Chubb Tempest Life Reinsurance Ltd.
and its subsidiaries

(Incorporated in Bermuda)

Consolidated Financial Statements

December 31, 2018 and 2017

(in thousands of U.S. dollars)

Report of Independent Auditors

To the Board of Directors of Chubb Tempest Life Reinsurance and its subsidiaries:

We have audited the accompanying consolidated financial statements of Chubb Tempest Life Reinsurance and its subsidiaries, which comprise the consolidated balance sheets as of December 31, 2018 and 2017, and the related consolidated statements of operations and comprehensive income, of shareholder's equity and of cash flows for the years then ended.

Management's Responsibility for the Consolidated Financial Statements

Management is responsible for the preparation and fair presentation of the consolidated US GAAP financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of consolidated US GAAP financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on the consolidated US GAAP financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated US GAAP financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the consolidated US GAAP financial statements. The procedures selected depend on our judgment, including the assessment of the risks of material misstatement of the consolidated US GAAP financial statements, whether due to fraud or error. In making those risk assessments, we consider internal control relevant to the Company's preparation and fair presentation of the consolidated US GAAP financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the consolidated US GAAP financial statements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the consolidated US GAAP financial statements referred to above present fairly, in all material respects, the financial position of Chubb Tempest Life Reinsurance and its subsidiaries as of December 31, 2018 and 2017, and the results of its operations and its cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America.

PricewaterhouseCoopers LLP

Philadelphia, PA
April 26, 2019

Chubb Tempest Life Reinsurance Ltd. and its subsidiaries

Consolidated Balance Sheets

As at December 31, 2018 and 2017

(in thousands of U.S. dollars, except share and per share data)

	2018 $	2017 $
Assets		
Fixed maturities available for sale, at fair value (amortized cost $12,048,658 and $13,176,811)	11,908,820	13,429,219
Fixed maturities held to maturity, at amortized cost (fair value $7,299 and $8,560)	7,080	8,139
Equity securities, at fair value (cost $569 and $439)	569	357
Short-term investments, at cost and fair value	377,905	362,042
Other investments (cost $3,179,849 and $2,211,458)	3,187,779	2,452,064
Cash	242,616	561,896
Restricted cash	27,408	59,001
Total investments and cash	15,752,177	16,872,718
Securities lending collateral	343,584	293,206
Accrued investment income	111,607	121,803
Reinsurance balances receivable	521,013	879,435
Prepaid reinsurance premiums	166,190	143,849
Reinsurance recoverable	1,049,151	1,113,811
Value of reinsurance business assumed	160,965	183,684
Deferred policy acquisition costs	502,075	559,594
Goodwill	371,087	371,087
Amounts due from affiliates	128,326	78,060
Funds withheld	370,582	338,985
Separate account assets	2,457,067	2,374,681
Other assets	329,058	131,368
Total assets	22,262,882	23,462,281
Liabilities		
Unpaid losses and loss expenses	6,530,063	7,178,491
Future policy benefits	947,218	1,701,492
Unearned premiums	1,106,959	1,502,784
Reinsurance balances payable	302,149	341,785
Securities lending payable	343,648	293,239
Separate account liabilities	2,457,067	2,374,681
Accounts payable, accrued expenses and other liabilities	679,680	436,982
Repurchase agreements	556,664	551,840
Amounts due to affiliates	59,171	43,276
Total liabilities	12,982,619	14,424,570
Shareholder's equity		
Chubb Tempest Life Reinsurance Ltd. shareholder's equity		
Common shares ($1 par value, 370,000 authorized 370,000 issued and outstanding)	370	370
Additional paid-in capital	2,828,068	2,828,068
Retained earnings	6,121,975	5,164,283
Accumulated other comprehensive income (AOCI)	(446,333)	253,848
Total Chubb Tempest Life Reinsurance Ltd. shareholder's equity	8,504,080	8,246,569
Non-controlling interest	776,183	791,142
Total shareholder's equity	9,280,263	9,037,711
Total liabilities and shareholder's equity	22,262,882	23,462,281

The accompanying notes are an integral part of these consolidated financial statements.

Chubb Tempest Life Reinsurance Ltd. and its subsidiaries

Consolidated Statements of Operations and Comprehensive Income

For the years ended December 31, 2018 and 2017

(in thousands of US. dollars)

	2018 $	2017 $
Revenues		
Gross premiums written		
Property and casualty premiums	2,934,340	4,337,578
Life and annuity premiums	767,787	868,311
	3,702,127	5,205,889
Reinsurance premiums ceded	(476,780)	(420,992)
Net premiums written	3,225,347	4,784,897
Change in unearned premiums	387,331	(99,606)
Net premiums earned	3,612,678	4,685,291
Net investment income	607,973	612,795
Other income, net	315,700	268,976
Net realized gains (losses):		
Other-than-temporary impairment (OTTI) losses gross	(9,674)	(18,337)
Portion of OTTI losses recognized in other comprehensive income	207	600
Net OTTI losses recognized in income	(9,467)	(17,737)
Net realized gains (losses) excluding OTTI losses	(304,120)	122,524
Total net realized gains (losses) (includes $(49,876) and $417 reclassified from AOCI)	(313,587)	104,787
Total revenues	4,222,764	5,671,849
Expenses		
Losses and loss expenses	1,899,608	2,856,571
Future Policy benefits	291,630	221,340
Policy acquisition costs	1,150,303	1,383,015
Administrative expenses	36,485	37,842
Interest expense	39,836	21,720
Total expenses	3,417,862	4,520,488
Net income	804,902	1,151,361
Less: Net income attributable to the non-controlling interest	87,041	119,414
Net income attributable to Chubb Tempest Life Reinsurance Ltd.	717,861	1,031,947
Other comprehensive income (OCI)		
Unrealized depreciation on investments	(445,490)	(49,956)
Reclassification adjustments for net realized loss (gains) included in net income	49,876	(417)
	(395,614)	(50,373)
Change in:		
Cumulative foreign currency translation adjustment	(64,736)	3,969
Other comprehensive loss	(460,350)	(46,404)
Comprehensive income	344,552	1,104,957
Less: Comprehensive income attributable to the non-controlling interest	87,041	115,822
Comprehensive income attributable to Chubb Tempest Life Reinsurance Ltd.	257,511	989,135

The accompanying notes are an integral part of these consolidated financial statements.

Chubb Tempest Life Reinsurance Ltd. and its subsidiaries

Consolidated Statements of Shareholder's Equity

For the years ended December 31, 2018 and 2017

(in thousands of US. dollars)

	2018	2017
	$	**$**
Common shares		
Balance – beginning and end of year	370	370
Additional paid-in capital		
Balance – beginning and end of year	2,828,068	2,828,068
Retained earnings		
Balance – beginning of year	5,164,283	4,512,336
Cumulative effect of adoption of accounting standards (refer to Note 3)	239,831	-
Balance – beginning of year, as adjusted	5,404,114	4,512,336
Net income	717,861	1,031,947
Dividends declared on Common Shares	-	(380,000)
Balance - end of year	6,121,975	5,164,283
Accumulated other comprehensive income		
Net unrealized appreciation on investments		
Balance – beginning of year	397,347	447,720
Cumulative effect of adoption of accounting standards (refer to Note 3)	(239,831)	-
Balance – beginning of year, as adjusted	157,516	447,720
Change in year, before reclassification from AOCI	(445,490)	(49,956)
Amounts reclassified from AOCI to net income	49,876	(417)
Balance - end of year	(238,098)	397,347
Cumulative foreign currency translation adjustment		
Balance – beginning of year	(143,499)	(147,468)
Change in year	(64,736)	3,969
Balance - end of year	(208,235)	(143,499)
Accumulated other comprehensive income	(446,333)	253,848
Total Chubb Tempest Life Reinsurance Ltd. shareholder's equity	8,504,080	8,246,569

	2018	2017
Non-controlling interest		
Balance - beginning of year	791,142	695,320
Distributions to holder of non-controlling interest	(102,000)	(20,000)
Net income	87,041	119,414
Change in year - unrealized depreciation	-	(3,592)
Total non-controlling interest	776,183	791,142

The accompanying notes are an integral part of these consolidated financial statements.

Chubb Tempest Life Reinsurance Ltd. and its subsidiaries

Consolidated Statements of Cash Flows

For the years ended December 31, 2018 and 2017

(in thousands of US. dollars)

	2018 $	2017 $
Cash flows from (used in) operating activities		
Net income	804,902	1,151,361
Adjustments to reconcile net income to net cash flows from operating activities:		
Net realized (gains) losses	313,587	(104,787)
Amortization of premiums/discounts on fixed maturities	13,332	13,761
Unpaid losses and loss expenses, net of reinsurance recoverable	(462,939)	477,179
Future policy benefits, net of reinsurance recoverable	(742,096)	65,592
Unearned premiums	(357,696)	143,026
Reinsurance balances payable	(54,346)	(12,436)
Accounts payable, accrued expenses, other liabilities, and funds withheld	12,245	96,517
Income taxes payable/receivable	-	3,156
Reinsurance balances receivable	353,466	(45,128)
Prepaid reinsurance premiums	(27,990)	18,462
Accrued investment income	7,369	(4,141)
Deferred policy acquisition costs	44,556	(138,781)
Amortization and depreciation	405	708
Value of reinsurance business assumed	22,719	15,553
Amounts due to/from affiliates, net	(29,840)	(16,645)
Equity earnings	(397,149)	(389,768)
Other	(62,987)	4,834
Net cash flows from (used in) operating activities	(562,462)	1,278,463
Cash flows from (used in) investing activities		
Purchases of fixed maturities (available for sale and held to maturity)	(3,957,516)	(4,548,859)
Purchases of equity securities	(2,161)	(171)
Sales of fixed maturities available for sale	3,076,021	1,830,397
Sales of equity securities	2,212	15,008
Maturities and redemptions of fixed maturities available for sale	1,573,158	2,133,071
Maturities and redemptions of fixed maturities held to maturity	994	1,367
Net change in short-term investments	(16,458)	28,541
Net derivative instruments settlements	(36,865)	(237,433)
Private equity contributions	(1,235,883)	(384,290)
Private equity distributions	792,166	456,094
Other investing activities	25,162	90
Net cash flows from (used in) investing activities	220,830	(706,185)
Cash flows from (used in) financing activities		
Repayment of repurchase agreements	(556,629)	(1,106,990)
Proceeds from issuance of repurchase agreements	561,453	1,106,893
Dividends paid on common shares	-	(380,000)
Net cash flows from (used in) financing activities	4,824	(380,097)
Effect of foreign currency rate change on cash and restricted cash	(14,065)	22,807
Net increase (decrease) in cash and restricted cash	(350,873)	214,988
Cash and restricted cash - beginning of year	620,897	405,909
Cash and restricted cash - end of year	270,024	620,897
Supplementary cash flow information		
Interest paid	39,375	21,635

The accompanying notes are an integral part of these consolidated financial statements.

