of principal on our 7.35% Senior Notes due 2034 and \$108.8 million of principal on our 7.125% Senior Notes due 2019 through a tender offer at a total purchase price of \$95.0 million and \$126.4 million, respectively. During 2018, 2017 and 2016, cash of \$54.0 million, \$110.8 million and \$51.1 million, respectively, was used to repurchase shares of our common stock.

Credit Risk

We have credit risk to the extent any of our reinsurers are unwilling or unable to meet their obligations under our ceded reinsurance agreements. Within our underwriting operations, our reinsurance recoverable balance for the ten largest reinsurers was \$1.6 billion at December 31, 2018, representing 61% of the total reinsurance recoverable, before considering allowances for bad debts. All of our ten largest reinsurers within our underwriting operations were rated "A" or better by A.M. Best. We were the beneficiary of letters of credit, trust accounts and funds withheld in the aggregate amount of \$401.1 million at December 31, 2018, collateralizing reinsurance recoverable balances due from these ten reinsurers.

Within our program services business, our reinsurance recoverable balance for the ten largest reinsurers was \$1.9 billion at December 31, 2018, representing 75% of the total reinsurance recoverable, before considering allowances for bad debts. Six of our ten largest reinsurers within our program services business were rated "A" or better by A.M. Best. We were the beneficiary of letters of credit, trust accounts and funds withheld in the aggregate amount of \$1.6 billion at December 31, 2018, collateralizing reinsurance recoverable balances due from these ten reinsurers. For reinsurers with a credit rating of lower than "A" we employ a stringent collateral monitoring program, under which the majority of the reinsurance recoverable balances are fully collateralized. These collateral requirements are regularly monitored by a credit committee within our program services operations. See note 15 of the notes to consolidated financial statements for further discussion of reinsurance recoverables and exposures.

Within our underwriting operations, we attempt to minimize credit exposure to reinsurers through adherence to internal reinsurance guidelines. We monitor changes in the financial condition of each of our reinsurers, and we assess our concentration of credit risk on a regular basis. Within our program services business, we mitigate credit risk by either selecting well capitalized, highly rated authorized reinsurers or requiring that the reinsurer post substantial collateral to secure the reinsured risks. While we believe that net reinsurance recoverable balances are collectible, deterioration in reinsurers' ability to pay, or collection disputes, could adversely affect our operating cash flows, financial position and results of operations.

Contractual Obligations

The following table summarizes our contractual cash payment obligations at December 31, 2018 .

<i>(dollars in thousands)</i>	Payments Due by Period ⁽¹⁾				
	Total	Less than 1 year	1-3 years	4-5 years	More than 5 years
Unpaid losses and loss adjustment expenses (estimated)	\$ 14,307,988	\$ 4,672,613	\$ 4,413,952	\$ 2,295,875	\$ 2,925,548
Life and annuity benefits (estimated)	1,329,254	82,439	138,025	128,351	980,439
Senior long-term debt and other debt	4,806,717	436,557	870,367	768,446	2,731,347
Operating leases	305,907	48,853	79,232	60,159	117,663
Total	\$ 20,749,866	\$ 5,240,462	\$ 5,501,576	\$ 3,252,831	\$ 6,754,997

⁽¹⁾ See notes 9 , 10 , 11 and 18 of the notes to consolidated financial statements for further discussion of these obligations.

Unpaid losses and loss adjustment expenses were \$14.3 billion and \$13.6 billion at December 31, 2018 and 2017 , respectively. Reserves for unpaid losses and loss adjustment expenses represent future contractual obligations associated with property and casualty insurance and reinsurance contracts issued to our policyholders or other insurance companies. Information presented in the table of contractual cash payment obligations is an estimate of our future payment of claims as of December 31, 2018 . Payment patterns for losses and loss adjustment expenses were generally based upon historical claims patterns. Each claim is settled individually based upon its merits and certain claims may take years to settle, especially if legal action is involved. The actual cash payments for settled claims will vary, possibly significantly, from the estimates shown in the preceding table. The unpaid losses and loss adjustment expenses in the table above are our gross estimates of known liabilities as of December 31, 2018 . The expected payments by period are the estimated payments at a future time, whereas the reserves for unpaid losses and loss adjustment expenses included in the consolidated balance sheet include the unamortized portion of any fair value adjustments for unpaid losses and loss adjustment expenses assumed in conjunction with an acquisition and any adjustments to discount reserves.

The following table summarizes case reserves and IBNR reserves. See note 9 of the notes to consolidated financial statements and "Critical Accounting Estimates" for a discussion of estimates and assumptions related to unpaid losses and loss adjustment expenses.

<i>(dollars in thousands)</i>	Insurance	Reinsurance	Other	Program Services	Consolidated
December 31, 2018					
Case reserves	\$ 2,719,038	\$ 1,336,884	\$ 166,844	\$ 881,847	\$ 5,104,613
IBNR reserves	5,204,653	2,144,456	219,485	1,634,781	9,203,375
Total	\$ 7,923,691	\$ 3,481,340	\$ 386,329	\$ 2,516,628 ⁽¹⁾	\$ 14,307,988
December 31, 2017					
Case reserves	\$ 2,705,663	\$ 1,219,119	\$ 188,892	\$ 759,943	\$ 4,873,617
IBNR reserves	4,976,016	2,104,783	240,377	1,435,488	8,756,664
Total	\$ 7,681,679	\$ 3,323,902	\$ 429,269	\$ 2,195,431 ⁽¹⁾	\$ 13,630,281

⁽¹⁾ Substantially all of the premium written in our program services business is ceded, resulting in reinsurance recoverables on paid and unpaid losses of \$2.5 billion and \$2.2 billion as of December 31, 2018 and 2017, respectively. We are the beneficiary of letters of credit, trust accounts and funds withheld in the aggregate amount of \$2.2 billion and \$1.9 billion at December 31, 2018 and 2017, respectively, collateralizing these reinsurance recoverable balances in our program services business.

Reserves for life and annuity benefits represent future contractual obligations associated with reinsurance contracts issued to other insurance companies. Information presented in the table of contractual cash payment obligations is an estimate of our future payment of benefits as of December 31, 2018. The assumptions used in estimating the likely payments due by period are based on cedent experience, industry mortality tables, and our expense experience. Due to the inherent uncertainty in the process of estimating the timing of such payments, there is a risk that the amounts paid in any such period can be significantly different from the estimates shown in the preceding table. The life and annuity benefits in the above table are our gross estimates of known obligations as of December 31, 2018. These obligations are computed on a net present value basis in the consolidated balance sheet as of December 31, 2018, whereas the expected payments by period in the table above are the estimated payments at a future time and do not reflect a discount of the amount payable.

Senior long-term debt and other debt was \$3.0 billion at December 31, 2018 and \$3.1 billion at December 31, 2017. The amounts in the contractual obligations table above include interest expense and exclude net unamortized premium and net unamortized debt issuance costs.

Restricted Assets and Capital

At December 31, 2018, we had \$4.8 billion of invested assets held in trust or on deposit for the benefit of policyholders or ceding companies or to support underwriting activities. Additionally, we have pledged investments and cash and cash equivalents totaling \$383.2 million at December 31, 2018 as security for letters of credit that have been issued by various banks on our behalf. These invested assets and the related liabilities are included on our consolidated balance sheet. See note 3 (g) of the notes to consolidated financial statements for further discussion of restrictions over our invested assets.

Our insurance operations require capital to support premium writings, and we remain committed to maintaining adequate capital and surplus at each of our insurance subsidiaries. The National Association of Insurance Commissioners (NAIC) developed a model law and risk-based capital formula designed to help regulators identify domestic property and casualty insurers that may be inadequately capitalized. Under the NAIC's requirements, a domestic insurer must maintain total capital and surplus above a calculated threshold or face varying levels of regulatory action. Capital adequacy of our foreign insurance subsidiaries is regulated by applicable laws of the U.K., Bermuda and other jurisdictions. At December 31, 2018, the capital and surplus of each of our insurance subsidiaries significantly exceeded the amount of statutory capital and surplus necessary to satisfy regulatory requirements.

Market Risk Disclosures

Market risk is the risk of economic losses due to adverse changes in the estimated fair value of a financial instrument as the result of changes in equity prices, interest rates, foreign currency exchange rates and commodity prices. Our consolidated balance sheets include assets and liabilities with estimated fair values that are subject to market risk. Our primary market risks have been equity price risk associated with investments in equity securities, interest rate risk associated with investments in fixed maturities and foreign currency exchange rate risk associated with our international operations. Some businesses within our Market Ventures operations are exposed to commodity price risk resulting from changes in the price of raw materials, parts and other components necessary to manufacture products, however, this risk is not material to the Company. The operating results of these businesses could be adversely impacted should they be unable to obtain price increases from customers in response to significant increases in raw material, parts and other component prices.

The estimated fair value of our investment portfolio at December 31, 2018 was \$19.2 billion, 70% of which was invested in fixed maturities, short-term investments, cash and cash equivalents and restricted cash and cash equivalents and 30% of which was invested in equity securities. At December 31, 2017, the estimated fair value of our investment portfolio was \$20.6 billion, 71% of which was invested in fixed maturities, short-term investments, cash and cash equivalents and restricted cash and cash equivalents and 29% of which was invested in equity securities.

Our fixed maturities, equity securities and short-term investments are recorded at fair value, which is measured based upon quoted prices in active markets, if available. We determine fair value for these investments after considering various sources of information, including information provided by a third party pricing service. The pricing service provides prices for substantially all of our fixed maturities and equity securities. In determining fair value, we generally do not adjust the prices obtained from the pricing service. We obtain an understanding of the pricing service's valuation methodologies and related inputs, which include, but are not limited to, reported trades, benchmark yields, issuer spreads, bids, offers, duration, credit ratings, estimated cash flows and prepayment speeds. We validate prices provided by the pricing service by reviewing prices from other pricing sources and analyzing pricing data in certain instances.

Equity Price Risk

We invest a portion of shareholder funds in equity securities, which have historically produced higher long-term returns relative to fixed maturities. We seek to invest in profitable companies, with honest and talented management, that exhibit reinvestment opportunities and capital discipline, at reasonable prices. We intend to hold these investments over the long term and focus on long-term total investment return, understanding that gains or losses on investments may fluctuate from one period to the next. As a result of adopting ASU No. 2016-01, changes in the fair value of equity securities are now recognized in net income rather than other comprehensive income. With this accounting change, we will experience more volatility in net income. However, this accounting change does not impact total comprehensive income.

At December 31, 2018, our equity portfolio was concentrated in terms of the number of issuers and industries. Such concentrations can lead to higher levels of price volatility. At December 31, 2018, our ten largest equity holdings represented \$2.3 billion, or 41%, of the equity portfolio. Investments in the property and casualty insurance industry represented \$1.0 billion, or 18%, of our equity portfolio at December 31, 2018. Our investments in the property and casualty insurance industry included a \$645.9 million investment in the common stock of Berkshire Hathaway Inc., a company whose subsidiaries engage in a number of diverse business activities in addition to insurance. We have investment guidelines that set limits on the equity holdings of our insurance subsidiaries.