1. General

Chubb Tempest Life Reinsurance Ltd. (the Company or we, us, or our) was incorporated under the laws of Bermuda and is a wholly owned subsidiary of Chubb Limited (Chubb). Chubb Tempest Reinsurance Ltd. (CTR) was incorporated under the laws of Bermuda and is a 100 percent owned subsidiary.

Effective November 1, 2017, a reorganization was completed whereby 100 percent of the shares of ACE European Life Limited (UK) (AELL), a party under common control of Chubb Limited, were transferred from the Company to CTR. Because CTR is a 100 percent owned subsidiary, the transfer had no impact on our consolidated financial statements.

Chubb Tempest Reinsurance Ltd. (CTR) was incorporated under the laws of Bermuda and was a 100 percent owned subsidiary of CTR. Effective April 9, 2018, AELL changed its name from ACE Europe Life Limited to ACE Europe Life Plc (AELP) and on July 19, 2018, changed its name to ACE Europe Life SE (AELS).

On November 27, 2018, second shareholders were appointed for AELS as part of preparations to re-domicile to France on January 1, 2019. Chubb Group Management and Holdings Ltd. now hold one share of AELS.

Oasis Investments Limited and Oasis Investments 2 Ltd are consolidated in these financial statements as the Company owns 66.6%. There has been no change in the ownership percentages held during 2018.

2. Principal Business

The Company provides life and annuity (Life) reinsurance and, through CTR, property catastrophe, property and casualty reinsurance as well as Life reinsurance for a diverse group of customers worldwide.

3. Significant accounting policies:

(a) Basis of presentation

The accompanying Consolidated financial statements, which include the accounts of the Company and its subsidiaries, have been prepared in accordance with accounting principles generally accepted in the United States of America (GAAP) and, in the opinion of management, reflect all adjustments (consisting of normally recurring accruals) necessary for a fair statement of the results and financial position for such periods. All significant intercompany accounts and transactions including internal reinsurance transactions have been eliminated. Certain items in the prior year financial statements have been reclassified to conform to the current year presentation.

The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the reporting period. Amounts included in the Consolidated financial statements reflect the Company's best estimates and assumptions; actual amounts could differ materially from these estimates. The Company's principal estimates include:

- unpaid loss and loss expense reserves and future policy benefits reserves;
- the amortization of deferred policy acquisition costs;
- value of reinsurance business assumed;
- reinsurance recoverable, including a provision for uncollectible reinsurance;
- the assessment of risk transfer for certain structured reinsurance contracts;
- the valuation of the investment portfolio and assessment of other than temporary impairment (OTTI);
- the valuation of certain derivatives including those related to guaranteed living benefits (GLB);
- the assessment of goodwill for impairment.

(b) Premiums

Premiums are generally recorded as written upon inception of the policy. For multi-year policies for which premiums written are payable in annual installments, only the current annual premium is included as written at policy inception due to the ability of the insured/reinsured to commute or cancel coverage within the term of the policy. The remaining annual premiums are recorded as written at each successive anniversary date within the multi-year term.

For property and casualty (P&C) reinsurance products, premiums written are primarily earned on a pro-rata basis over the terms of the policies to which they relate. Unearned premiums represent the portion of premiums written applicable to the unexpired portion of the policies in force. For retrospectively-rated policies, written premiums are adjusted to reflect expected ultimate premiums consistent with changes to incurred losses, or other measures of exposure as stated in the policy, and earned over the policy coverage period. For retrospectively-rated multi-year policies, premiums recognized in the current period are computed using a with-and-without method as the difference between the ceding enterprise's total contract costs before and after the experience under the contract at the reporting date. Accordingly, for retrospectively-rated multi-year policies, additional premiums are generally written and earned when losses are incurred.

Reinsurance premiums from traditional life and annuity policies with life contingencies are generally recognized as revenue when due from policyholders. Traditional life policies include those contracts with fixed and guaranteed premiums and benefits. Benefits and expenses are matched with such income to result in the recognition of profit over the life of the contracts.

Mandatory reinstatement premiums assessed on reinsurance policies are earned in the period of the loss event that gave rise to the reinstatement premiums. All remaining unearned premiums are recognized over the remaining coverage period.

Premiums from long duration contracts such as certain long duration personal accident and health (A&H) policies are generally recognized as revenue when due from policyholders. Benefits and expenses are matched with such income to result in the recognition of profit over the life of the contracts.

Retroactive loss portfolio transfer (LPT) contracts in which the insured loss events occurred prior to the inception of the contract are evaluated to determine whether they meet the established criteria for reinsurance accounting. If reinsurance accounting is appropriate, written premiums are fully earned and corresponding losses and loss expenses recognized at the inception of the contract. The contracts can cause significant variances in gross premiums written, net premiums written, net premiums earned, and net incurred losses in the years in which they are written.

Reinsurance premiums assumed are based on information provided by ceding companies supplemented by the Company’s own estimates of premium when the Company has not received ceding company reports. The information used in establishing these estimates is reviewed and adjustments are recorded in the period in which they are determined. Premiums are earned over the coverage terms of the related reinsurance contracts and range from one to three years.

(c) Deferred policy acquisition costs

Policy acquisition costs consist of commissions, premium taxes, and certain underwriting costs related directly to the successful acquisition of new or renewal insurance contracts. Policy acquisition costs are deferred and amortized. Amortization is recorded in Policy acquisition costs in the Consolidated statements of operations. Policy acquisition costs on P&C contracts are generally amortized ratably over the period in which premiums are earned. Policy acquisition costs are reviewed to determine if they are recoverable from future income, including investment income. Unrecoverable policy acquisition costs are expensed in the period identified.

Policy acquisition costs on traditional long-duration contracts are amortized over the estimated life of the contracts, generally in proportion to premium revenue recognized based upon the same assumptions used in estimating the liability for future policy benefits. For non-traditional long-duration contracts, the Company amortizes policy acquisition costs over the expected life of the contracts in proportion to expected gross profits. The effect of changes in estimates of expected gross profits is reflected in the period the estimates are revised. Policy acquisition costs are reviewed to determine if they are recoverable from future income, including investment income. Unrecoverable policy acquisition costs are expensed in the period identified.

(d) Reinsurance

The Company assumes and cedes reinsurance with other insurance companies to provide greater diversification of business and minimize the net loss potential arising from large risks. Ceded reinsurance contracts do not relieve the Company of its primary obligation to its policyholders.

For both ceded and assumed reinsurance, risk transfer requirements must be met in order to obtain reinsurance status for accounting purposes, principally resulting in the recognition of cash flows under the contract as premiums and losses. To meet risk transfer requirements, a reinsurance contract must include insurance risk, consisting of both underwriting and timing risk, and a reasonable possibility of a significant loss for the assuming entity. To assess risk transfer for certain contracts, the Company generally develops expected discounted cash flow analyses at contract inception.

Reinsurance recoverable includes the balances due from reinsurance companies for paid and unpaid losses and loss expenses and future policy benefits that will be recovered from reinsurers, based on contracts in force. The method for determining the reinsurance recoverable on unpaid losses and loss expenses incurred but not reported (IBNR) involves actuarial estimates consistent with those used to establish the associated liability for unpaid losses and loss expenses as well as a determination of the Company's ability to cede unpaid losses and loss expenses under the terms of the reinsurance agreement.

Reinsurance recoverable is presented net of a provision for uncollectible reinsurance determined based upon a review of the financial condition of the reinsurers and other factors. The provision for uncollectible reinsurance is based on an estimate of the amount of the reinsurance recoverable balance that the Company will ultimately be unable to recover due to reinsurer insolvency, a contractual dispute, or any other reason. The valuation of this provision includes several judgments including certain aspects of the allocation of reinsurance recoverable on IBNR claims by reinsurer and a default analysis to estimate uncollectible reinsurance. The primary components of the default analysis are reinsurance recoverable balances by reinsurer, net of collateral, and default factors used to determine the portion of a reinsurer's balance deemed uncollectible. The definition of collateral for this purpose requires some judgment and is generally limited to assets held in trust, letters of credit, and liabilities held by the Company with the same legal entity for which it believes there is a contractual right of offset. The determination of the default factor is principally based on the financial strength rating of the reinsurer. Default factors require considerable judgment and are determined using the current financial strength rating, or rating equivalent, of each reinsurer as well as other key considerations and assumptions. The more significant considerations include, but are not necessarily limited to, the following:

- For reinsurers that maintain a financial strength rating from a major rating agency, and for which recoverable balances are considered representative of the larger population (i.e., default probabilities are consistent with similarly rated reinsurers and payment durations conform to averages), the financial rating is based on a published source and the default factor is based on published default statistics of a major rating agency applicable to the reinsurer's particular rating class. When a recoverable is expected to be paid in a brief period of time by a highly rated reinsurer, such as certain property catastrophe claims, a default factor may not be applied;
- For balances recoverable from reinsurers that are both unrated by a major rating agency and for which management is unable to determine a credible rating equivalent based on a parent, affiliate, or peer company, the Company determines a rating equivalent based on an analysis of the reinsurer that considers an assessment of the creditworthiness of the particular entity, industry benchmarks, or other factors as considered appropriate. The Company then applies the applicable default factor for that rating class. For balances recoverable from unrated reinsurers for which the ceded reserve is below a certain threshold, the Company generally applies a default factor of 34 percent, consistent with published statistics of a major rating agency;
- For balances recoverable from reinsurers that are either insolvent or under regulatory supervision, the Company establishes a default factor and resulting provision for uncollectible reinsurance based on reinsurer-specific facts and circumstances. Upon initial notification of an insolvency, the Company generally recognizes expense for a substantial portion of all balances outstanding, net of collateral, through a combination of write-offs of recoverable balances and increases to the provision for uncollectible reinsurance. When regulatory action is taken on a reinsurer, the Company generally recognizes a default factor by estimating an expected recovery on all balances outstanding, net of collateral. When sufficient credible information becomes available, the Company

adjusts the provision for uncollectible reinsurance by establishing a default factor pursuant to information received; and

- For other recoverables, management determines the provision for uncollectible reinsurance based on the specific facts and circumstances of that dispute.

The methods used to determine the reinsurance recoverable balance and related provision for uncollectible reinsurance are regularly reviewed and updated and any resulting adjustments are reflected in earnings in the period identified.

Prepaid reinsurance premiums represent the portion of premiums ceded to reinsurers applicable to the unexpired coverage terms of the reinsurance contracts in force.

The value of reinsurance business assumed represents the excess of estimated ultimate value of the liabilities assumed under retroactive reinsurance contracts over consideration received. The value of reinsurance business assumed is amortized and recorded to losses and loss expenses based on the payment pattern of the losses assumed and ranges between 9 and 40 years. The unamortized value is reviewed regularly to determine if it is recoverable based upon the terms of the contract, estimated losses and loss expenses, and anticipated investment income. Unrecoverable amounts are expensed in the period identified.