The following table summarizes our equity price risk and shows the effect of a hypothetical 35% increase or decrease in market prices as of December 31, 2018 and 2017. The selected hypothetical changes do not indicate what could be the potential best or worst case scenarios.

<i>(dollars in millions)</i>	Estimated Fair Value	Hypothetical Price Change	Estimated Fair Value after Hypothetical Change in Prices	Estimated Hypothetical Percentage Increase (Decrease) in Shareholders' Equity
As of December 31, 2018				
Equity securities	\$ 5,721	35% increase	\$ 7,723	17.4 %
		35% decrease	3,719	(17.4)
As of December 31, 2017				
Equity securities	\$ 5,968	35% increase	\$ 8,057	17.1 %
		35% decrease	3,879	(17.1)

Interest Rate Risk

Our fixed maturity investments and borrowings are subject to interest rate risk. Increases and decreases in interest rates typically result in decreases and increases, respectively, in the fair value of these financial instruments.

The majority of our investable assets come from premiums paid by policyholders. These funds are invested predominantly in high quality government, municipal and corporate bonds that generally match the duration of our loss reserves. The fixed maturity portfolio, including short-term investments and cash and cash equivalents, has an average duration of 4.5 years and an average rating of "AA." See note 3 (c) of the notes to consolidated financial statements for disclosure of contractual maturity dates of our fixed maturity portfolio. The changes in the estimated fair value of the fixed maturity portfolio are presented as a component of shareholders' equity in accumulated other comprehensive income, net of taxes.

We work to manage the impact of interest rate fluctuations on our fixed maturity portfolio. The effective duration of the fixed maturity portfolio is managed with consideration given to the estimated duration of our liabilities. We have investment guidelines that limit the maximum duration and maturity of the fixed maturity portfolio.

We use a commercially available model to estimate the effect of interest rate risk on the fair values of our fixed maturity portfolio and borrowings. The model estimates the impact of interest rate changes on a wide range of factors including duration, prepayment, put options and call options. Fair values are estimated based on the net present value of cash flows, using a representative set of possible future interest rate scenarios. The model requires that numerous assumptions be made about the future. To the extent that any of the assumptions are invalid, incorrect estimates could result. The usefulness of a single point-in-time model is limited, as it is unable to accurately incorporate the full complexity of market interactions.

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The following table summarizes our interest rate risk and shows the effect of hypothetical changes in interest rates as of December 31, 2018 and 2017. The selected hypothetical changes do not indicate what could be the potential best or worst case scenarios.

<i>(dollars in millions)</i>	Estimated Fair Value	Hypothetical Change in Interest Rates (bp=basis points)	Estimated Fair Value after Hypothetical Change in Interest Rates	Hypothetical Percentage Increase (Decrease) in	
				Fair Value of Fixed Maturities	Shareholders' Equity
Fixed Maturity Investments					
As of December 31, 2018					
Total fixed maturity investments	\$ 10,043	200 bp decrease	\$ 11,364	13.2 %	11.5 %
		100 bp decrease	10,681	6.4	5.6
		100 bp increase	9,436	(6.0)	(5.3)
		200 bp increase	8,848	(11.9)	(10.4)
As of December 31, 2017					
Total fixed maturity investments	\$ 9,941	200 bp decrease	\$ 11,323	13.9 %	11.3 %
		100 bp decrease	10,606	6.7	5.5
		100 bp increase	9,319	(6.3)	(5.1)
		200 bp increase	8,720	(12.3)	(10.0)
Liabilities ⁽¹⁾					
As of December 31, 2018					
Borrowings	\$ 3,030	200 bp decrease	\$ 3,555		
		100 bp decrease	3,270		
		100 bp increase	2,826		
		200 bp increase	2,652		
As of December 31, 2017					
Borrowings	\$ 3,351	200 bp decrease	\$ 4,015		
		100 bp decrease	3,653		
		100 bp increase	3,096		
		200 bp increase	2,880		

⁽¹⁾ Changes in estimated fair value have no impact on shareholders' equity.

Foreign Currency Exchange Rate Risk

We have foreign currency exchange rate risk associated with certain of our assets and liabilities related to certain of our foreign operations. We manage this risk primarily by matching assets and liabilities in each foreign currency, other than non-monetary assets, as closely as possible. Non-monetary assets primarily consist of goodwill and intangible assets. As of December 31, 2018 and December 31, 2017, the carrying value of goodwill and intangible assets which are subject to foreign currency exchange rate risk was \$126.5 million and \$225.9 million, respectively. The decrease is due to the reassessment of our functional currency determination as of January 1, 2018, resulting in the U.S. Dollar being the only functional currency for most of our foreign underwriting operations. Consequently, goodwill and intangible assets of certain foreign operations denominated in a currency other than the U.S. Dollar are now remeasured into the U.S. Dollar at historic exchange rates and are no longer impacted by changes in foreign currency exchange rates.

To assist with the matching of assets and liabilities in foreign currencies, we periodically purchase foreign currency forward contracts and we purchase or sell foreign currencies in the open market. Realized and unrealized gains and losses on our forward contracts are recorded in earnings. Our forward contracts generally have maturities of three months. At December 31, 2018 and 2017, substantially all of our monetary assets and liabilities denominated in foreign currencies were either matched or hedged.

At both December 31, 2018 and 2017, 87% of our invested assets were denominated in U.S. Dollars. At December 31, 2018 and 2017, 83% and 84%, respectively, of our reserves for unpaid losses and loss adjustment expenses and life and annuity benefits were denominated in U.S. Dollars. At those dates, the largest foreign currency denominated balances within both our invested assets and reserves for unpaid losses and loss adjustment expenses and life and annuity benefits were the Euro and British Pound Sterling.

Credit Risk

Credit risk exists within our fixed maturity portfolio from the potential for loss resulting from adverse changes in an issuer's ability to repay its debt obligations. We monitor our investment portfolio to ensure that credit risk does not exceed prudent levels. We have consistently invested in high credit quality, investment grade securities. Our fixed maturity portfolio has an average rating of "AA," with 98% rated "A" or better by at least one nationally recognized rating organization. Our policy is to invest in investment grade securities and to minimize investments in fixed maturities that are unrated or rated below investment grade. At December 31, 2018, less than 1% of our fixed maturity portfolio was unrated or rated below investment grade. Our fixed maturity portfolio includes securities issued with financial guaranty insurance. We purchase fixed maturities based on our assessment of the credit quality of the underlying assets without regard to insurance.

Our fixed maturity portfolio includes securities issued by foreign governments and non-sovereign foreign institutions. General concern exists about the financial difficulties facing certain foreign countries in light of the adverse economic conditions experienced over the past several years. We monitor developments in foreign countries, currencies and issuers that could pose risks to our fixed maturity portfolio, including ratings downgrades, political and financial changes and the widening of credit spreads. We believe that our fixed maturity portfolio is highly diversified and is comprised of high quality securities.

We obtain information from news services, rating agencies and various financial market participants to assess potential negative impacts on a country or company's financial risk profile. We analyze concentrations within our fixed maturity portfolio by country, currency and issuer, which allows us to assess our level of diversification with respect to these exposures, reduce troubled exposures should they occur and mitigate any future financial distress that these exposures could cause.

General concern exists about municipalities that experience financial difficulties during periods of adverse economic conditions. We manage the exposure to credit risk in our municipal bond portfolio by investing in high quality securities and by diversifying our holdings, which are typically either general obligation or revenue bonds related to essential products and services.

Impact of Inflation

Property and casualty insurance premiums are established before the amount of losses and loss adjustment expenses, or the extent to which inflation may affect such expenses, is known. Consequently, in establishing premiums, we attempt to anticipate the potential impact of inflation. We also consider inflation in the determination and review of reserves for losses and loss adjustment expenses and life and annuity benefits since portions of these reserves are expected to be paid over extended periods of time. This is especially true for our long-tailed lines of business. Although our life and annuity reinsurance business is in run-off, we must monitor the effects inflation and changing interest rates have on the related reserves. We regularly complete loss recognition testing to ensure that held reserves are sufficient to meet our future claim obligations in the current investment environment.

Brexit Developments

On June 23, 2016, the U.K. voted to exit the E.U. (Brexit). Unless the date is extended, the U.K. will automatically exit the E.U. on March 29, 2019. The effects of Brexit will depend in part on agreements, if any, the U.K. makes to retain access to E.U. markets. For almost two years the U.K. and E.U. have been negotiating the future terms of the U.K.'s relationship with the E.U., including the terms of trade between the U.K. and the E.U. All Brexit terms must be ratified by the U.K. Parliament and the legislative bodies of the 27 E.U. member states. The likelihood of the U.K. Parliament ratifying an agreement in its current form appears to be low. This significantly increases the chance that the U.K. will leave the E.U. without an agreement regarding the U.K.'s relationship with the E.U.

Brexit could impair or end the ability of both Markel International Insurance Company Limited (MIICL) and our Lloyd's syndicate to transact business in E.U. countries from our U.K. offices and MIICL's ability to maintain its current branches in E.U. member states. In order to continue transacting E.U. business if U.K. access to E.U. markets ceases or is materially impaired, we have established a regulated insurance carrier, Markel Insurance SE (MISE), in Munich, Germany. From its offices in Germany, MISE can transact business in all remaining E.U. member states and throughout the European Economic Area (EEA). MISE is also establishing branches in Ireland, the Netherlands, Spain, and the U.K. In addition, the Society of Lloyd's has organized a new insurance company in Brussels, Belgium, in order to maintain access to E.U. business for Lloyd's syndicates. We expect that the new Lloyd's Brussels insurance company will supplement, or serve as an alternative to, MISE for access to E.U. markets.

Without a Brexit agreement, U.K. based insurers may be prohibited from administering policies for, or paying claims to, EEA policyholders post Brexit. In order to provide certainty for its EEA policyholders, MIICL has commenced the transfer of its legacy EEA exposures, claims and policies to MISE. However, this transfer must be approved by the U.K. High Court. While we expect this transfer to be approved by March 29, 2019, there is no assurance when or whether this approval will be granted or on what terms and conditions. Lloyd's also has commenced its transfer of legacy EEA exposures. However, there is significant uncertainty whether this approval will be granted by March 29, 2019, and there is no assurance the approval will be granted or on what terms and conditions. For more discussion regarding Brexit and its risks to us, see the Risk Factor titled "The exit of the United Kingdom from the European Union could have a material adverse effect on us."

Disclosure of Certain Activities Relating to Iran

Under the Iran Threat Reduction and Syria Human Rights Act of 2012, non-U.S. entities owned or controlled by U.S. persons have been prohibited from engaging in activities, transactions or dealings with Iran to the same extent as U.S. persons. In January 2016, the Office of Foreign Assets Control of the U.S. Department of the Treasury (OFAC) issued General License H, which authorized non-U.S. entities that are owned or controlled by a U.S. person to engage in most activities with Iran permitted for other non-U.S. entities so long as they met certain requirements.