(e) Investments

Fixed maturities, equity securities, and short-term investments

Fixed maturities are classified as either available for sale or held to maturity.

- Available for sale (AFS) portfolio is reported at fair value with changes in fair value recorded as a separate component of AOCI in Shareholder's equity.
- Held to maturity portfolio includes securities for which the Company has the ability and intent to hold to maturity or redemption and is reported at amortized cost.

Equity securities are reported at fair value with changes in fair value recorded in net realized gains (losses) on the Consolidated statement of operations. Prior to January 1, 2018, changes in fair value were recorded as a separate component of AOCI in Shareholder's equity.

Short-term investments comprise securities due to mature within one year of the date of purchase and are recorded at fair value which typically approximates cost.

Interest, dividend income, amortization of fixed maturity market premiums and discounts related to these securities are recorded in Net investment income, net of investment management and custody fees, in the Consolidated statement of operations.

For mortgage-backed securities and any other holdings for which there is a prepayment risk, prepayment assumptions are evaluated and revised as necessary. Any adjustments required due to the resultant change in effective yields and maturities are recognized prospectively. Prepayment fees or call premiums that are only payable when a security is called prior to its maturity are earned when received and reflected in Net investment income.

The Company regularly reviews its investments for OTTI. Refer to Note 4 for additional information. With respect to securities where the decline in value is determined to be temporary and the security's value is not written down, a subsequent decision may be made to sell that security and realize a loss. Subsequent decisions on security sales are the result of changing or unforeseen facts and circumstances (e.g., arising from a large insured loss such as a catastrophe), deterioration of the credit-worthiness of the issuer or its industry, or changes in regulatory requirements. The Company believes that subsequent decisions to sell such securities are consistent with the classification of the majority of the portfolio as available for sale.

Other investments

Other investments principally comprise investment funds, limited partnerships, partially-owned investment companies, partially-owned insurance companies and policy loans.

Investment funds and limited partnerships

Investment funds, limited partnerships and all other investments over which the Company cannot exercise significant influence are accounted for as follows. Generally, we own less than three percent of the investee's shares.

- Income and expenses from these funds are reported within Net investment income.
- These funds are carried at net asset value which approximates fair value with changes in fair value recorded in net realized gains (losses) on the Consolidated statement of operations. Refer to Note 11 for a further discussion on net asset value. Prior to January 1, 2018, changes in fair value were recorded as a separate component of AOCI in Shareholder's equity.
- As a result of the timing of the receipt of valuation data from the investment managers, these investments are generally reported on a three month lag.
- Sales of these investments are reported within Net realized gains (losses).

Partially-owned investment companies

Partially-owned investment companies where our ownership interest is in excess of three percent are accounted for under the equity method because the Company exerts significant influence. These investments apply investment company accounting to determine operating results, and the Company retains the investment company accounting in applying the equity method.

- This means that investment income, realized gains or losses, and unrealized gains or losses are included in the portion of equity earnings reflected in Other (income) expense.
- As a result of the timing of the receipt of valuation data from the investment managers, these investments are generally reported on a three month lag.

Investments in partially-owned insurance companies

Investments in partially-owned insurance companies primarily represent direct investments in which the Company has significant influence and as such, meet the requirements for equity accounting. The Company reports its share of the net income or loss of the partially-owned insurance companies in Other (income) expense.

Other

- Policy loans are carried at outstanding balance and interest income is reflected in Net investment income.

Derivative instruments

The Company recognizes all derivatives at fair value in the Consolidated balance sheets in either Accounts payable, accrued expenses, and other liabilities or Other assets. Changes in fair value are included in Net realized gains (losses) in the Consolidated statements of operations. We did not designate any derivatives as accounting hedges during 2018 or 2017. The Company participates in derivative instruments in two principal ways:

(i) To sell protection to customers as an insurance or reinsurance contract that meets the definition of a derivative for accounting purposes. The reinsurance of GLBs was our primary product falling into this category; and

(ii) To mitigate financial risks and manage certain investment portfolio risks and exposures, including assets and liabilities held in foreign currencies. We use derivative instruments including futures, swaps, and foreign currency forward contracts. Refer to Note 9 for additional information.

Collateral held by brokers equal to a percentage of the total value of open futures contracts is included in the investment portfolio.

Securities lending programs

The Company participates in a securities lending program operated by a third party banking institution whereby certain assets are loaned to qualified borrowers and from which the Company earns an incremental return which is recorded within Net investment income in the Consolidated statement of operations.

Borrowers provide collateral, in the form of either cash or approved securities, at a minimum of 102 percent of the fair value of the loaned securities. Each security loan is deemed to be an overnight transaction. Cash collateral is invested in a collateral pool which is managed by the banking institution. The collateral pool is subject to written investment guidelines with key objectives which include the safeguard of principal and adequate liquidity to meet anticipated redemptions. The fair value of the loaned securities is monitored on a daily basis, with additional collateral obtained or refunded as the fair value of the loaned securities changes.

The collateral is held by the third party banking institution, and the collateral can only be accessed in the event that the institution borrowing the securities is in default under the lending agreement. As a result of these restrictions, the Company considers its securities lending activities to be non-cash investing and financing activities. An indemnification agreement with the lending agent protects the Company in the event a borrower becomes insolvent or fails to return any of the securities on loan. The fair value of the securities on loan is included in fixed maturities and equity securities in the Consolidated balance sheets. The securities lending collateral is reported as a separate line in the Consolidated balance sheets with a related liability reflecting the Company's obligation to return the collateral plus interest.

Repurchase agreements

Similar to securities lending arrangements, securities sold under repurchase agreements, whereby the Company sells securities and repurchases them at a future date for a predetermined price, are accounted for as collateralized investments and borrowings and are recorded at the contractual repurchase amounts plus accrued interest. Assets to be repurchased are the same or substantially the same as the assets transferred and the transferor, through right of substitution, maintains the right and ability to redeem the collateral on short notice. The fair value of the underlying securities is included in fixed maturities. In contrast to securities lending programs, the use of cash received is not restricted. The Company reports the obligation to return the cash as Repurchase agreements in the Consolidated balance sheets and record the fees under these repurchase agreements within Interest expense on the Consolidated statement of operations.

Refer to Note 11 for a discussion on the determination of fair value for the Company's various investment securities.

(f) Cash

Cash includes cash on hand and deposits with an original maturity of three months or less at time of purchase. . Cash held by external money managers is included in Short-term investments.

Chubb has agreements with a third party bank provider which implemented two international multi-currency notional cash pooling programs. In each program, participating Chubb entities establish deposit accounts in different currencies with the bank provider and each day the credit or debit balances in every account are notionally translated into a single currency (U.S. dollars) and then notionally pooled. The bank extends overdraft credit to any participating Chubb entity as needed, provided that the overall notionally-pooled balance of all accounts in each pool at the end of each day is at least zero. Actual cash balances are not physically converted and are not commingled between legal entities. Any overdraft balances incurred under this program by a Chubb entity would be guaranteed by Chubb Limited (up to $300 million in the aggregate). The syndicated letter of credit facility allows for same day drawings to fund a net pool overdraft should participating Chubb entities overdraw contributed funds from the pool. The Company is a participating Chubb entity.

Restricted cash

Restricted cash in the Consolidated balance sheets represents amounts held for the benefit of third parties and is legally or contractually restricted as to withdrawal or usage.

Effective January 1, 2018, we retrospectively adopted guidance on "Restricted Cash" that clarified the presentation of restricted cash on the Consolidated statement of cash flows. As a result, we revised the Consolidated statement of cash flow for the year ended December 31, 2017 to include restricted cash in the beginning and ending cash balances. In addition, we reclassified $59 million of Restricted cash from Other assets to a separate line in the Consolidated balance sheet as of December 31, 2017.

(g) Goodwill

Goodwill represents the excess of the cost of acquisitions over the fair value of net assets acquired and is not amortized. Goodwill is assigned at acquisition to the applicable reporting unit of the acquired entities giving rise to the goodwill. Goodwill impairment tests are performed annually, or more frequently if circumstances indicate a possible impairment. For goodwill impairment testing, the Company uses a qualitative assessment to determine whether it is more likely than not (i.e., more than a 50 percent probability) that the fair value of a reporting unit is greater than its carrying amount. If assessment indicates less than a 50 percent probability that fair value exceeds carrying value, the Company quantitatively estimates a reporting unit's fair value.

(h) Unpaid losses and loss expenses

A liability is established for the estimated unpaid losses and loss expenses under the terms of, and with respect to, the Company's policies and agreements. Similar to premiums that are recognized as revenues over the coverage period of the policy, a liability for unpaid losses and loss expenses is recognized as expense when insured events occur over the coverage period of the policy. These amounts include provision for both reported claims (case reserves) and incurred but not reported (IBNR) claims. IBNR reserve estimates are generally calculated by first projecting the ultimate cost of all losses that have occurred (expected losses), and then subtracting paid losses, case reserves, and loss expenses. The methods of determining such estimates and establishing the resulting liability are reviewed regularly and any adjustments are reflected in operations in the period in which they become known. Future developments may result in losses and loss expenses materially greater or less than the recorded amounts. The Company does not discount its property and casualty loss reserves.

Prior period development arises from changes to loss estimates recognized in the current year that relate to loss reserves first reported in previous calendar years and excludes the effect of losses from the development of earned premiums from previous accident years.

For purposes of analysis and disclosure, management views prior period development to be changes in the nominal value of loss estimates from period to period, net of premium and profit commission adjustments on loss sensitive contracts. Prior period development generally excludes changes in loss estimates that do not arise from the emergence of claims, such as those related to uncollectible reinsurance, interest, unallocated loss adjustment expenses, or foreign currency. Accordingly, specific items excluded from prior period development include the following: gains/losses related to foreign currency remeasurement; losses recognized from the early termination or commutation of reinsurance agreements that principally relate to the time value of money; changes in the value of reinsurance business assumed reflected in losses incurred but principally related to the time value of money; and losses that arise from changes in estimates of earned premiums from prior accident years. Except for foreign currency remeasurement, which is included in Net realized gains (losses), these items are included in current year losses.

(i) Future policy benefits

The valuation of long-duration contract reserves requires management to make estimates and assumptions regarding expenses, mortality, persistency, and investment yields. Estimates are primarily based on historical experience and information provided by ceding companies and include a margin for adverse deviation. Interest rates used in calculating reserves range from less than 1 percent to 6.5 percent at both December 31, 2018 and 2017. Actual results could differ materially from these estimates. Management monitors actual experience and where circumstances warrant, will revise assumptions and the related reserve estimates. Revisions are recorded in the period they are determined.