On May 8, 2018, President Trump announced that the United States would no longer participate in the Joint Comprehensive Plan of Action, which was intended to ensure that Iran's nuclear program remains peaceful. As a result, all previously suspended sanctions have "snapped back" into effect. On June 27, 2018, OFAC revoked General License H and, at the same time, issued a license authorizing, through November 4, 2018, foreign entities owned or controlled by a U.S. person to engage in all transactions and activities that are ordinarily incident and necessary to the wind-down of transactions previously authorized under General License H (the Wind-Down License).

Section 13(r) of the Securities Exchange Act of 1934 requires reporting of certain Iran-related activities, including underwriting, insuring and reinsuring certain activities previously permitted under General License H related to the importation of refined petroleum products by Iran and vessels involved in the transportation of crude oil from Iran.

Certain of our non-U.S. insurance operations underwrite global marine hull policies and global marine hull war policies that provide coverage for vessels or fleets navigating into and out of ports worldwide, potentially including Iran under policies entered into before May 8, 2018. Under a global marine hull war policy, the insured is required to give notice before entering designated areas, including Iran. During the quarter ended December 31, 2018, we received notice that one or more vessels covered by a global marine hull war policy were entering Iranian waters. However, no additional premium is required under global marine hull policies or global marine hull war policies for calling into Iran. During the quarter ended December 31, 2018, we were not asked to cover a specific voyage into or out of Iran that would result in a separate, allocable premium for that voyage.

Certain of our non-U.S. reinsurance operations underwrite marine, energy, aviation and trade credit liability treaties on a worldwide basis and, as a result, it is possible that the underlying insurance portfolios may have had exposure during the quarter ended December 31, 2018 to the Iranian petroleum industry and its related products and service providers under reinsurance treaties entered into before May 8, 2018.

Prior to May 8, 2018, we entered into two energy construction reinsurance contracts in Iran, two Iran-related marine liability contracts, two Iran-related marine cargo contracts and one Iran-related hull war contract. These contracts were underwritten through our syndicate at Lloyd's and one of our non-U.S. insurance companies. Our portion of the annual premium for these contracts was approximately \$1 million in the aggregate. Except for these contracts, we are not aware of any premium apportionment with respect to underwriting, insurance or reinsurance activities of our non-U.S. insurance subsidiaries reportable under Section 13(r). Should any such risks have entered into the stream of commerce covered by the insurance portfolios underlying our reinsurance treaties, we believe that the premiums associated with such business were immaterial.

Since May 8, 2018, our non-U.S. subsidiaries, including our non-U.S. insurance subsidiaries, have not entered into any new transactions that had previously been permitted under General License H. During the quarter ended December 31, 2018, our non-U.S. subsidiaries, including our non-U.S. insurance subsidiaries, engaged in activities, transactions or dealings with Iran only in the manner permitted under, and in accordance with, the Wind-Down License or as otherwise permitted under other applicable economic or trade sanctions requirements or licenses.

Controls and Procedures

As of December 31, 2018, we carried out an evaluation of the effectiveness of the design and operation of our disclosure controls and procedures pursuant to Securities Exchange Act Rule 13a-15 (Disclosure Controls). This evaluation was conducted under the supervision and with the participation of our management, including the Co-Principal Executive Officers (Co-PEOs) and the Principal Financial Officer (PFO).

Our management, including the Co-PEOs and PFO, does not expect that our Disclosure Controls will prevent all error and all fraud. A control system, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. Further, the design of a control system must reflect the fact that there are resource constraints, and the benefits of controls must be considered relative to their costs. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected. These inherent limitations include the realities that judgments in decision making can be faulty, and that breakdowns can occur because of simple error or mistake. The design of any system of controls also is based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions.

Based upon our controls evaluation, the Co-PEOs and PFO concluded that effective Disclosure Controls were in place to ensure that the information required to be disclosed in reports we file or submit under the Securities Exchange Act of 1934 is recorded, processed, summarized and reported within the time periods specified in the Securities and Exchange Commission's rules and forms.

Pursuant to Section 404 of the Sarbanes-Oxley Act of 2002, we carried out an evaluation, under the supervision and with the participation of our management, including the Co-PEOs and the PFO, of the effectiveness of our internal control over financial reporting as of December 31, 2018. See Management's Report on Internal Control over Financial Reporting and our independent registered public accounting firm's attestation report on the effectiveness of our internal control over financial reporting.

There were no changes in our internal control over financial reporting during the fourth quarter of 2018 that materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Safe Harbor and Cautionary Statement

This report contains statements concerning or incorporating our expectations, assumptions, plans, objectives, future financial or operating performance and other statements that are not historical facts. These statements are "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. Such statements may use words such as "anticipate," "believe," "estimate," "expect," "intend," "predict," "project" and similar expressions as they relate to us or our management.

There are risks and uncertainties that may cause actual results to differ materially from predicted results in forward-looking statements. Factors that may cause actual results to differ are often presented with the forward-looking statements themselves. Additional factors that could cause actual results to differ from those predicted are set forth under "Risk Factors" or are included in the items listed below:

- our expectations about future results of our underwriting, investing, Markel Ventures and other operations are based on current knowledge and assume no significant man-made or natural catastrophes, no significant changes in products or personnel and no adverse changes in market conditions;
- the effect of cyclical trends on our underwriting, investing, Markel Ventures and other operations, including demand and pricing in the insurance, reinsurance and other markets in which we operate;
- actions by competitors, including the application of new or "disruptive" technologies or business models and consolidation, and the effect of competition on market trends and pricing;
- the frequency and severity of man-made and natural catastrophes (including earthquakes, fires and weather-related catastrophes) may exceed expectations, are unpredictable and, in the case of fires and weather-related catastrophes, may be exacerbated if, as many forecast, conditions in the oceans and atmosphere result in increased hurricane, flood, drought or other adverse weather-related activity;
- we offer insurance and reinsurance coverage against terrorist acts in connection with some of our programs, and in other instances we are legally required to offer terrorism insurance; in both circumstances, we actively manage our exposure, but if there is a covered terrorist attack, we could sustain material losses;
- emerging claim and coverage issues, changing legal and social trends, and inherent uncertainties in the loss estimation process can adversely impact the adequacy of our loss reserves and our allowance for reinsurance recoverables;
- reinsurance reserves are subject to greater uncertainty than insurance reserves, primarily because of reliance upon the original underwriting decisions made by ceding companies and the longer lapse of time from the occurrence of loss events to their reporting to the reinsurer for ultimate resolution;
- changes in the assumptions and estimates used in establishing reserves for our life and annuity reinsurance book (which is in runoff), for example, changes in assumptions and estimates of mortality, longevity, morbidity and interest rates, could result in material increases in our estimated loss reserves for such business;
- adverse developments in insurance coverage litigation or other legal or administrative proceedings could result in material increases in our estimates of loss reserves;
- changes in the availability, costs and quality of reinsurance coverage, which may impact our ability to write or continue to write certain lines of business;
- the ability or willingness of reinsurers to pay balances due may be adversely affected by industry and economic conditions, deterioration in reinsurer credit quality and coverage disputes, and collateral we hold may not be sufficient to cover a reinsurer's obligation to us;
- after the commutation of ceded reinsurance contracts, any subsequent adverse development in the re-assumed loss reserves will result in a charge to earnings;
- regulatory actions can impede our ability to charge adequate rates and efficiently allocate capital;
- general economic and market conditions and industry specific conditions, including extended economic recessions or expansions; prolonged periods of slow economic growth; inflation or deflation; fluctuations in foreign currency exchange rates, commodity and energy prices and interest rates; volatility in the credit and capital markets; and other factors;

- economic conditions, actual or potential defaults in municipal bonds or sovereign debt obligations, volatility in interest and foreign currency exchange rates and changes in market value of concentrated investments can have a significant impact on the fair value of our fixed maturity and equity securities, as well as the carrying value of our other assets and liabilities, and this impact may be heightened by market volatility;
- economic conditions may adversely affect our access to capital and credit markets;
- the effects of government intervention, including material changes in the monetary policies of central banks, to address financial downturns and economic and currency concerns;
- the impacts that political and civil unrest and regional conflicts may have on our businesses and the markets they serve or that any disruptions in regional or worldwide economic conditions generally arising from these situations may have on our businesses, industries or investments;
- the impacts that health epidemics and pandemics may have on our business operations and claims activity;
- the impact on our businesses of the repeal, in part or in whole, or modification of U.S. health care reform legislation and regulations;
- changes in U.S. tax laws, regulations or interpretations, including those relating to the Tax Cuts and Jobs Act, or in the tax laws, regulations or interpretations of other jurisdictions in which we operate and adjustments we may make in our operations or tax strategies in response to those changes;
- a failure of our enterprise information technology systems and those maintained by third parties upon which we may rely, or a failure to comply with data protection or privacy regulations;
- our acquisitions may increase our operational and control risks for a period of time;
- we may not realize the contemplated benefits, including cost savings and synergies, of our acquisitions;
- any determination requiring the write-off of a significant portion of our goodwill and intangible assets;
- the failure or inadequacy of any loss limitation methods we employ;
- the loss of services of any executive officer or other key personnel could adversely impact one or more of our operations;
- our substantial international operations and investments expose us to increased political, operational and economic risks, including foreign currency exchange rate and credit risk;
- the political, legal, regulatory, financial, tax and general economic impacts, and other impacts we cannot anticipate, related to the vote by the United Kingdom to leave the European Union (Brexit), which could have adverse consequences for our businesses, particularly our London-based international insurance operations;
- our ability to obtain additional capital for our operations on terms favorable to us;
- our compliance, or failure to comply, with covenants and other requirements under our revolving credit facility, senior debt and other indebtedness;
- our ability to maintain or raise third party capital for existing or new investment vehicles and risks related to our management of third party capital;
- the effectiveness of our procedures for compliance with existing and ever increasing guidelines, policies and legal and regulatory standards, rules, laws and regulations;
- the impact of economic and trade sanctions and embargo programs on our businesses, including instances in which the requirements and limitations applicable to the global operations of U.S. companies and their affiliates are more restrictive than those applicable to non-U.S. companies and their affiliates;
- regulatory changes, or challenges by regulators, regarding the use of certain issuing carrier or fronting arrangements;
- our dependence on a limited number of brokers for a large portion of our revenues and third-party capital;
- adverse changes in our assigned financial strength or debt ratings could adversely impact us, including our ability to attract and retain business, the amount of capital our insurance subsidiaries must hold and the availability and cost of capital;
- changes in the amount of statutory capital our insurance subsidiaries are required to hold, which can vary significantly and is based on many factors outside our control;
- losses from litigation and regulatory investigations and actions; and

- a number of additional factors may adversely affect our Markel Ventures operations, and the markets they serve, and negatively impact their revenues and profitability, including, among others: adverse weather conditions, plant disease and other contaminants; changes in government support for education, healthcare and infrastructure projects; changes in capital spending levels; changes in the housing market; liability for environmental matters; volatility in the market prices for their products; and volatility in commodity prices and interest and foreign currency exchange rates.