Effective October 1, 2018, this balance was reduced by a settlement of reserves of $868.1 million, as a result of the commutation of North American affiliated A&H business.

(j) Assumed reinsurance programs involving minimum benefit guarantees under annuity contracts

The Company reinsures various death and living benefit guarantees associated with variable annuities issued primarily in the United States. We generally receive a monthly premium during the accumulation phase of the covered annuities (in-force) based on a percentage of either the underlying accumulated account values or the underlying accumulated guaranteed values. Depending on an annuitant's age, the accumulation phase can last many years. To limit our exposure under these programs, all reinsurance treaties include annual or aggregate claim limits and many include an aggregate deductible.

The guarantees which are payable on death, referred to as guaranteed minimum death benefits (GMDB), principally cover shortfalls between accumulated account value at the time of an annuitant's death and either i) an annuitant's total deposits; ii) an annuitant's total deposits plus a minimum annual return; or iii) the highest accumulated account value attained at any policy anniversary date. In addition, a death benefit may be based on a formula specified in the variable annuity contract that uses a percentage of the growth of the underlying contract value. Liabilities for GMDBs are based on cumulative assessments or premiums to date multiplied by a benefit ratio that is determined by estimating the present value of benefit payments and related adjustment expenses divided by the present value of cumulative assessment or expected premiums during the contract period.

Under reinsurance programs covering GLBs, we assume the risk of guaranteed minimum income benefits (GMIB) associated with variable annuity contracts. The GMIB risk is triggered if, at the time the contract holder elects to convert the accumulated account value to a periodic payment stream (annuitize), the accumulated account value is not sufficient to provide a guaranteed minimum level of monthly income. We also assume the risk of guaranteed minimum accumulation benefits (GMAB). However, at December 31, 2018, the risks related to our GMAB programs are minimal given that the majority of these policies are no longer in force. Our GLB reinsurance products meet the definition of a derivative for accounting purposes and are carried at fair value with changes in fair value recognized in Realized gains (losses) in the Consolidated statement of operations. Refer to Note 6 and Note 9 for additional information.

(k) Foreign currency remeasurement and translation

The functional currency for each of the Company’s foreign operations is generally the currency of the local operating environment. Transactions in currencies other than a foreign operation's functional currency are remeasured into the functional currency and the resulting foreign exchange gains and losses are reflected in Net realized gains (losses) in the Consolidated statements of operations. Functional currency assets and liabilities are translated into the reporting currency, U.S. dollars, using period end exchange rates and the related translation adjustments are recorded as a separate component of AOCI in Shareholder’s equity. Functional statement of operations amounts expressed in functional currencies are translated using average exchange rates.

(l) Administrative expenses

Administrative expenses generally include all operating costs other than policy acquisition costs.

(m) Cash flow information

Premiums received and losses paid associated with the GLB reinsurance products, which as discussed previously meet the definition of a derivative instrument for accounting purposes, are included within Cash flows from operating activities. Cash flows, such as settlements and collateral requirements, associated with other derivative instruments are included on a net basis within Cash flows from investing activities. Purchases, sales, and maturities of short-term investments are recorded on a net basis within Cash flows from investing activities.

(n) Share-based compensation

The Company receives an allocation of share-based compensation costs from its ultimate parent, Chubb Limited. Chubb Limited measures and records compensation cost for all share-based payment awards at grant-date fair value. Compensation costs are recognized for vesting of share-based payment awards with only service conditions on a straight-line basis over the requisite service period for each separately vesting portion of the award as if the award were, in substance, multiple awards. For retirement-eligible participants, compensation costs for certain share-based payment awards are recognized immediately at the date of grant.

(o) New accounting pronouncements

Adopted in 2018

Financial Instruments – Recognition and Measurement of Financial Assets and Financial Liabilities

Effective January 2018, the Company adopted new accounting guidance on "Recognition and Measurement of Financial Assets and Financial Liabilities" on a modified-retrospective basis. The guidance requires equity investments, other than those accounted for under the equity method of accounting, to be measured at fair value with changes in fair value recognized through net income. The guidance impacts our public equities and cost-method private equities. As a result, we recorded a cumulative-effect adjustment to increase beginning Retained earnings by $239.8 million, representing the unrealized appreciation on our equity investments as of December 31, 2017 with an offsetting adjustment to decrease beginning Accumulated other comprehensive income. All subsequent changes in fair value of our equity investments are recognized within realized gains (losses) on the Consolidated statement of operations. Prior period amounts have not been adjusted and continue to be reported in accordance with the previous accounting guidance.

Changes to the Disclosure Requirements for Fair Value Measurements

In August 2018, the FASB issued amendments to modify the disclosure requirements on fair value measurements. The amendments allow for the removal of (1) the amount and reasons for transfer between Level 1 and Level 2 of the fair value hierarchy; (2) the policy for transfers between levels; and (3) the valuation processes for Level 3 fair value measurements. This update also requires the expanded discussion on unobservable inputs that are significant to the fair value measurement. We have early adopted the amendments that allow the removal of certain disclosures and deferred the adoption of the additional disclosure until the effective date in the first quarter of 2020, as permitted. The guidance changes disclosure only and did not have an impact on our financial condition or results of operations.

Adopted in 2019

Premium Amortization on Purchased Callable Debt Securities

In March 2017, the FASB issued guidance on the amortization period for purchased callable debt securities held at a premium. The guidance requires the premium to be amortized to the earliest call date. Under current guidance, premiums generally are amortized over the contracted life of the security. We adopted this guidance on January 1, 2019 on a modified retrospective basis through a cumulative effect adjustment which increased beginning retained earnings by approximately $1.4 million. Securities held at a discount do not require an accounting change.

Accounting guidance not yet adopted

Financial Instruments – Credit Losses: Measurement of Credit Losses on Financial Instruments

In June 2016, the FASB issued guidance on the accounting for credit losses of financial instruments that are measured at amortized cost, including held to maturity securities and reinsurance recoverables, by applying an approach based on the current expected credit losses (CECL). The estimate of expected credit losses should consider historical information, current information, as well as reasonable and supportable forecasts, including estimates of prepayments. The allowance for credit losses is a valuation account that is deducted from the amortized cost basis of the financial asset in order to present the net carrying value at the amount expected to be collected on the financial asset on the Consolidated balance sheet.

The guidance also amends the current debt security other-than-temporary impairment model by requiring an estimate of the expected credit loss (ECL) only when the fair value is below the amortized cost of the asset. The length of time the fair value of an AFS debt security has been below the amortized cost will no longer impact the determination of whether a potential credit loss exists. The AFS debt security model will also require the use of a valuation allowance as compared to the current practice of writing down the asset.

The standard is effective for us in the first quarter of 2020 with early adoption permitted. We will be able to assess the effect of adopting this guidance on our financial condition and results of operations closer to the date of adoption.

Targeted Improvements to the Accounting for Long-Duration Contracts

In August 2018, the FASB issued guidance to improve the existing recognition, measurement, presentation, and disclosure requirements for long-duration contracts issued by an insurance entity. The amendments in this update require more frequent updating of assumptions and a standardized discount rate for the future policy benefit liability, a requirement to use the fair value measurement model for policies with market risk benefits, simplified amortization of deferred acquisition costs, and enhanced disclosures.

This standard will be effective for us in the first quarter of 2021 with early adoption permitted. We are currently assessing the effect of adopting this guidance on our financial condition and results of operations. We will be better able to quantify the effect of adopting this standard as we progress in our implementation process and draw nearer to the date of adoption.

4. *Investments*

(a) Fixed maturities

The following tables present the fair values and amortized costs of fixed maturities as well as OTTI recognized in AOCI at December 31, 2018 and 2017.

2018

(in thousands of U.S. dollars)

	Amortized Cost	Gross Unrealized Appreciation	Gross Unrealized Depreciation	Fair Value	OTTI Recognized in AOCI
Available for sale					
U.S. Treasury and agency	$ 993,695	$ 5,283	$ (10,327)	$ 988,651	$ -
Foreign	2,917,961	68,615	(57,964)	2,928,612	-
Corporate securities	4,851,613	29,021	(138,701)	4,741,933	(1,149)
Mortgage-backed securities	3,072,453	17,169	(52,828)	3,036,794	(95)
States, municipalities, and political subdivisions	212,936	4,637	(4,743)	212,830	-
	$ 12,048,658	$ 124,725	$ (264,563)	$ 11,908,820	$ (1,244)
Held to maturity					
Corporate securities	$ 2,047	$ 72	$ -	$ 2,119	$ -
Mortgage-backed securities	5,033	152	(5)	5,180	-
	$ 7,080	$ 224	$ (5)	$ 7,299	$ -

2017

(in thousands of U.S. dollars)

	Amortized Cost	Gross Unrealized Appreciation	Gross Unrealized Depreciation	Fair Value	OTTI Recognized in AOCI
Available for sale					
U.S. Treasury and agency	$ 996,263	$ 8,564	$ (7,454)	$ 997,373	$ -
Foreign	3,305,852	116,596	(26,395)	3,396,053	-
Corporate securities	5,401,184	156,453	(18,276)	5,539,361	(942)
Mortgage-backed securities	3,218,916	39,245	(21,897)	3,236,264	(125)
States, municipalities, and political subdivisions	254,596	8,094	(2,522)	260,168	-
	$ 13,176,811	$ 328,952	$ (76,544)	$ 13,429,219	$ (1,067)
Held to maturity					
Corporate securities	$ 2,258	$ 135	$ -	$ 2,393	$ -
Mortgage-backed securities	5,881	286	-	6,167	-
	$ 8,139	$ 421	$ -	$ 8,560	$ -

As discussed in Note 4 (d), if a credit loss is incurred on an impaired fixed maturity, an OTTI is considered to have occurred and the portion of the impairment not related to credit losses (non-credit OTTI) is recognized in OCI. Included in the "OTTI Recognized in AOCI" columns above are the cumulative amounts of non-credit OTTI recognized in OCI adjusted for subsequent sales, maturities, and redemptions. OTTI recognized in AOCI does not include the impact of subsequent changes in fair value of the related securities. In periods subsequent to a recognition of OTTI in OCI, changes in the fair value of the related fixed maturities are reflected in Net unrealized appreciation (depreciation) on investments in the Consolidated statements of shareholder's equity. For the year ended December 31, 2018 and 2017, $nil and $1 million of net unrealized depreciation, respectively, related to such securities are included in OCI. At December 31, 2018 and 2017, AOCI included net unrealized appreciation of $0.5 million and $1 million, respectively, related to securities remaining in the investment portfolio for which a non-credit OTTI was recognized.

Mortgage-backed securities issued by U.S. government agencies are combined with all other "to be announced" mortgage backed securities held (refer to Note 9 c) (iv)) and are included in the category, "Mortgage-backed securities". Approximately 83 percent and 86 percent of the total mortgage-backed securities at December 31, 2018 and 2017 are represented by investments in U.S. government agency bonds. The remainder of the mortgage exposure consists of collateralized mortgage obligations and non-government mortgage-backed securities, the majority of which provide a planned structure for principal and interest payments and carry a rating of AAA by the major credit rating agencies.