Our premium volume, underwriting and investment results and results from our other operations have been and will continue to be potentially materially affected by these factors. In addition, with respect to previously announced developments at MCIM:

- the Markel CATCo Inquiries may have an adverse impact on the operations of MCIM and may result in adverse findings, reputational damage, the imposition of sanctions, increased costs, litigation and other negative consequences;
- management time and resources may be diverted to address the Markel CATCo Inquiries, as well as related litigation;
- the ongoing internal review related to the Markel CATCo Inquiries may result in adverse findings;
- the MCIM Executive Departures, the lawsuits brought by two former MCIM executives and the ongoing leadership transition at MCIM, may materially and adversely impact MCIM's business, operations and results of operations; and
- the Markel CATCo Inquiries and the MCIM Executive Departures, as well as special redemption rights that are now being offered to investors in the Markel CATCo Funds, will adversely impact MCIM's ability to maintain or raise capital.

By making forward-looking statements, we do not intend to become obligated to publicly update or revise any such statements whether as a result of new information, future events or other changes. Readers are cautioned not to place undue reliance on any forward-looking statements, which speak only as at their dates.

Legal Proceedings

Markel CATCo Inquiries

On November 30, 2018, we were notified that the U.S. Department of Justice and the U.S. Securities and Exchange Commission are conducting inquiries into loss reserves recorded in late 2017 and early 2018 at our Markel CATCo operations. Those reserves are held at Markel CATCo Re, an unconsolidated subsidiary of MCIM. On December 5, 2018, the Bermuda Monetary Authority notified us that it is conducting an inquiry on the same subject. The Markel CATCo Inquiries are limited to MCIM and its subsidiaries and do not involve other Markel subsidiaries. The Company and MCIM are cooperating fully with the Markel CATCo Inquiries, and outside counsel has been retained to conduct an internal review of the matters. At this time, we are unable to predict the duration, scope or outcome of the Markel CATCo Inquiries or of our internal review.

David Bergen v. Markel Corporation, et al. (U.S. District Court for the Southern District of New York)

On January 11, 2019, David Bergen filed a suit naming Markel Corporation and certain present or former officers as defendants in a putative class action alleging violations of the federal securities laws relating to the matters that are the subject of the Markel CATCo Inquiries. The Plaintiff seeks to represent a class of persons or entities that purchased Markel securities between July 26, 2017 and December 6, 2018. We believe that the claims are without merit.

Anthony Belisle v. Markel CATCo Investment Management Ltd and Markel Corp. (U.S. District Court for the District of New Hampshire)

On February 21, 2019, Anthony Belisle filed a suit alleging, among other claims, breach of contract, defamation and invasion of privacy. The Plaintiff's complaint seeks relief including payment of \$66.0 million in incentive compensation, as well as consequential damages, damages for emotional distress and injury to reputation, enhanced compensatory damages, statutory interest and attorneys' fees. We believe that the claims are without merit.

Alissa Fredricks v. Markel CATCo Investment Management Ltd. and Markel Corp. (U.S. District Court for the District of Massachusetts)

On February 21, 2019, Alissa Fredricks filed a suit alleging, among other claims, breach of contract, defamation and invasion of privacy. The Plaintiff's complaint seeks relief including payment of \$7.5 million in incentive compensation, as well as consequential damages, damages for emotional distress and injury to reputation, statutory interest and attorneys' fees. We believe that the claims are without merit.

Thomas Yeransian v. Markel Corporation (U.S. District Court for the District of Delaware)

In October 2010, we completed the acquisition of Aspen Holdings, Inc. (Aspen). As part of the consideration for that acquisition, Aspen shareholders received contingent value rights (CVRs). Based on a valuation of the CVRs as of their December 31, 2017 maturity date, we paid \$9.9 million to the CVR holders on June 5, 2018, which represents 90% of the undisputed portion of the final amount we believe we are required to pay under the CVR agreement.

Prior to the December 31, 2017 CVR maturity date, the CVR holder representative, Thomas Yeransian, had disputed our prior estimation of the value of the CVRs. On September 15, 2016, Mr. Yeransian filed a suit alleging, among other things, that we are in default under the CVR agreement. The holder representative seeks: \$47.3 million in damages, which represents the unadjusted value of the CVRs; plus interest (\$14.1 million through December 31, 2018) and default interest (up to an additional \$12.0 million through December 31, 2018 , depending on the date any default occurred); and an unspecified amount of punitive damages, costs, and attorneys' fees.

At the initial hearing held February 21, 2017, the court stayed the proceedings and ordered the parties to discuss resolving the dispute pursuant to the independent CVR valuation procedure under the CVR agreement. The parties met on April 5, 2017, but were unsuccessful in reaching agreement on a process for resolving the dispute. We subsequently filed a motion to stay the litigation and compel arbitration, and, on July 31, 2017, the court issued an order granting that motion. Mr. Yeransian filed a motion requesting that the court reconsider that order.

On September 20, 2018, a new judge was assigned to the case. On October 12, 2018, the court denied both Yeransian's motion to reconsider the order staying the litigation and compelling arbitration and a motion by us for sanctions against Yeransian for violating the confidentiality of mediation proceedings. The court subsequently (1) on December 3, 2018 ordered Yeransian to provide the court and us with the identity of an actuarial firm to participate in the selection of independent experts for the CVR valuation procedure under the CVR agreement and (2) on December 11, 2018 denied Yeransian's motion for judgment that we had waived our right to require Yeransian's participation in the arbitration.

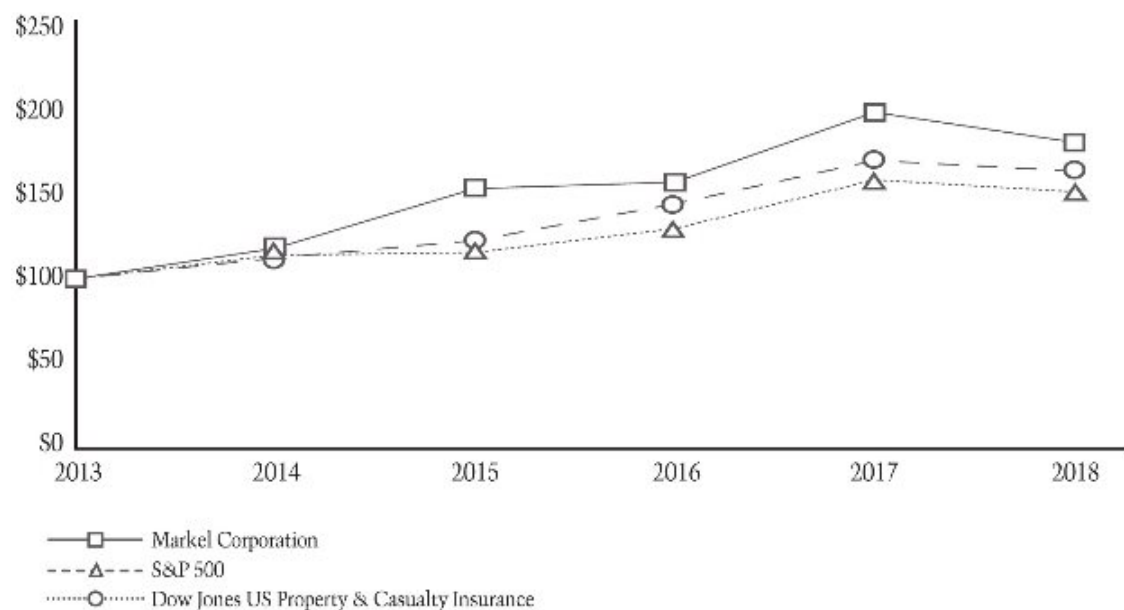
On November 13, 2018, Yeransian filed a second suit, Thomas Yeransian v. Markel Corporation (U.S. District Court for the District of Delaware), which also alleges that the Company is in default under the CVR agreement. The second suit also seeks: \$47.3 million in damages, which represents the unadjusted value of the CVRs; plus interest (\$14.1 million through December 31, 2018) and default interest (up to an additional \$12.0 million through December 31, 2018 , depending on the date any default occurred); and an unspecified amount of punitive damages, costs, and attorneys' fees. We filed a motion to stay this suit until the arbitration for the original suit has concluded and the CVR holders have received the remainder of the final amount due under the CVR Agreement.

We believe the holder representative's suits to be without merit. We further believe that any material loss resulting from the holder representative's suits to be remote. We do not believe the contractual contingent consideration payments related to the CVRs will have a material impact on the Company's liquidity.

OTHER INFORMATION

Performance Graph

The following graph compares the cumulative total return (based on share price) on our common stock with the cumulative total return of companies included in the S&P 500 Index and the Dow Jones Property & Casualty Insurance Companies Index. This information is not necessarily indicative of future results.



	Years Ended December 31,					
	2013 ⁽¹⁾	2014	2015	2016	2017	2018
Markel Corporation	\$ 100	\$ 118	\$ 152	\$ 156	\$ 196	\$ 179
S&P 500	100	114	115	129	157	150
Dow Jones Property & Casualty Insurance	100	112	122	143	168	162

⁽¹⁾ \$100 invested on December 31, 2013 in our common stock or the listed index. Includes reinvestment of dividends.

Common Stock and Dividend Information

Our common stock trades on the New York Stock Exchange under the symbol MKL. The number of shareholders of record as of February 5, 2019 was approximately 300. The total number of shareholders, including those holding shares in street name or in brokerage accounts, is estimated to be in excess of 150,000. Our current strategy is to retain earnings and, consequently, we have not paid and do not expect to pay a cash dividend on our common stock.

Common Stock Repurchases

The following table summarizes our common stock repurchases for the quarter ended December 31, 2018.

Period	Issuer Purchases of Equity Securities			
	(a)	(b)	(c)	(d)
	Total Number of Shares Purchased	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs ⁽¹⁾	Approximate Dollar Value of Shares that May Yet Be Purchased Under the Plans or Programs (in thousands)
October 1, 2018 through October 31, 2018	—	\$ —	—	\$ 289,832
November 1, 2018 through November 30, 2018	2,805	\$ 1,106.26	2,805	\$ 286,729
December 1, 2018 through December 31, 2018	7,785	\$ 1,042.93	7,785	\$ 278,610
Total	10,590	\$ 1,059.70	10,590	\$ 278,610

⁽¹⁾ The Board of Directors approved the repurchase of up to \$300 million of our common stock pursuant to a share repurchase program publicly announced on May 14, 2018 (the 2018 Program). The 2018 Program terminated and replaced a similar program authorized in November 2013 (the 2013 Program). Under the 2018 Program, as under the 2013 Program, we may repurchase outstanding shares of our common stock from time to time in privately negotiated or open market transactions, including under plans complying with Rule 10b5-1 under the Securities Exchange Act of 1934. The 2018 Program has no expiration date but may be terminated by the Board of Directors at any time.

Available Information

This document represents Markel Corporation's Annual Report and Form 10-K, which is filed with the Securities and Exchange Commission.

We make available free of charge on or through our website our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and all amendments to those reports as soon as reasonably practicable after such material is electronically filed with or furnished to the Securities and Exchange Commission. Our website address is www.markelcorp.com.

Transfer Agent

American Stock Transfer & Trust Co., LLC, Operations Center, 6201 15th Avenue, Brooklyn, NY 11219
(800) 937-5449 info@astfinancial.com

Code of Conduct

We have adopted a code of business conduct and ethics (Code of Conduct) which is applicable to all directors and associates, including executive officers. We have posted the Code of Conduct on our website at www.markelcorp.com. We intend to satisfy applicable disclosure requirements regarding amendments to, or waivers from, provisions of our Code of Conduct by posting such information on our website. Shareholders may obtain printed copies of the Code of Conduct by writing Investor Relations, at the address of the corporate offices listed below, or by calling (800) 446-6671.

Annual Shareholders' Meeting

Shareholders of Markel Corporation are invited to attend the Annual Meeting to be held at Altria Theater, 6 North Laurel Street, Richmond, Virginia at 4:30 p.m. ET, May 13, 2019.

Corporate Offices

Markel Corporation, 4521 Highwoods Parkway, Glen Allen, Virginia 23060-6148
(804) 747-0136 (800) 446-6671

Executive Officers

Alan I. Kirshner

Executive Chairman since January 2016. Chairman of the Board since 1986. Chief Executive Officer from 1986 to December 2015. Director since 1978. Age 83.

Anthony F. Markel

Vice Chairman of Markel Corporation and the Board since May 2008. President and Chief Operating Officer from March 1992 to April 2008. Director since 1978. Age 77.

Steven A. Markel

Vice Chairman of Markel Corporation and the Board since March 1992. Director since 1978. Age 70.

Thomas S. Gayner

Co-Chief Executive Officer since January 2016. President and Chief Investment Officer from May 2010 to December 2015. Chief Investment Officer from January 2001 to December 2015. President, Markel-Gayner Asset Management Corporation, a subsidiary, since December 1990. Director from 1998 to 2004. Director since August 2016. Age 57.

Richard R. Whitt, III

Co-Chief Executive Officer since January 2016. President and Co-Chief Operating Officer from May 2010 to December 2015. Senior Vice President and Chief Financial Officer from May 2005 to May 2010. Director since August 2016. Age 55.

Robert C. Cox

President and Chief Operating Officer, Insurance Operations since September 2018. Executive Vice President of Chubb Ltd. (a public company) and Division Chairman of Chubb Ltd.'s North American Financial Lines from January 2016 until retirement in July 2016; Executive Vice President of Chubb & Son and Chief Operating Officer of Chubb Specialty Insurance from June 2013 to January 2016. Age 60.

Michael R. Heaton

President, Markel Ventures since January 2016; President and Chief Operating Officer, Markel Ventures, Inc., a subsidiary, since January 2016 and September 2013, respectively. Age 42.

Bradley J. Kiscaden

President and Chief Administrative Officer, Insurance Operations since September 2018. Executive Vice President and Chief Actuarial Officer from July 2012 to September 2018. Chief Actuarial Officer from March 1999 to September 2018. Age 56.

Jeremy A. Noble

Senior Vice President and Chief Financial Officer since September 2018. Senior Vice President, Finance from June 2018 to September 2018. Finance Director, Markel International from July 2015 to June 2018. Managing Director, Internal Audit from September 2011 to July 2015. Age 43.

Linda V. Schreiner

Senior Vice President, Strategic Management since January 2016. Senior Vice President, Human Resources and Communications of MeadWestvaco Corporation (a public company) from January 2002 to July 2015. Age 59.

Richard R. Grinnan

General Counsel and Secretary since June 2014. Assistant General Counsel from August 2012 to June 2014. Age 50.

EXHIBIT INDEX

Exhibit No.	Document Description
3(i)	Amended and Restated Articles of Incorporation (incorporated by reference from Exhibit 3.1 in the Registrant's report on Form 8-K filed with the Commission May 13, 2011)
3(ii)	Bylaws, as amended and restated May 14, 2018 (incorporated by reference from Exhibit 3(ii) in the Registrant's report on Form 10-Q filed with the Commission for the quarter ended June 30, 2018)
4.1	Indenture dated as of June 5, 2001 between Markel Corporation and The Chase Manhattan Bank, as Trustee (incorporated by reference from Exhibit 4.1 in the Registrant's report on Form 8-K filed with the Commission June 5, 2001)
4.2	Form of Third Supplemental Indenture dated as of August 13, 2004 between Markel Corporation and JPMorgan Chase Bank (formerly known as The Chase Manhattan Bank), as Trustee, including form of the securities as Exhibit A (incorporated by reference from Exhibit 4.2 in the Registrant's report on Form 8-K filed with the Commission August 11, 2004)
4.3	Form of Fifth Supplemental Indenture dated as of September 22, 2009 between Markel Corporation and The Bank of New York Mellon (as successor to The Chase Manhattan Bank), as Trustee, including form of the securities as Exhibit A (incorporated by reference from Exhibit 4.2 in the Registrant's report on Form 8-K filed with the Commission September 21, 2009)
4.4	Form of Sixth Supplemental Indenture dated as of June 1, 2011 between Markel Corporation and The Bank of New York Mellon (as successor to The Chase Manhattan Bank), as Trustee, including form of the securities as Exhibit A (incorporated by reference from Exhibit 4.2 in the Registrant's report on Form 8-K filed with the Commission May 31, 2011)
4.5	Form of Seventh Supplemental Indenture dated as of July 2, 2012 between Markel Corporation and The Bank of New York Mellon (as successor to The Chase Manhattan Bank), as Trustee, including form of the securities as Exhibit A (incorporated by reference from Exhibit 4.2 in the Registrant's report on Form 8-K filed with the Commission June 29, 2012)
4.6	Form of Eighth Supplemental Indenture dated as of March 8, 2013 between Markel Corporation and The Bank of New York Mellon (as successor to The Chase Manhattan Bank), as Trustee, including form of the securities as Exhibit A (incorporated by reference from Exhibit 4.2 in the Registrant's report on Form 8-K filed with the Commission March 7, 2013)
4.7	Form of Ninth Supplemental Indenture dated as of March 8, 2013 between Markel Corporation and The Bank of New York Mellon (as successor to The Chase Manhattan Bank), as Trustee, including form of the securities as Exhibit A (incorporated by reference from Exhibit 4.3 in the Registrant's report on Form 8-K filed with the Commission March 7, 2013)
4.8	Form of Tenth Supplemental Indenture dated as of April 5, 2016 between Markel Corporation and The Bank of New York Mellon (as successor to The Chase Manhattan Bank), as Trustee, including form of the securities as Exhibit A (incorporated by reference from Exhibit 4.2 in the Registrant's report on Form 8-K filed with the Commission March 31, 2016)
4.9	Form of Eleventh Supplemental Indenture dated as of November 2, 2017 between Markel Corporation and The Bank of New York Mellon (as successor to The Chase Manhattan Bank), as Trustee, including form of the securities as Exhibit A (incorporated by reference from Exhibit 4.2 in the Registrant's report on Form 8-K filed with the Commission November 2, 2017)
4.10	Form of Twelfth Supplemental Indenture dated as of November 2, 2017 between Markel Corporation and The Bank of New York Mellon (as successor to The Chase Manhattan Bank), as Trustee, including form of the securities as Exhibit A (incorporated by reference from Exhibit 4.3 in the Registrant's report on Form 8-K filed with the Commission November 2, 2017)
4.11	Indenture dated as of September 1, 2010, among Alterra Finance LLC, Alterra Capital Holdings Limited and The Bank of New York Mellon, as Trustee (incorporated by reference from Exhibit 4.14 in the Registrant's report on Form 10-Q filed with the Commission for the quarter ended June 30, 2013)
4.12	First Supplemental Indenture, dated as of September 27, 2010 between Alterra Finance LLC, Alterra Capital Holdings Limited and The Bank of New York Mellon, as Trustee, including the form of the securities as Exhibit A (incorporated by reference from Exhibit 4.15 in the Registrant's report on Form 10-Q filed with the Commission for the quarter ended June 30, 2013)

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- [4.13](#) [Form of Second Supplemental Indenture dated as of June 30, 2014 among Alterra Finance LLC, Alterra Capital Holdings Limited and the Bank of New York Mellon, as Trustee \(incorporated by reference from Exhibit 4.16 in the Registrant's report on Form 10-Q filed with the Commission for the quarter ended June 30, 2014\)](#)
- [4.14](#) [Form of Guaranty Agreement by Markel Corporation dated as of June 30, 2014 in connection with the Alterra Finance LLC 6.25% Senior Notes due 2020 \(incorporated by reference from Exhibit 4.17 in the Registrant's report on Form 10-Q filed with the Commission for the quarter ended June 30, 2014\)](#)

The registrant hereby agrees to furnish to the Securities and Exchange Commission, upon request, a copy of all other instruments defining the rights of holders of long-term debt of the registrant and its subsidiaries.

Exhibit No.	Document Description
10.1	Form of Credit Agreement dated as of August 1, 2014 among Markel Corporation, Markel Bermuda Limited, Alterra Reinsurance USA Inc., Alterra Finance LLC, Alterra USA Holdings Limited, the lenders party from time to time thereto, and Wells Fargo Bank, National Association, Administrative Agent, a Fronting Bank and Swingline Lender ("Wells Fargo Credit Agreement") (incorporated by reference from Exhibit 4.1 in the Registrant's report on Form 10-Q filed with the Commission for the quarter ended June 30, 2014)
10.2	First Amendment to Credit Agreement dated as of November 13, 2015, to the Wells Fargo Credit Agreement (incorporated by reference from Exhibit 10.2 in the Registrant's report on Form 10-K filed with the Commission for the year ended December 31, 2015)
10.3	Second Amendment to Credit Agreement dated as of November 2, 2017, to the Wells Fargo Credit Agreement (incorporated by reference from Exhibit 10.1 in the Registrant's report on Form 8-K filed with the Commission November 7, 2017)
10.4	Third Amendment to Credit Agreement dated as of November 5, 2018, to the Wells Fargo Agreement **
10.5	Fourth Amendment to Credit Agreement dated as of February 5, 2019, to the Wells Fargo Credit Agreement (incorporated by reference from Exhibit 10.1 in the Registrant's report on Form 8-K filed with the Commission February 8, 2019)
10.6	Form of Amended and Restated Employment Agreement with Alan I. Kirshner (incorporated by reference from Exhibit 10.2 in the Registrant's report on Form 10-K filed with the Commission for the year ended December 31, 2008)*
10.7	Amendment, dated February 21, 2019, to Amended and Restated Employment Agreement, dated December 31, 2018, between Markel Corporation and Alan I. Kirshner (incorporated by reference from Exhibit 10.1 in the Registrant's report on Form 8-K filed with the Commission February 22, 2019) *
10.8	Amended and Restated Employment Agreement with Steven A. Markel (incorporated by reference from Exhibit 10.1 in the Registrant's report on Form 10-Q filed with the Commission for the quarter ended September 30, 2015)*
10.9	Amendment dated as of December 31, 2017 to Amended and Restated Employment Agreement with Steven A. Markel (incorporated by reference from Exhibit 10.6 in the Registrant's report on Form 10-K filed with the Commission for the year ended December 31, 2017) *
10.10	Form of Amended and Restated Employment Agreement with Anthony F. Markel (incorporated by reference from Exhibit 10.4 in the Registrant's report on Form 10-K filed with the Commission for the year ended December 31, 2008)*
10.11	Form of Executive Employment Agreement with Anne G. Waleski (incorporated by reference from Exhibit 10.5 in the Registrant's report on Form 10-K filed with the Commission for the year ended December 31, 2008)*
10.12	Letter Agreement dated November 16, 2017 between Markel Corporation and F. Michael Crowley (incorporated by reference from Exhibit 10.1 in the Registrant's report on Form 8-K filed with the Commission May 11, 2017)*
10.13	Employment Agreement, dated June 28, 2018, between Markel Corporation and Robert C. Cox (incorporated by reference from Exhibit 10.1 in the Registrant's report on Form 8-K filed with the Commission July 12, 2018) *
10.14	Amended and Restated Form of Executive Employment Agreement (incorporated by reference from Exhibit 10.1 in the Registrant's report on Form 8-K filed with the Commission August 21, 2018)*