The following table presents fixed maturities by contractual maturity at December 31, 2018 and 2017.

(in thousands of U.S. dollars)	2018		2017	
	Fair Value	Amortized Cost	Fair Value	Amortized Cost
Available for sale; maturity period				
Due in 1 year or less	$ 730,060	$ 728,469	$ 804,861	$ 797,485
Due after 1 year through 5 years	3,464,583	3,470,094	4,007,648	3,918,169
Due after 5 years through 10 years	3,546,873	3,660,880	4,324,613	4,250,066
Due after 10 years	1,130,510	1,116,762	1,055,833	992,175
	8,872,026	8,976,205	10,192,955	9,957,895
Mortgage-backed securities	3,036,794	3,072,453	3,236,264	3,218,916
	$ 11,908,820	$ 12,048,658	$ 13,429,219	$ 13,176,811
Held to maturity; maturity period				
Due in 1 year or less	$ 408	$ 403	$ -	$ -
Due after 1 year through 5 years	1,140	1,086	1,638	1,524
Due after 10 years	571	558	755	734
	2,119	2,047	2,393	2,258
Mortgage-backed securities	5,180	5,033	6,167	5,881
	$ 7,299	$ 7,080	$ 8,560	$ 8,139

Expected maturities could differ from contractual maturities because borrowers may have the right to call or prepay obligations, with or without call or prepayment penalties.

(b) Equity securities and other investments

Effective January 1, 2018, we adopted new accounting guidance that requires any changes in fair value of equity securities and other investments that are accounted for under the cost-method to be recognized immediately in realized gains and losses in net income. As a result, beginning on January 1, 2018, realized gains and losses from these investments include both sales of securities and unrealized gains and losses as follows:

(in thousands of U.S. dollars)		Equity securities		Other investments		Total
Net gains (losses) recognized during the period	$	267	$	(6,415)	$	(6,148)
Less: Net gains recognized from sales of securities		76		122,725		122,801
Unrealized gains (losses) recognized for securities still held at reporting date	$	191	$	(129,140)	$	(128,949)

At December 31, 2017, the cost, gross unrealized depreciation, and fair value of equity securities was $0.4 million, $0.1 million, and $0.3 million, respectively. At December 31, 2017, the net unrealized appreciation (depreciation) was recorded within accumulated other comprehensive income on the balance sheet.

The following table presents Other Investments at December 31, 2018 and 2017.

(in thousands of U.S. dollars)		2018		2017		
		Fair value/Cost		Fair Value		Cost
Equity method investments						
Partially-owned investment companies	$	2,312,521	$	1,419,283	$	1,419,283
Cost method investments						
Limited partnerships		394,897		403,756		310,477
Investment funds		82,185		269,772		123,242
Other						
Policy loans and other		85,801		52,176		52,176
Total	$	2,875,404	$	2,144,987	$	1,905,178

Included in limited partnerships and partially-owned investment companies are 145 individual limited partnerships covering a broad range of investment strategies including large cap buyouts, specialist buyouts, growth capital, distressed, mezzanine, real estate, and co-investments. The underlying portfolio consists of various public and private debt and equity securities of publicly traded and privately held companies and real estate assets. The underlying investments across various partnerships, geographies, industries, asset types, and investment strategies provide risk diversification within the limited partnership portfolio and the overall investment portfolio.

Investment funds include one highly diversified fund investment as well as several direct funds that employ a variety of investment styles such as long/short equity and arbitrage/distressed.

The following table presents Investments in partially-owned insurance companies

(in thousands of U.S. dollars)	2018			2017			
		Carrying value	Ownership Percentage		Carrying value	Ownership Percentage	Domicile
Huatai Life Insurance Company	$	221,133	9.9%	$	214,000	9.9%	China
ABR reinsurance LTD		91,242	11.3%		93,077	11.3%	Bermuda
Total	$	312,375		$	307,077		

(c) Net realized gains (losses)

In accordance with guidance related to the recognition and presentation of OTTI, when an impairment related to a fixed maturity has occurred, OTTI is required to be recorded in Net income if management has the intent to sell the security or it is more likely than not that the Company will be required to sell the security before the recovery of its amortized cost. Further, in cases where the Company does not intend to sell the security and it is more likely than not that the Company will not be required to sell the security, we must evaluate the security to determine the portion of the impairment, if any, related to credit losses. If a credit loss is incurred, an OTTI is considered to have occurred and any portion of the OTTI related to credit losses must be reflected in Net income while the portion of OTTI related to all other factors is recognized in OCI. For fixed maturities held to maturity, OTTI recognized in OCI is accreted from AOCI to the amortized cost of the fixed maturity prospectively over the remaining term of the securities.

Each quarter, securities in an unrealized loss position (impaired securities), including fixed maturities and securities lending collateral are reviewed to identify impaired securities to be specifically evaluated for a potential OTTI.

Evaluation of potential credit losses related to fixed maturities

The Company review each fixed maturity in an unrealized loss position to assess whether the security is a candidate for credit loss. Specifically, the Company consider credit rating, market price, and issuer-specific financial information, among other factors, to assess the likelihood of collection of all principal and interest as contractually due. Securities for which the Company determine that credit loss is likely are subjected to further analysis to estimate the credit loss recognized in Net income, if any. In general, credit loss recognized in Net income equals the difference between the security's amortized cost and the net present value of its projected future cash flows discounted at the effective interest rate implicit in the debt security. All significant assumptions used in determining credit losses are subject to change as market conditions evolve.

U.S. Treasury and agency obligations (including agency mortgage-backed securities), foreign government obligations, and states, municipalities, and political subdivisions obligations

U.S. Treasury and agency obligations (including agency mortgage-backed securities), foreign government obligations, and states, municipalities, and political subdivisions obligations represent $83 million of gross unrealized loss at December 31, 2018. These securities were evaluated for credit loss primarily using qualitative assessments of the likelihood of credit loss considering credit rating of the issuers and level of credit enhancement, if any. The Company concluded that the high level of creditworthiness of the issuers coupled with credit enhancement, where applicable, supports recognizing no credit loss in Net income.

Corporate securities

Projected cash flows for corporate securities (principally senior unsecured bonds) are driven primarily by assumptions regarding probability of default and also the timing and amount of recoveries associated with defaults. The Company developed projected cash flows for corporate securities using market observable data, issuer-specific information, and credit ratings. The Company use historical default data by Moody's Investors Service (Moody's) rating category to calculate a 1-in-100 year probability of default, which results in a default assumption in excess of the historical mean default rate. Consistent with management's approach, the Company assumed a 32 percent recovery rate (the par value of a defaulted security that will be recovered) across all rating categories rather than using Moody's historical mean recovery rate of 42 percent. The Company believes that use of a default assumption in excess of the historical mean is conservative.

The following table presents default assumptions by Moody's rating category (historical mean default rate provided for comparison):

Moody's Rating Category	1-in-100 Year Default Rate	Historical Mean Default Rate
Investment Grade:		
Aaa-Baa	0.0-1.3%	0.0-0.3%
Below Investment Grade:		
Ba	4.80%	1.00%
B	12.00%	3.20%
Caa-C	36.60%	10.50%

Application of the methodology and assumptions described above resulted in credit losses recognized in Net income for corporate securities for the years ended December 31, 2018 and 2017 of $4 million and $2.3 million, respectively.

Mortgage-backed securities

For mortgage-backed securities, credit impairment is assessed using a cash flow model that estimates the cash flows on the underlying mortgages, using the security-specific collateral and transaction structure. The model estimates cash flows from the underlying mortgage loans and distributes those cash flows to various tranches of securities, considering the transaction structure and any subordination and credit enhancements that exist in that structure. The cash flow model incorporates actual cash flows on the mortgage-backed securities through the current period and then projects the remaining cash flows using a number of assumptions, including default rates, prepayment rates, and loss severity rates (the par value of a defaulted security that will not be recovered) on foreclosed properties.

The Company develops specific assumptions using market data, where available, and include internal estimates as well as estimates published by rating agencies and other third-party sources. The Company projects default rates by mortgage sector considering current underlying mortgage loan performance, generally assuming lower loss severity for Prime sector bonds versus ALT-A and Sub-prime bonds.

These estimates are extrapolated along a default timing curve to estimate the total lifetime pool default rate. Other assumptions used contemplate the actual collateral attributes, including geographic concentrations, rating agency loss projections, rating actions, and current market prices. If cash flow projections indicate that losses will exceed the credit enhancement for a given tranche, then the Company does not expect to recover the Company's amortized cost basis and the Company recognize an estimated credit loss in Net income.

There were no credit losses recognized in Net income for mortgage-backed securities for the years ended December 31, 2018 and 2017.

The following table presents, for the years ended December 31, 2018 and 2017, the components of Net realized gains (losses) and the change in net unrealized appreciation (depreciation) of investments.

(in thousands of U.S. dollars)		2018		2017
Fixed maturities:				
OTTI on fixed maturities, gross	$	(9,674)	$	(12,933)
OTTI on fixed maturities recognized in OCI, pre-tax		207		600
OTTI on fixed maturities, net		(9,467)		(12,333)
Gross realized gains excluding OTTI		23,859		31,880
Gross realized losses excluding OTTI		(64,535)		(19,684)
Total fixed maturities		(50,143)		(137)
Equity securities:				
OTTI on equity securities		-		(1,303)
Gross realized gains excluding OTTI		320		1,857
Gross realized losses excluding OTTI		(53)		-
Total equity securities		267		554
OTTI on other investments		-		(4,101)
Other investments		(7,017)		-
Foreign exchange losses		(10,595)		32,116
Derivative instruments		5,948		(26,342)
Fair value adjustments on insurance derivative		(248,228)		364,060
S&P futures		(3,768)		(261,252)
Other		(51)		(111)
Net realized gains (losses)	$	(313,587)	$	104,787

(in thousands of U.S. dollars)		2018		2017
Change in net unrealized appreciation (depreciation) on investments:				
Fixed maturities available for sale	$	(395,928)	$	(41,654)
Fixed maturities held to maturity		(393)		(243)
Equity securities		76		(1,219)
Other		631		(7,257)
Change in net unrealized appreciation (depreciation) on investments	$	(395,614)	$	(50,373)
Total net realized gains (losses) and change in net unrealized appreciation (depreciation) on investments	$	(709,201)	$	54,414

The following table presents, for the year ended December 31, 2018 and 2017, a roll-forward of pre-tax credit losses related to fixed maturities for which a portion of OTTI was recognized in OCI.

(in thousands of U.S. dollars)		2018		2017
Balance of credit losses related to securities still held-beginning of year	$	4,228	$	6,980
Additions where no OTTI was previously recorded		3,682		1,944
Additions where an OTTI was previously recorded		307		406
Reductions for securities sold during the period		(861)		(5,102)
Balance of credit losses related to securities still held-end of year	$	7,356	$	4,228

(d) Gross unrealized loss

At December 31, 2018, there were 2,765 fixed maturities out of a total of 4,784 fixed maturities in an unrealized loss position. The largest single unrealized loss in the fixed maturities was $1.9 million. Fixed maturities in an unrealized loss position at December 31, 2018 comprised both investment grade and below investment grade securities for which fair value declined primarily due to widening credit spreads since the date of purchase.

The following tables present, for all securities in an unrealized loss position at December 31, 2018 and 2017 (including securities on loan), the aggregate fair value and gross unrealized loss by length of time the security has continuously been in an unrealized loss position.

(in thousands of U.S. dollars)	2018					
	0 - 12 Months		Over 12 Months		Total	
	Fair Value	Gross Unrealized Loss	Fair Value	Gross Unrealized Loss	Fair Value	Gross Unrealized Loss
U.S. Treasury and agency	$ 293,443	$ (1,355)	$ 438,307	$ (8,972)	$ 731,750	$ (10,327)
Foreign bonds	731,538	(27,093)	554,090	(30,871)	1,285,628	(57,964)
Corporate securities	3,074,016	(114,490)	462,359	(24,211)	3,536,375	(138,701)
Mortgage-backed securities	807,033	(13,331)	1,091,986	(39,497)	1,899,019	(52,828)
States, municipalities, and political subdivisions	64,427	(598)	69,041	(4,145)	133,468	(4,743)
Total fixed maturities	$ 4,970,457	$ (156,867)	$ 2,615,783	$ (107,696)	$ 7,586,240	$ (264,563)

(in thousands of U.S. dollars)	2017					
	0 - 12 Months		Over 12 Months		Total	
	Fair Value	Gross Unrealized Loss	Fair Value	Gross Unrealized Loss	Fair Value	Gross Unrealized Loss
U.S. Treasury and agency	$ 503,735	$ (3,432)	$ 175,018	$ (4,022)	$ 678,753	$ (7,454)
Foreign bonds	681,574	(10,929)	356,049	(15,466)	1,037,623	(26,395)
Corporate securities	630,012	(8,037)	277,459	(10,239)	907,471	(18,276)
Mortgage-backed securities	935,975	(7,010)	637,244	(14,887)	1,573,219	(21,897)
States, municipalities, and political subdivisions	29,767	(178)	49,080	(2,344)	78,847	(2,522)
Total fixed maturities	2,781,063	(29,586)	1,494,850	(46,958)	4,275,913	(76,544)
Equity securities	142	(82)	-	-	142	(82)
Total	$ 2,781,205	$ (29,668)	$ 1,494,850	$ (46,958)	$ 4,276,055	$ (76,626)

(e) Net investment income

The following table presents the source of net investment income for the years ended December 31, 2018 and 2017.

(in thousands of U.S. dollars)	2018	2017
Fixed maturities	$ 512,440	$ 518,189
Short-term investments	51,858	26,481
Equity securities	162	164
Other investments	66,221	92,623
Investment income from affiliates	6,514	6,387
Gross investment income	637,195	624,347
Investment expenses	(29,222)	(31,049)
Net investment income	$ 607,973	$ 612,795

(f) Restricted Assets

The Company is required to maintain assets on deposit with various regulatory authorities to support its reinsurance operations. These requirements are generally promulgated in the statutory regulations of the individual jurisdictions. The assets on deposit are available to settle reinsurance liabilities. The Company is also required to pledge assets under repurchase agreements which represent the Company's agreement to sell securities and repurchase them at a future date for a predetermined price. The Company also utilizes trust funds in certain transactions where the trust funds are set up for the benefit of the ceding companies and generally take the place of Letter of Credit (LOC) requirements. The Company has investments in segregated portfolios primarily to provide collateral or guarantees for LOCs and derivative transactions. Included in restricted assets at December 31, 2018 and 2017, are fixed maturities and short term investments totaling $7.1 billion and $8 billion, respectively, and cash of $27 million and $59 million, respectively.

The following table presents the components of the restricted assets at December 31, 2018 and 2017.

(in thousands of U.S. dollars)	2018	2017
Deposits with non-U.S. regulatory authorities	$ 18,816	$ 18,986
Trust funds	6,480,869	7,492,367
Assets pledged under repurchase agreements	581,868	572,274
Other pledged assets	296	306
	$ 7,081,849	$ 8,083,933

In addition, the Company also utilizes a floating charge over certain assets for the benefit of a ceding company. Under the agreement, the Company would be required to secure assets in a trust for the benefit of the ceding company upon certain triggering events, including a rating downgrade below “A” by Standard and Poor’s. Although there have been no triggering events during 2018 and 2017, in 2016 the Company elected to fund a trust for the benefit of the ceding company with a balance at December 31, 2018 and 2017 of $781 million and $823 million, respectively, and therefore the maximum amount of the floating charge as at December 31, 2018 and 2017 is $nil.

5. *Unpaid losses and loss expenses*

The Company establishes reserves for the estimated unpaid ultimate liability for losses and loss expenses under the terms of its policies and agreements. Reserves include estimates for both claims that have been reported and for IBNR claims, and include estimates of expenses associated with processing and settling these claims. Reserves are recorded in Unpaid losses and loss expenses in the consolidated balance sheets. While the Company believes that its reserves for unpaid losses and loss expenses at December 31, 2018 are adequate, new information or trends may lead to future developments in incurred losses and loss expenses significantly greater or less than the reserves provided. Any such revisions could result in future changes in estimates of losses or reinsurance recoverable and would be reflected in the Company's results of operations in the period in which the estimates are changed.

The following table presents a reconciliation of unpaid losses and loss expenses for the years ended December 31, 2018 and 2017.

(in thousands of U.S. dollars)	**2018**	**2017**
Gross unpaid losses and loss expenses at beginning of year	$ 7,178,491	$ 6,256,213
Reinsurance recoverable[1]	(1,061,478)	(716,496)
Net unpaid losses and loss expenses at beginning of year	6,117,013	5,539,717
Net losses and loss expenses incurred in respect of losses occurring in:		
Current year	1,865,994	2,957,357
Prior years[2]	33,614	(100,786)
Total	1,899,608	2,856,571
Net losses and loss expenses paid in respect of losses occurring in:		
Current year[3]	(639,689)	(954,870)
Prior years	(1,671,066)	(1,406,729)
Total	(2,310,755)	(2,361,599)
Foreign currency revaluation and other	(102,556)	82,324
Net unpaid losses and loss expenses at end of year	5,603,310	6,117,013
Reinsurance recoverable[1]	926,753	1,061,478
Gross unpaid losses and loss expenses at end of year	$ 6,530,063	$ 7,178,491

(1) Net of provision for uncollectible reinsurance.

(2) Relates to prior period loss reserve development only and excludes prior period development related to reinstatement premiums, expense adjustments, and earned premium.

The decrease in gross and net unpaid losses and loss expenses in 2018 primarily reflects lower catastrophe losses in 2018 compared to 2017.

Net losses and loss expenses incurred includes $33.6 million of net unfavorable and $100.8 million of net favorable prior period development in the years ended December 31, 2018 and 2017, respectively.

In 2018, $86.3 million of net unfavorable prior period development ($41.4 million of net favorable prior period development in 2017) was attributable to long-tailed business across a number of lines and accident years due to higher than expected claims emergence and unfavorable claim settlements. In addition, there was favorable development of $52.7 million ($59.4 million of net favorable prior period development in 2017) in short-tailed lines primarily related to various accident years, due to lack of emergence of newly reported claims and favorable development on known claims.

Much of the business written or assumed by the Company is long-tailed in nature (e.g., Workers' Compensation and Professional Lines) and can exhibit a high degree of variability. Furthermore, many of the lines of business written by the Company have grown significantly over the past several years as compared to the volume of business written in the early- to mid-2000's. The nature of the business written coupled with the relative immaturity of the business can expose the reserves to a higher-than-normal degree of uncertainty and the ultimate losses may be materially different.

The following table presents a reconciliation of the loss development tables to the liability for unpaid losses and loss expenses in the consolidated balance sheet as at December 31, 2018:

(in thousands of U.S. dollars)		**2018**
Net unpaid loss and allocated loss adjustment expense:		
North America P& C – Casualty	$	2,453,668
North America P& C – Non-Casualty		188,181
Overseas General P&C – Casualty		1,225,463
Overseas General P&C – Non-Casualty		674,547
Global Reinsurance – Casualty		526,322
Global Reinsurance – Non-Casualty		267,885
Excluded from the loss development tables		
Other [(1)]		35,151
Net unpaid loss and allocated loss adjustment expense	$	5,371,217
Ceded unpaid loss and allocated loss adjustment expense:		
North America P& C – Casualty	$	-
North America P& C – Non-Casualty		(493)
Overseas General P&C – Casualty		225,793
Overseas General P&C – Non-Casualty		628,380
Global Reinsurance – Casualty		2,071
Global Reinsurance – Non-Casualty		77,631
Other [(1)]		(6,629)
Ceded unpaid loss and allocated loss adjustment expense	$	926,753
Unpaid loss and loss expense on other than short-duration contracts [(2)]	$	232,093
Unpaid unallocated loss adjustment expenses		-
Unpaid losses and loss expenses	$	6,530,063

[(1)] This is comprised of businesses not included in the loss development tables from various lines of businesses none of which are materially significant.

[(2)] Primarily includes the claims reserve of our international A&H business and Life Insurance segment reserves.

(a) Description of Reserving Methodologies

Our recorded reserves represent management's best estimate of the provision for unpaid claims as of the balance sheet date. Management's best estimate is developed after collaboration with actuarial, underwriting, claims, legal, and finance departments and culminates with the input of reserve committees. Each reserve committee includes the participation of the relevant parties from actuarial, finance, claims, and unit senior management and has the responsibility for finalizing, recommending and approving the estimate to be used as management's best estimate. Reserves are further reviewed by Chubb's Chief Actuary and senior management. The objective of such a process is to determine a single estimate that we believe represents a better estimate than any other and which is viewed by management to be the best estimate of ultimate loss settlements.