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<u>10.15</u>	<u>Amended and Restated Executive Employment Agreement, dated as of August 15, 2018, between Markel Corporation and Thomas S. Gayner (incorporated by reference from Exhibit 10.2 in the Registrant's report on Form 8-K filed with the Commission August 21, 2018)*</u>
<u>10.16</u>	<u>Amended and Restated Executive Employment Agreement, dated as of August 15, 2018, between Markel Corporation and Richard R. Whitt, III (incorporated by reference from Exhibit 10.3 in the Registrant's report on Form 8-K filed with the Commission August 21, 2018)*</u>
<u>10.17</u>	<u>Executive Employment Agreement, dated as of August 15, 2018, between Markel Corporation and Jeremy A. Noble (incorporated by reference from Exhibit 10.4 in the Registrant's report on Form 8-K filed with the Commission August 21, 2018)*</u>
<u>10.18</u>	<u>Markel Corporation Executive Bonus Plan, as amended and restated May 14, 2018 (incorporated by reference from Exhibit 10.1 in the Registrant's report on Form 10-Q filed with the Commission for the quarter ended June 30, 2018)*</u>
<u>10.19</u>	<u>Markel Corporation Voluntary Deferral Plan (incorporated by reference from Exhibit 10.14 in the Registrant's report on Form 10-K filed with the Commission for the year ended December 31, 2015)*</u>
<u>10.20</u>	<u>Amendment to Markel Corporation Voluntary Deferral Plan * **</u>
<u>10.21</u>	<u>Employee Stock Purchase and Bonus Plan (incorporated by reference from Exhibit 10.9 in the Registrant's report on Form 10-K filed with the Commission for the year ended December 31, 2008)*</u>
<u>10.22</u>	<u>2016 Employee Stock Purchase and Bonus Plan (incorporated by reference from Exhibit 10.2 in the Registrant's report on Form 8-K filed with the Commission May 19, 2016)*</u>
<u>10.23</u>	<u>Markel Corporation Omnibus Incentive Plan (incorporated by reference from Appendix B in the Registrant's Proxy Statement and Definitive 14A filed with the Commission April 2, 2003)*</u>
<u>10.24</u>	<u>Form of Restricted Stock Unit Award Agreement for Executive Officers (revised 2010) (incorporated by reference from Exhibit 10.2 filed with the Commission in the Registrant's report on Form 10-Q for the quarter ended March 31, 2010)</u>
<u>10.25</u>	<u>Form of Amended and Restated May 2010 Restricted Stock Unit Award Agreement for Executive Officers (incorporated by reference from Exhibit 10.1 in the Registrant's report on Form 10-Q filed with the Commission for the quarter ended June 30, 2010)*</u>
<u>10.26</u>	<u>May 2010 Restricted Stock Units Deferral Election Form (incorporated by reference from Exhibit 10.2 in the Registrant's report on Form 10-Q filed with the Commission for the quarter ended June 30, 2010)*</u>
<u>10.27</u>	<u>Markel Corporation 2012 Equity Incentive Compensation Plan (incorporated by reference from Appendix A in the Registrant's Proxy Statement and Definitive 14A filed with the Commission March 16, 2012)*</u>
<u>10.28</u>	<u>Form of Time Based Restricted Stock Unit Award Agreement for Executive Officers for the 2012 Equity Incentive Compensation Plan (incorporated by reference from Exhibit 10.22 in the Registrant's report on Form 10-K filed with the Commission for the year ended December 31, 2012)*</u>
<u>10.29</u>	<u>Form of Performance Based Restricted Stock Unit Award Agreement for Executive Officers for the 2012 Equity Incentive Compensation Plan (incorporated by reference from Exhibit 10.23 in the Registrant's report on Form 10-K filed with the Commission for the year ended December 31, 2012)*</u>
<u>10.30</u>	<u>Restricted Stock Units Deferral Election Form for the 2012 Equity Incentive Compensation Plan (incorporated by reference from Exhibit 10.24 in the Registrant's report on Form 10-K filed with the Commission for the year ended December 31, 2012)*</u>
<u>10.31</u>	<u>Form of Restricted Stock Unit Award Agreement for Executive Officers under the Markel Corporation 2012 Equity Incentive Compensation Plan (incorporated by reference from Exhibit 10.1 in the Registrant's report on Form 8-K filed with the Commission May 17, 2013)*</u>
<u>10.32</u>	<u>Form of Performance Based Restricted Stock Unit Award Agreement for Executive Officers for the 2012 Equity Incentive Compensation Plan (revised 2016) (incorporated by reference from Exhibit 10.1 in the Registrant's report on Form 10-Q filed with the Commission for the quarter ended March 31, 2016)*</u>
<u>10.33</u>	<u>Form of Time Based (Cliff Vesting) Restricted Stock Unit Award Agreement for Executive Officers for the 2012 Equity Incentive Compensation Plan (revised 2016) (incorporated by reference from Exhibit 10.2 in the Registrant's report on Form 10-Q filed with the Commission for the quarter ended March 31, 2016)*</u>
<u>10.34</u>	<u>Form of Time Based (Graded Vesting) Restricted Stock Unit Award Agreement for Executive Officers for the 2012 Equity Incentive Compensation Plan (revised 2016) (incorporated by reference from Exhibit 10.3 in the Registrant's report on Form 10-Q filed with the Commission for the quarter ended March 31, 2016)*</u>

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<u>10.35</u>	<u>2016 Equity Incentive Compensation Plan (incorporated by reference from Exhibit 10.1 in the Registrant's report on Form 8-K filed with the Commission May 19, 2016)*</u>
<u>10.36</u>	<u>Description of Awards Under Executive Bonus Plan and 2016 Equity Incentive Compensation Plan for 2018 (incorporated by reference from Item 5.02 in the Registrant's report on Form 8-K filed with the Commission February 23, 2018)*</u>
<u>10.37</u>	<u>Form of Performance Based Restricted Stock Unit Award Agreement for Executive Officers for the 2016 Equity Incentive Compensation Plan (incorporated by reference from Exhibit 10.3 in the Registrant's report on Form 10-Q filed with the Commission for the quarter ended June 30, 2016)*</u>
<u>10.38</u>	<u>Form of Time Based (Cliff Vesting) Restricted Stock Unit Award Agreement for Executive Officers for the 2016 Equity Incentive Compensation Plan (incorporated by reference from Exhibit 10.4 in the Registrant's report on Form 10-Q filed with the Commission for the quarter ended June 30, 2016)*</u>
<u>10.39</u>	<u>Form of Time Based (Graded Vesting) Restricted Stock Unit Award Agreement for Executive Officers for the 2016 Equity Incentive Compensation Plan (incorporated by reference from Exhibit 10.5 in the Registrant's report on Form 10-Q filed with the Commission for the quarter ended June 30, 2016)*</u>
<u>10.40</u>	<u>Form of Restricted Stock Award Agreement for Outside Directors for the 2016 Equity Incentive Compensation Plan (incorporated by reference from Exhibit 10.6 in the Registrant's report on Form 10-Q filed with the Commission for the quarter ended June 30, 2016)*</u>
<u>10.41</u>	<u>Form of Performance-Based Restricted Stock Unit Award Agreement for Executive Officers for the 2016 Equity Incentive Compensation Plan (revised May 2017) (incorporated by reference from Exhibit 10.1 in the Registrant's report on Form 8-K filed with the Commission May 17, 2017)*</u>
<u>10.42</u>	<u>Form of Performance-Based (Graded Vesting) Restricted Stock Unit Award Agreement for Executive Officers for the 2016 Equity Incentive Compensation Plan (incorporated by reference from Exhibit 10.2 in the Registrant's report on Form 10-Q filed with the Commission for the quarter ended March 31, 2018)*</u>
<u>10.43</u>	<u>Aspen Holdings, Inc. Amended and Restated 2008 Stock Option Plan (incorporated by reference from Exhibit 99.1 in the Registrant's Registration Statement on Form S-8 (Reg. No. 333-170047))*</u>
<u>21</u>	<u>Certain Subsidiaries of Markel Corporation**</u>
<u>23</u>	<u>Consent of KPMG LLP**</u>
<u>31.1</u>	<u>Certification of Co-Principal Executive Officer Pursuant to Rule 13a-14(a)/ 15d-14(a)**</u>
<u>31.2</u>	<u>Certification of Co-Principal Executive Officer Pursuant to Rule 13a-14(a)/ 15d-14(a)**</u>
<u>31.3</u>	<u>Certification of Principal Financial Officer Pursuant to Rule 13a-14(a)/ 15d-14(a)**</u>
<u>32.1</u>	<u>Certification of Co-Principal Executive Officer furnished Pursuant to 18 U.S.C. Section 1350**</u>
<u>32.2</u>	<u>Certification of Co-Principal Executive Officer furnished Pursuant to 18 U.S.C. Section 1350**</u>
<u>32.3</u>	<u>Certification of Principal Financial Officer furnished Pursuant to 18 U.S.C. Section 1350**</u>
<u>101</u>	<u>The following consolidated financial statements from Markel Corporation's Annual Report on Form 10-K for the year ended December 31, 2018, filed on February 28, 2019, formatted in XBRL: (i) Consolidated Balance Sheets, (ii) Consolidated Statements of Income and Comprehensive Income, (iii) Consolidated Statements of Changes in Equity, (iv) Consolidated Statements of Cash Flows and (v) Notes to Consolidated Financial Statements.**</u>

* Indicates management contract or compensatory plan or arrangement

** Filed with this report

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.