This estimate is based on a combination of exposure and experience-based actuarial methods (described below) and other considerations such as claims reviews, reinsurance recovery assumptions and/or input from other knowledgeable parties such as underwriting. Exposure-based methods are most commonly used on relatively immature origin years (i.e., the year in which the losses were incurred — “accident year” or “report year”), while experience-based methods provide a view based on the projection of loss experience that has emerged as of the valuation date. Greater reliance is placed upon experience-based methods as the pool of emerging loss experience grows and where it is deemed sufficiently credible and reliable as the basis for the estimate. In comparing the held reserve for any given origin year to the actuarial projections, judgment is required as to the credibility, uncertainty and inherent limitations of applying actuarial techniques to historical data to project future loss experience. Examples of factors that impact such judgments include, but are not limited to, the following:

- nature and complexity of underlying coverage provided and net limits of exposure provided;
- segmentation of data to provide sufficient homogeneity and credibility for loss projection methods;
- extent of credible internal historical loss data and reliance upon industry information as required;
- historical variability of actual loss emergence compared with expected loss emergence;
- extent of emerged loss experience relative to the remaining expected period of loss emergence;
- rate monitor information for new and renewal business;
- facts and circumstances of large claims;
- impact of applicable reinsurance recoveries; and
- nature and extent of underlying assumptions.

We have actuarial staff who analyze loss reserves (including loss expenses) and regularly project estimates of ultimate losses and the corresponding indications of the required IBNR reserve. Our reserving approach is a comprehensive ground-up process using data at a detailed level that reflects the specific types and coverages of our diverse product offering. The data presented in this disclosure was prepared on a more aggregated basis and with a focus on changes in incurred loss estimates over time as well as associated cash flows. We note that data prepared on this basis may not demonstrate the full spectrum of characteristics that are evident in the more detailed level studied internally.

We perform an actuarial reserve review for each product line at least once a year. For most product lines, one or more standard actuarial reserving methods may be used to determine estimates of ultimate losses and loss expenses, and from these estimates, a single actuarial central estimate is selected. The actuarial central estimate is an input to the reserve committee process described above.

(b) Standard actuarial reserving methods

Standard actuarial reserving methods include, but are not limited to, expected loss ratio, paid and reported loss development, and Bornhuetter-Ferguson methods. A general description of these methods is provided below. In addition to these standard methods, depending upon the product line characteristics and available data, we may use other recognized actuarial methods and approaches. Implicit in the standard actuarial methods that we generally utilize is the need for two fundamental assumptions: first, the pattern by which losses are expected to emerge over time for each origin year, and second the expected loss ratio for each origin year.

The expected loss ratio for any particular origin year is selected after consideration of a number of factors, including historical loss ratios adjusted for rate changes, premium and loss trends, industry benchmarks, the results of policy level loss modeling at the time of underwriting, and/or other more subjective considerations for the product line (e.g., terms and conditions) and external environment as noted above. The expected loss ratio for a given origin year is initially established at the start of the origin year as part of the planning process. This analysis is performed in conjunction with underwriters and management. The expected loss ratio method arrives at an ultimate loss estimate by multiplying the expected ultimate loss ratio by the corresponding premium base. This method is most commonly used as the basis for the actuarial central estimate for immature origin periods on product lines where the actual paid or reported loss experience is not yet deemed sufficiently credible to serve as the principal basis for the selection of ultimate losses. The expected loss ratio for a given origin year may be modified over time if the underlying assumptions differ from the original assumptions (e.g., the assessment of prior year loss ratios, loss trend, rate changes, actual claims, or other information).

Our selected paid and reported development patterns provide a benchmark against which the actual emerging loss experience can be monitored. Where possible, development patterns are selected based on historical loss emergence by origin year. For product lines where the historical data is viewed to have low statistical credibility, the selected development patterns also reflect relevant industry benchmarks and/or experience from similar product lines written elsewhere within Chubb. This most commonly occurs for relatively new product lines that have limited historical data or for high severity/low frequency portfolios where our historical experience exhibits considerable volatility and/or lacks credibility. The paid and reported loss development methods convert the selected loss emergence pattern to a set of multiplicative factors which are then applied to actual paid or reported losses to arrive at an estimate of ultimate losses for each period. Due to their multiplicative nature, the paid and reported loss development methods will leverage differences between actual and expected loss emergence. These methods tend to be utilized for more mature origin periods and for those portfolios where the loss emergence has been relatively consistent over time.

The Bornhuetter-Ferguson method is a combination of the expected loss ratio method and the loss development method, where the loss development method is given more weight as the origin year matures. This approach allows a logical transition between the expected loss ratio method which is generally utilized at earlier maturities and the loss development methods which are typically utilized at later maturities. We usually apply this method using reported loss data although paid data may also be used.

Short-tail business

Short-tail business generally describes product lines for which losses are typically known and paid shortly after the loss actually occurs. This would include, for example, most property, personal accident, and automobile physical damage policies that we write. Due to the short reporting and development pattern for these product lines, the uncertainty associated with our estimate of ultimate losses for any particular accident period diminishes relatively quickly as actual loss experience emerges. We typically assign credibility to methods that incorporate actual loss emergence, such as the paid and reported loss development and Bornhuetter-Ferguson methods, sooner than would be the case for long-tail lines at a similar stage of development for a given origin year. The reserving process for short-tail losses arising from catastrophic events typically involves an assessment by the claims department, in conjunction with underwriters and actuaries, of our exposure and estimated losses immediately following an event and then subsequent revisions of the estimated losses as our insureds provide updated actual loss information.

Long-tail business

Long-tail business describes lines of business for which specific losses may not be known/reported for some period and for which claims can take significant time to settle/close. This includes most casualty lines such as general liability, D&O, and workers' compensation. There are various factors contributing to the uncertainty and volatility of long-tail business. Among these are:

- The nature and complexity of underlying coverage provided and net limits of exposure provided;
- Our historical loss data and experience is sometimes too immature and lacking in credibility to rely upon for reserving purposes. Where this is the case, in our reserve analysis we may utilize industry loss ratios or industry benchmark development patterns that we believe reflect the nature and coverage of the underwritten business and its future development, where available. For such product lines, actual loss experience may differ from industry loss statistics as well as loss experience for previous underwriting years;
- The difficulty in estimating loss trends, claims inflation (e.g., medical and judicial) and underlying economic conditions;
- The need for professional judgment to estimate loss development patterns beyond that represented by historical data using supplemental internal or industry data, extrapolation, or a blend of both;
- The need to address shifts in mix over time when applying historical paid and reported loss development patterns from older origin years to more recent origin years. For example, changes over time in the processes and procedures for establishing case reserves can distort reported loss development patterns or changes in ceded reinsurance structures by origin year can alter the development of paid and reported losses;
- Loss reserve analyses typically require loss or other data be grouped by common characteristics in some manner. If data from two combined lines of business exhibit different characteristics, such as loss payment patterns, the credibility of the reserve estimate could be affected. Additionally, since casualty lines of business can have significant intricacies in the terms and conditions afforded to the insured, there is an inherent risk as to the homogeneity of the underlying data used in performing reserve analyses; and

- The applicability of the price change data used to estimate ultimate loss ratios for most recent origin years.

As described above, various factors are considered when determining appropriate data, assumptions, and methods used to establish the loss reserve estimates for long-tail product lines. These factors may also vary by origin year for given product lines. The derivation of loss development patterns from data and the selection of a tail factor to project ultimate losses from actual loss emergence require considerable judgment, particularly with respect to the extent to which historical loss experience is relied upon to support changes in key reserving assumptions.

(c) Loss Development Tables

The tables were designed to present business with similar risk characteristics which exhibit like development patterns and generally similar trends, in order to provide insight into the nature, amount, timing and uncertainty of cash flows related to our claims liabilities.

Each table follows a similar format and reflects the following:

- The incurred loss triangle includes both reported case reserves and IBNR liabilities.
- Both the incurred and paid loss triangles include allocated loss adjustment expense (i.e., defense and investigative costs particular to individual claims) but exclude unallocated loss adjustment expense (i.e., the costs associated with internal claims staff and third party administrators).
- The amounts in both triangles for the years ended December 31, 2009, to December 31, 2017 and average historical claim duration as of December 31, 2018, are presented as supplementary information.
- All data presented in the triangles is net of reinsurance recoverables.
- The IBNR reserves shown to the right of each incurred loss development exhibit reflect the net IBNR recorded as of December 31, 2018.

Historical dollar amounts are presented in this footnote on a constant-dollar basis, which is achieved by assuming constant foreign exchange rates for all periods in the loss triangles, translating prior period amounts using the same local currency exchange rates as the current year end. The impact of this conversion is to show the change between periods exclusive of the effect of fluctuations in exchange rates, which would otherwise distort the change in incurred loss and cash flow patterns shown. The change in incurred loss shown will differ from other GAAP disclosures of incurred prior period reserve development amounts, which include the effect of fluctuations in exchanges rates.

We provided guidance above on key assumptions that should be considered when reviewing this disclosure and information relating to how loss reserve estimates are developed. We believe the information provided in the “Loss Development Tables” section of the disclosure is of limited use for independent analysis or application of standard actuarial estimations.

North America P&C - Casualty - Long-tail

This product line is comprised of various long-tail lines of business including Workers Compensation, Liability, and Other Casualty coverages.

Workers Compensation has a substantial geographic spread and a broad mix across industries. Types of coverage include risk management business predominantly with high deductible policies, loss sensitive business (i.e., retrospectively-rated policies), business fronted for captives, as well as excess and primary guaranteed cost coverages.

Liability consists of primary and excess liability exposures, including medical liability, and professional lines, including directors and officers (D&O) liability, errors and omissions (E&O) liability, employment practices liability (EPL), fidelity bonds, and fiduciary liability. This line also consists of automobile liability, marine, and aviation.

The primary and excess liability business represents the largest part of these exposures. The former includes both monoline and commercial package liability. The latter includes a substantial proportion of commercial umbrella, excess and high excess business, where loss activity can produce significant volatility in the loss triangles at later ages within an accident year (and sometimes across years) due to the size of the limits afforded and the complex nature of the underlying losses.

This line includes management and professional liability products provided to a wide variety of clients, from national accounts to small firms along with private and not-for-profit organizations, distributed through brokers, agents, wholesalers and MGAs. Many of these coverages, particularly D&O and E&O, are typically written on a claims-made form. While most of the coverages are underwritten on a primary basis, there are significant amounts of large line and excess exposure as well.

Other Casualty consists of the remaining commercial casualty coverages such as automobile liability and aviation. There is also a small portion of commercial multi-peril (CMP) business in accident years 2014 and prior. The paid and reported data are impacted by some catastrophe loss activity primarily on the CMP exposures just noted.

The 2018 data in the following tables reflects the impact of CTRL non-renewing the 15% quota share reinsurance treaty with the affiliated Chubb North American (NA) Pool ("the NA Pool") companies on a cut-off basis, effective January 1, 2018.