MARKEL CORPORATION

<u>/s/ Thomas S. Gayner</u>	<u>/s/ Richard R. Whitt, III</u>	<u>/s/ Jeremy A. Noble</u>
Thomas S. Gayner	Richard R. Whitt, III	Jeremy A. Noble
Co-Chief Executive Officer	Co-Chief Executive Officer	Senior Vice President and Chief Financial Officer
(Co-Principal Executive Officer)	(Co-Principal Executive Officer)	(Principal Financial Officer)
February 28, 2019	February 28, 2019	February 28, 2019

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

[Table of Contents](#)

<u>Signatures</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Alan I. Kirshner</u> Alan I. Kirshner	Executive Chairman, Chairman of the Board	February 28, 2019
<u>/s/ Anthony F. Markel</u> Anthony F. Markel	Director, Vice Chairman	February 28, 2019
<u>/s/ Steven A. Markel</u> Steven A. Markel	Director, Vice Chairman	February 28, 2019
<u>/s/ Thomas S. Gayner</u> Thomas S. Gayner	Director, Co-Chief Executive Officer (Co-Principal Executive Officer)	February 28, 2019
<u>/s/ Richard R. Whitt, III</u> Richard R. Whitt, III	Director, Co-Chief Executive Officer (Co-Principal Executive Officer)	February 28, 2019
<u>/s/ Jeremy A. Noble</u> Jeremy A. Noble	Senior Vice President and Chief Financial Officer (Principal Financial Officer)	February 28, 2019
<u>/s/ Nora N. Crouch</u> Nora N. Crouch	Chief Accounting Officer (Principal Accounting Officer)	February 28, 2019
<u>/s/ J. Alfred Broaddus, Jr.</u> J. Alfred Broaddus, Jr.	Director	February 28, 2019
<u>/s/ K. Bruce Connell</u> K. Bruce Connell	Director	February 28, 2019
<u>/s/ Stewart M. Kasen</u> Stewart M. Kasen	Director	February 28, 2019
<u>/s/ Diane Leopold</u> Diane Leopold	Director	February 28, 2019
<u>/s/ Lemuel E. Lewis</u> Lemuel E. Lewis	Director	February 28, 2019
<u>/s/ Darrell D. Martin</u> Darrell D. Martin	Director	February 28, 2019
<u>/s/ Michael O'Reilly</u> Michael O'Reilly	Director	February 28, 2019
<u>/s/ Michael J. Schewel</u> Michael J. Schewel	Director	February 28, 2019
<u>/s/ Debora J. Wilson</u> Debora J. Wilson	Director	February 28, 2019

THIRD AMENDMENT TO CREDIT AGREEMENT

This **THIRD AMENDMENT TO CREDIT AGREEMENT** (this “Amendment”), dated as of November 5, 2018, is entered into by and among **MARKEL CORPORATION**, a Virginia corporation with its principal offices in Glen Allen, Virginia (the “Borrower”), **MARKEL BERMUDA LIMITED**, a Bermuda company, **MARKEL GLOBAL REINSURANCE COMPANY** (formerly Alterra Reinsurance USA Inc.), a Delaware corporation, **ALTERRA FINANCE LLC**, a Delaware limited liability company, **ALTERRA USA HOLDINGS LIMITED**, a Delaware corporation, the Lenders (as hereinafter defined), and **WELLS FARGO BANK, NATIONAL ASSOCIATION**, as Administrative Agent.

RECITALS

A. The Credit Parties, the several lenders from time to time party thereto (the “Lenders”), and the Administrative Agent are party to the Credit Agreement, dated as of August 1, 2014, as amended by the First Amendment to Credit Agreement, dated as of November 15, 2015, and the Second Amendment to Credit Agreement, dated as of November 2, 2017 (as so amended, the “Credit Agreement”). Capitalized terms used but not defined herein shall have the meanings assigned to such terms in the Credit Agreement as amended by this Amendment.

B. The Borrower has requested that the Required Lenders amend the Credit Documents on the terms and conditions set forth herein.

STATEMENT OF AGREEMENT

NOW, THEREFORE, in consideration of the foregoing and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

ARTICLE I

AMENDMENTS TO CREDIT DOCUMENTS

1.1 Existing Defined Terms. Section 1.1 of the Credit Agreement is hereby amended by amending and restating the following defined term:

““Excluded Subsidiary” shall mean Markel Ventures, Inc., a Virginia corporation, Markel CATCo Investment Management Ltd., a Bermuda company, Nephila Holdings Ltd., a Bermuda company, or any other Subsidiary of the Borrower that

(i) is a Pledged Subsidiary;

(ii) (x) is acquired or formed by Borrower or a Subsidiary of Borrower on or after the Closing Date, (y) is not, or is formed for the purpose of acquiring another Person that is not, primarily engaged in the property and casualty insurance or property and casualty insurance-related businesses, and (z) is designated as an Excluded Subsidiary in the first Compliance Certificate under Section 6.3(a) following its formation or acquisition; or

(iii) is a Subsidiary of another Excluded Subsidiary.”

ARTICLE II

CONDITIONS OF EFFECTIVENESS

2.1 The amendments set forth in **Article I** shall become effective as of the date (the “Amendment Effective Date”)

when, and only when, the Administrative Agent shall have received an executed counterpart of this Amendment from the Credit Parties and the Required Lenders.

ARTICLE III

REPRESENTATIONS AND WARRANTIES

3.1 Each Credit Party (solely as to itself and its Subsidiaries) represents and warrants to the Administrative Agent, the Lenders and the Issuing Banks on and as of the Amendment Effective Date, that: (i) it has taken all necessary action to authorize the execution, delivery and performance of this Amendment, (ii) this Amendment has been duly executed and delivered by such Credit Party and constitutes such Credit Party's legal, valid and binding obligations, enforceable in accordance with its terms, except as such enforcement may be limited by bankruptcy, insolvency, reorganization, moratorium or similar state or federal debtor relief laws from time to time in effect which affect the enforcement of creditors' rights in general and the availability of equitable remedies, (iii) no consent, approval, authorization or order of, or filing, registration or qualification with, any court or Governmental Authority or third party is required in connection with the execution, delivery or performance by such Credit Party of this Amendment, (iv) the representations and warranties set forth in Article V of the Credit Agreement are true and correct as of the date hereof except for those which expressly relate to an earlier date, (v) after giving effect to this Amendment, no event has occurred and is continuing which constitutes a Default or an Event of Default, (vi) the Security Documents continue to create a valid security interest in, and Lien upon, all right, title and interest of each Account Party in and to the Collateral purported to be pledged by it thereunder and described therein, superior to and prior to the rights of all third persons and subject to no other Liens except as specifically permitted under the Credit Documents and (vii) the Obligations are not reduced by this Amendment and are not subject to any offsets, defenses or counterclaims.

ARTICLE IV

ACKNOWLEDGEMENT AND CONFIRMATION

4.1 Each party to this Amendment hereby confirms and agrees that, after giving effect to this Amendment, the Credit Agreement and the other Credit Documents to which it is a party remain in full force and effect and enforceable against such party in accordance with their respective terms, as modified hereby, and shall not be discharged, diminished, limited or otherwise affected in any respect.

ARTICLE V

MISCELLANEOUS

5.1 Governing Law. THIS AMENDMENT SHALL BE GOVERNED BY AND CONSTRUED AND ENFORCED IN ACCORDANCE WITH THE LAWS OF THE COMMONWEALTH OF VIRGINIA (WITHOUT REGARD TO THE CONFLICTS OF LAW PROVISIONS THEREOF).

5.2 Credit Document. As used in the Credit Agreement, "hereinafter," "hereto," "hereof," and words of similar import shall, unless the context otherwise requires, mean the Credit Agreement after amendment by this Amendment. Any reference to the Credit Agreement or any of the other Credit Documents herein or in any such documents shall refer to the Credit Agreement and the other Credit Documents as amended hereby. This Amendment is limited to the matters expressly set forth herein, and shall not constitute or be deemed to constitute an amendment, modification or waiver of any provision of the Credit Agreement except as expressly set forth herein. This Amendment shall constitute a Credit Document under the terms of the Credit Agreement.

5.3 Expenses. The Credit Parties shall pay all reasonable and documented fees and expenses of counsel to the Administrative Agent in connection with the preparation, negotiation, execution and delivery of this Amendment.

5.4 Severability. To the extent any provision of this Amendment is prohibited by or invalid under the applicable law of any jurisdiction, such provision shall be ineffective only to the extent of such prohibition or invalidity and only in any such jurisdiction, without prohibiting or invalidating such provision in any other jurisdiction or the remaining provisions of this Amendment in any jurisdiction.

5.5 Successors and Assigns. This Amendment shall be binding upon, inure to the benefit of and be enforceable by the respective successors and permitted assigns of the parties hereto.

5.6 Construction. The headings of the various sections and subsections of this Amendment have been inserted for convenience only and shall not in any way affect the meaning or construction of any of the provisions hereof.

5.7 Counterparts; Integration. This Amendment may be executed and delivered via facsimile or electronic mail with the same force and effect as if an original were executed and may be signed in any number of counterparts, each of which shall be an original, with the same effect as if the signatures hereto were upon the same instrument. This Amendment constitutes the entire contract among the parties hereto with respect to the subject matter hereof and supersedes any and all prior agreements and understandings, oral or written, relating to the subject matter hereof.

[remainder of page intentionally left blank]

IN WITNESS WHEREOF , the parties hereto have caused this Amendment to be executed by their duly authorized officers as of the date first above written.

MARKEL CORPORATION

By: /s/ Jeremy A. Noble
Name: Jeremy A. Noble
Title: Senior Vice President and Chief Financial Officer

MARKEL BERMUDA LIMITED

By: /s/ April L. Duff
Name: April L. Duff
Title: Treasurer

MARKEL GLOBAL REINSURANCE COMPANY

By: /s/ April L. Duff
Name: April L. Duff
Title: Treasurer

ALTERRA USA HOLDINGS LIMITED

By: /s/ Jeremy A. Noble
Name: Jeremy A. Noble
Title: Vice President, Chief Financial Officer and Treasurer

ALTERRA FINANCE LLC

By: /s/ Jeremy A. Noble
Name: Jeremy A. Noble
Title: Chief Financial Officer and Treasurer

WELLS FARGO BANK, NATIONAL ASSOCIATION , as
Administrative Agent, Swingline Lender, a Fronting Bank and as a
Lender

By: /s/ Grainne M. Pergolini
Name: Grainne M. Pergolini
Title: Managing Director

CITIBANK, N.A. , as a Lender

By: /s/ John Modin
Name: John Modin
Title: Vice President & Managing Director

BARCLAYS BANK, PLC , as a Lender

By: /s/ Karla K. Maloof
Name: Karla K. Maloof
Title: Head of Insurance - Americas, Corporate Banking
Executed in New York

JPMORGAN CHASE BANL, N.A. , as a Lender

By: /s/ Hector J. Varona
Name: Hector J. Varona
Title: Executive Director

SUNTRUST BANK , as a Lender

By: /s/ Doug Kennedy
Name: Doug Kennedy
Title: Director

Branch Banking and Trust Company , as a Lender

By: /s/ Scott Hennessee
Name: Scott Hennessee
Title: Senior Vice President

THE NORTHERN TRUST COMPANY , as a Lender

By: /s/ Joshua Metcalf
Name: Joshua Metcalf
Title: VP

Bank of America, N.A. , as a Lender

By: /s/ Hema Kishnani
Name: Hema Kishnani
Title: Vice President

THE BANK OF NEW YORK MELLON , as a Lender

By: /s/ Tatiana Ross

Name: Tatiana Ross

Title: Vice President

SIGNATURE PAGE TO
THIRD AMENDMENT TO CREDIT AGREEMENT

AMENDMENT TO THE MARKEL CORPORATION VOLUNTARY DEFERRAL PLAN

WHEREAS, Markel Corporation (the "Company") sponsors the Markel Corporation Voluntary Deferral Plan, effective as of April 1, 2016 (the "Plan");

WHEREAS, the Company has the power to amend the Plan and now wishes to do so;

NOW, THEREFORE, the Plan is hereby amended as follows, effective as of January 1, 2019:

1. Section 4.01(a)(ii) of the Adoption Agreement to the Plan is hereby amended in its entirety as follows:

(ii) Bonuses [do not complete if you complete (iii)]

Type of Bonus	Dollar Amount		% Amount		Increment
	Min	Max	Min	Max	
(a) Annual Bonus Plan			0%	75%	5%
(b) Executive Bonus Plan			0%	75%	5%
(c)					

2. Effective for Participant distribution elections made for Compensation earned during periods beginning on or after January 1, 2019, the last paragraph of Section 6.01(b) of the Plan is hereby amended in its entirety as follows:

Installments may be paid [select each that applies]

Monthly
Quarterly
X Annually

3. In all respects not amended, the Plan is hereby ratified and confirmed.

* * * *

IN WITNESS WHEREOF, the Company has caused this Amendment to be signed as of the effective date set forth above.

MARKEL CORPORATION

By: /s/ Linda V. Schreiner

Name: Linda V. Schreiner

Title: Sr. Vice President, Strategic Management

CERTAIN SUBSIDIARIES OF MARKEL CORPORATION

Subsidiary	State or Other Jurisdiction of Incorporation or Organization
Alterra Capital Holdings Limited	Bermuda
Alterra Capital America Limited	England
Alterra USA Holdings, LLC	Delaware
Alterra Insurance USA Inc.	Delaware
Alterra Capital Brazil Limited	England
Markel Participações Ltda.	Brazil
Markel Resseguradora do Brasil S.A.	Brazil
Markel Seguradora do Brasil SA	Brazil
Alterra Capital Services Limited	Ireland
Alterra Holdings Limited	Bermuda
Alterra Agency Limited	Bermuda
New Point Re III Limited	Bermuda
Markel Bermuda Limited	Bermuda
Markel CATCo Investment Management Ltd.	Bermuda
Black/White & Associates Insurance Brokers	California
Essentia Insurance Company	Missouri
Evanston Insurance Company	Illinois
Mark IV Realty Corporation	Virginia
Schultz-Markel Associates, LLC	Delaware
Schultz Markel II, LLC	New Jersey
Markel American Insurance Company	Virginia
Markel Aspen, Inc.	Delaware
FirstComp Insurance Company	Nebraska
Markel Holdings GmbH	Germany
Markel Insurance S.E.	Germany
Markel Holdings Netherlands B.V.	The Netherlands
Markel Insurance Company	Illinois
Markel Global Reinsurance Company	Delaware
Markel International Holdings (Delaware) Limited	Delaware
Markel International Limited	England
Markel Capital Holdings Limited	England
Abbey Protection Limited	England
Abbey Protection Group Ltd.	England
Abbey Legal Holdings Limited	England
Abbey Legal Protection Limited	England
ACCTX Consulting Limited	England
ACCTX UK Limited	England
Accountax Law Limited	England
Alterra Capital UK Limited	England
Alterra at Lloyd's Limited	England
Markel Underwriting Services Limited	England
EC Insurance Company Limited	England
Galleon Marine Insurance Agency Limited	England
Markel Capital Limited	England

Markel International Insurance Company Limited	England
Markel Syndicate Management Limited	England
Markel Servicios S.A.	Argentina
Markel Service, Incorporated	Virginia
Thompson Insurance Enterprises, LLC	Delaware
Markel Surety Holding Corporation	Delaware
SureTec Insurance Company	Texas
SureTec Indemnity Company	California
Markel Ventures, Inc.	Virginia
Brahmin Leather Works, LLC	Delaware
CapTech Ventures, Inc.	Virginia
Cottrell Enterprises, Inc.	Georgia
Cottrell, Inc.	Georgia
Cottrell Properties, L.P.	Georgia
Diamond Healthcare Corporation	Virginia
Eagle Construction of Va., LLC	Virginia
archi-Tec-tonic, LLC	Virginia
Eagle Commercial Construction, LLC	Virginia
Eagle Commercial Realty, LLC	Virginia
Eagle Construction of Va. Properties, LLC	Virginia
Eagle Realty of Virginia, LLC	Virginia
Eagle West 7, LLC	Virginia
Innslake Title Agency, LLC	Virginia
KA Holdings, LLC	Virginia
Precision Realty, LLC	Virginia
West Broad Village IV, LLC	Virginia
EIC Credit, LLC	Virginia
Ellicott Dredge Enterprises, LLC	Maryland
Baltimore Dredge International, Inc.	Maryland
Ellicott Dredges, LLC	Maryland
Liquid Waste Technology, LLC	Maryland
Rohr International Dredge Co., LLC	Maryland
Rohr Dredge North America, LLC	Maryland
Rohr International Dredge Holdings, Inc.	Maryland
IDRECO B.V.	The Netherlands
Rohr Bagger GmbH	Germany
Rohr France, societie responsabilitee limitee	France
Havco WP LLC	Delaware
Markel Eagle Investment, LLC	Virginia
Markel Eagle Investment II, LLC	Virginia
Markel Food Group, Inc.	Virginia
AMF Automation Technologies, LLC	Virginia
Baking Technology Systems, LLC	Georgia
Reading Bakery Systems, Inc.	Pennsylvania
Solbern, Inc.	Virginia
Tromp Group Americas, LLC	Virginia
Tromp Group B.V.	The Netherlands
MVP Properties, LLC	Delaware
P1, Inc.	Delaware
P2, Inc.	Delaware

Costa Farms Holdings, LLC	Florida
Gardenvision, LLC	Florida
Costa Carolina Operations, LLC	North Carolina
PM Transport of Florida, LLC	Florida
Panel Specialists, Inc.	Texas
ParkLand Ventures, Inc.	Virginia
PMD Holdings, Inc.	Virginia
PartnerMD, LLC	Virginia
RD Holdings, LLC	Virginia
Retail Data, LLC	Virginia
Rosemont Investment Group, LLC	Delaware
Tennessee Dredge Company, LLC	Maryland
WI Holdings Inc.	Pennsylvania
Texas Trailer Corporation LLC	Texas
Weldship Industries, LLC	New Jersey
Weldship LLC	Pennsylvania
Markel West, Inc.	California
Markel-Gayner Asset Management Corporation	Virginia
MINT Canadian Specialty Underwriters Limited	Canada
Markel Canada Limited	Canada
Prairie State Administrative Services, Inc.	Illinois
State National Companies, Inc.	Delaware
SNC Financial GP, LLC	Nevada
SNC Financial LP, LLC	Nevada
T.B.A. Insurance Group, Ltd.	Texas
State National Intermediate Holdings, Inc.	Texas
State National Insurance Company, Inc.	Texas
Alterra America Insurance Company	Delaware
National Specialty Insurance Company	Texas
United Specialty Insurance Company	Delaware
City National Insurance Company	Texas
Independent Specialty Insurance Company	Delaware

Consent of Independent Registered Public Accounting Firm

The Board of Directors
Markel Corporation:

We consent to the incorporation by reference in the registration statements No. 333-223194 on Form S-3; No. 333-107661, No. 333-143393, No. 333-170047, No. 333-178051, No. 333-181419, No. 333-188294, No. 333-211414, and No. 333-211415 on Form S-8; and No. 333-185715 on Form S-4 of Markel Corporation of our reports dated February 28, 2019 , with respect to the consolidated balance sheets of Markel Corporation and subsidiaries (the Company) as of December 31, 2018 and 2017 , and the related consolidated statements of income (loss) and comprehensive income (loss), changes in equity, and cash flows for each of the years in the three-year period ended December 31, 2018 , and the related notes, and the effectiveness of internal control over financial reporting as of December 31, 2018 , which reports appear in the December 31, 2018 annual report on Form 10-K of Markel Corporation.

/s/ KPMG LLP

Richmond, Virginia
February 28, 2019

**CERTIFICATION OF CO-PRINCIPAL EXECUTIVE OFFICER
PURSUANT TO RULE 13a-14(a)/15d-14(a)**

I, Richard R. Whitt, III, certify that:

1. I have reviewed this annual report on Form 10-K of Markel Corporation;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, 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;
 - c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

February 28, 2019

/s/ Richard R. Whitt, III

Richard R. Whitt, III

Co-Chief Executive Officer

(Co-Principal Executive Officer)

**CERTIFICATION OF CO-PRINCIPAL EXECUTIVE OFFICER
PURSUANT TO RULE 13a-14(a)/15d-14(a)**

I, Thomas S. Gayner, certify that:

1. I have reviewed this annual report on Form 10-K of Markel Corporation;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, 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;
 - c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

February 28, 2019

/s/ Thomas S. Gayner

Thomas S. Gayner

Co-Chief Executive Officer

(Co-Principal Executive Officer)

**CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER
PURSUANT TO RULE 13a-14(a)/15d-14(a)**

I, Jeremy A. Noble, certify that:

1. I have reviewed this annual report on Form 10-K of Markel Corporation;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, 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;
 - c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

February 28, 2019

/s/ Jeremy A. Noble

Jeremy A. Noble

Senior Vice President and Chief Financial Officer
(Principal Financial Officer)

**CERTIFICATION OF CO-PRINCIPAL EXECUTIVE OFFICER
FURNISHED PURSUANT TO 18 U.S.C. SECTION 1350**

In connection with the Annual Report of Markel Corporation (the "Company") on Form 10-K for the year ended December 31, 2018 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Thomas S. Gayner, Co-Chief Executive Officer of the Company, certify pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to my knowledge:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ Thomas S. Gayner

Thomas S. Gayner

Co-Chief Executive Officer

(Co-Principal Executive Officer)

February 28, 2019

**CERTIFICATION OF CO-PRINCIPAL EXECUTIVE OFFICER
FURNISHED PURSUANT TO 18 U.S.C. SECTION 1350**

In connection with the Annual Report of Markel Corporation (the "Company") on Form 10-K for the year ended December 31, 2018 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Richard R. Whitt, III, Co-Chief Executive Officer of the Company, certify pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to my knowledge:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ Richard R. Whitt, III

Richard R. Whitt, III

Co-Chief Executive Officer

(Co-Principal Executive Officer)

February 28, 2019

**CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER
FURNISHED PURSUANT TO 18 U.S.C. SECTION 1350**

In connection with the Annual Report of Markel Corporation (the "Company") on Form 10-K for the year ended December 31, 2018 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Jeremy A. Noble, Senior Vice President and Chief Financial Officer of the Company, certify pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to my knowledge:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ Jeremy A. Noble

Jeremy A. Noble

Senior Vice President and Chief Financial Officer

(Principal Financial Officer)

February 28, 2019