Net Incurred Loss and Allocated Loss Adjustment Expenses as at

(in thousands of U.S. dollars)	Years ended December 31										Net IBNR reserves
	Unaudited										
Accident Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2018
2009	$495,077	$496,355	$492,491	$493,958	$483,081	$414,991	$408,701	$407,238	$405,249	$406,610	$53,296
2010		$468,430	$457,428	$460,849	$464,869	$463,125	$433,161	$423,408	$434,603	$427,811	$56,960
2011			$441,159	$429,342	$433,956	$437,511	$435,995	$427,545	$429,679	$421,301	$74,567
2012				$444,771	$451,816	$465,841	$469,756	$465,435	$456,817	$464,491	$77,162
2013					$530,453	$529,912	$541,389	$540,371	$518,324	$509,021	$118,600
2014						$442,167	$448,366	$463,027	$470,391	$457,759	$144,059
2015							$493,145	$501,283	$519,379	$556,448	$195,994
2016								$549,126	$556,415	$578,915	$269,792
2017									$582,250	$601,638	$370,583
2018										$80,477	$62,678
Total										$4,504,471	

Net Cumulative Paid Loss and Allocated Loss Adjustment Expenses as at

(in thousands of U.S. dollars)	Years ended December 31 Unaudited									
Accident Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
2009	$30,139	$81,651	$126,054	$174,245	$207,762	$258,081	$284,648	$314,005	$320,150	$320,888
2010		$48,997	$103,129	$157,191	$200,764	$242,446	$285,832	$307,702	$322,286	$347,204
2011			$58,232	$112,561	$158,056	$208,256	$251,062	$284,092	$300,077	$318,081
2012				$52,650	$126,055	$181,824	$241,492	$298,534	$332,377	$355,802
2013					$49,232	$123,781	$202,367	$260,193	$314,612	$346,802
2014						$49,915	$116,458	$183,683	$240,379	$275,040
2015							$59,818	$143,511	$219,485	$294,401
2016								$63,996	$156,012	$234,529
2017									$76,813	$167,949
2018										$6,928
Total										$2,667,624

Net Liabilities for Loss and Allocated Loss Adjustment Expenses as at December 31, 2018

(in thousands of U.S. dollars)	2018
Accident years prior to 2009	$ 616,821
All Accident years	$ 2,453,668

Supplementary Information: Average Annual Percentage Payout of Net Incurred Claims by Age, as at December 31, 2018

Age in Years	1	2	3	4	5	6	7	8	9	10
Percentage	11%	14%	13%	12%	10%	9%	5%	5%	4%	0%

North America P&C – Non-Casualty - Short-tail

This product line represents first party personal and commercial product lines that are short-tailed in nature. Chubb provides personal lines coverage for high-net-worth individuals and families in North America including homeowners, automobile, valuable articles (including fine art), umbrella liability, and recreational marine insurance offered through independent regional agents and brokers. Commercial include a wide diversity of products including property, inland marine, ocean marine, surety, and A&H on both a primary and excess basis, and various policy sizes. Some years may be impacted by natural catastrophe losses.

Net Incurred Loss and Allocated Loss Adjustment Expenses as at

(in thousands of U.S. dollars) Years ended December 31

	Unaudited										Net IBNR reserves
Accident Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2018
2009	$180,287	$167,212	$159,390	$157,002	$155,516	$155,033	$154,472	$154,708	$154,127	$154,071	$544
2010		$182,762	$190,058	$187,051	$182,014	$180,861	$181,164	$178,461	$178,288	$177,914	$870
2011			$480,655	$480,365	$475,021	$472,563	$471,676	$470,027	$469,082	$469,038	$129
2012				$552,681	$533,904	$524,728	$522,661	$523,839	$522,199	$520,282	$136
2013					$508,179	$523,051	$511,497	$510,073	$507,771	$506,751	$3,197
2014						$344,556	$338,253	$330,032	$328,702	$327,997	$3,153
2015							$344,281	$326,105	$314,318	$312,931	$7,168
2016								$281,486	$276,576	$268,793	$18,782
2017									$379,027	$375,074	$17,042
2018										$122,403	$30,578
Total										$3,235,254	

Net Cumulative Paid Loss and Allocated Loss Adjustment Expenses as at

(in thousands of U.S. dollars) Years ended December 31

	Unaudited									
Accident Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
2009	$83,570	$132,696	$145,239	$148,953	$151,429	$152,426	$152,874	$153,527	$153,606	$153,335
2010		$100,069	$159,288	$168,731	$172,776	$174,917	$177,972	$177,751	$177,960	$178,182
2011			$330,346	$440,676	$457,836	$464,848	$465,675	$467,166	$467,704	$467,542
2012				$391,840	$491,673	$504,867	$511,778	$517,293	$517,609	$518,880
2013					$329,410	$481,049	$494,772	$501,246	$503,438	$503,562
2014						$188,261	$301,095	$315,196	$319,853	$323,841
2015							$186,872	$278,678	$295,239	$302,807
2016								$133,983	$221,116	$237,239
2017									$165,725	$303,099
2018										$60,563
Total										$3,049,050

Net Liabilities for Loss and Allocated Loss Adjustment Expenses as at December 31, 2018

(in thousands of U.S. dollars)	2018
Accident years prior to 2009	$ 1,977
All Accident years	$ 188,181

Supplementary Information: Average Annual Percentage Payout of Net Incurred Claims by Age, as at December 31, 2018

Age in Years	1	2	3	4	5	6	7	8	9	10
Percentage	61%	29%	4%	2%	1%	0%	0%	0%	0%	0%

Overseas General –Casualty - Long-tail

This product line is comprised of D&O liability, E&O liability, financial institutions (including crime/fidelity coverages), and non-U.S. general liability as well as aviation and political risk. Exposures are located around the world, including Europe, Latin America, and Asia.

There is some U.S. exposure in Casualty from multinational accounts. The financial lines coverages are typically written on a claims-made form, while general liability coverages are typically on an occurrence basis and include a mix of primary and excess business.

Net Incurred Loss and Allocated Loss Adjustment Expenses as at

(in thousands of U.S. dollars) Years ended December 31

	Unaudited										Net IBNR reserves
Accident Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2018
2009	$128,202	$145,468	$159,325	$167,052	$160,209	$139,787	$133,461	$143,589	$139,625	$144,211	$8,244
2010		$134,468	$167,818	$164,421	$169,610	$159,609	$151,990	$147,288	$145,053	$148,781	$7,944
2011			$150,005	$155,830	$152,740	$162,129	$153,867	$144,197	$150,253	$137,405	$25,360
2012				$159,254	$176,208	$191,737	$201,971	$209,904	$223,905	$238,861	$22,384
2013					$149,963	$169,885	$166,524	$150,868	$135,691	$137,287	$20,148
2014						$160,824	$160,102	$179,839	$181,719	$169,976	$40,790
2015							$171,722	$153,586	$154,784	$164,190	$24,296
2016								$175,788	$157,968	$194,894	$66,462
2017									$312,746	$310,768	$175,027
2018										$325,642	$288,016
Total										$1,972,015	

Net Cumulative Paid Loss and Allocated Loss Adjustment Expenses as at

(in thousands of U.S. dollars) Years ended December 31

	Unaudited									
Accident Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
2009	$6,612	$20,344	$39,255	$57,178	$60,270	$65,616	$76,772	$84,678	$93,915	$108,276
2010		$6,267	$16,326	$41,059	$56,275	$72,516	$82,248	$94,809	$104,240	$109,745
2011			$9,158	$19,505	$23,262	$42,448	$46,851	$57,347	$78,679	$82,640
2012				$11,280	$35,262	$51,075	$73,345	$82,811	$135,790	$152,252
2013					$11,309	$31,095	$52,622	$65,981	$79,321	$94,113
2014						$11,217	$27,617	$48,547	$67,245	$88,176
2015							$7,015	$22,277	$51,254	$77,817
2016								$18,423	$42,307	$96,838
2017									$14,944	$66,526
2018										$12,965
Total										$889,348

Net Liabilities for Loss and Allocated Loss Adjustment Expenses as at December 31, 2018

(in thousands of U.S. dollars)	2018
Accident years prior to 2009	$ 142,796
All Accident years	$ 1,225,463

Supplementary Information: Average Annual Percentage Payout of Net Incurred Claims by Age, as at December 31, 2018

Age in Years	1	2	3	4	5	6	7	8	9	10
Percentage	6%	11%	14%	12%	7%	12%	9%	5%	5%	10%

<u>Overseas General – Non-Casualty - Short-tail</u>

This product line is comprised of commercial fire, marine (predominantly cargo), surety, personal automobile, personal cell phones, personal residential (including high net worth), energy and construction. In general, these lines have relatively stable payment and reporting patterns although some years may be impacted by natural catastrophes.

Net Incurred Loss and Allocated Loss Adjustment Expenses as at

(in thousands of U.S. dollars) Years ended December 31

			Unaudited								Net IBNR reserves
Accident Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2018
2009	$287,479	$210,772	$195,883	$200,468	$194,477	$194,670	$194,558	$193,008	$192,929	$192,982	$873
2010		$283,135	$293,664	$278,191	$293,297	$304,853	$305,604	$302,793	$287,757	$290,133	$1,574
2011			$393,419	$410,710	$378,541	$376,074	$384,374	$384,379	$387,864	$382,203	$2,592
2012				$266,170	$256,448	$252,212	$243,997	$238,402	$232,418	$233,106	$2,001
2013					$303,903	$294,200	$271,712	$265,451	$251,927	$253,372	$2,858
2014						$325,500	$349,156	$316,817	$299,490	$304,398	$4,796
2015							$392,770	$361,849	$339,544	$341,497	$7,659
2016								$527,319	$540,321	$542,859	$14,041
2017									$752,939	$685,603	$116,178
2018										$599,609	$91,209
Total										$3,825,762	

Net Cumulative Paid Loss and Allocated Loss Adjustment Expenses as at

(in thousands of U.S. dollars)	Years ended December 31 Unaudited									
Accident Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
2009	$70,508	$143,526	$166,492	$186,324	$189,369	$190,794	$190,356	$189,987	$189,708	$189,704
2010		$97,819	$197,658	$227,379	$251,159	$263,953	$264,604	$264,951	$265,131	$267,306
2011			$137,019	$296,692	$329,854	$339,576	$350,561	$348,269	$350,847	$353,891
2012				$81,740	$180,940	$215,211	$226,165	$228,179	$228,552	$229,133
2013					$75,275	$178,889	$230,791	$230,537	$236,611	$245,220
2014						$81,347	$224,304	$281,314	$288,960	$290,868
2015							$107,768	$243,345	$316,238	$341,820
2016								$211,106	$401,839	$486,358
2017									$255,178	$509,633
2018										$242,147
Total										$3,156,080

Net Liabilities for Loss and Allocated Loss Adjustment Expenses as at December 31, 2018

(in thousands of U.S. dollars)	2018
Accident years prior to 2009	$ 4,865
All Accident years	$ 674,547

Supplementary Information: Average Annual Percentage Payout of Net Incurred Claims by Age, as at December 31, 2018

Age in Years	1	2	3	4	5	6	7	8	9	10
Percentage	36%	39%	15%	5%	2%	1%	0%	0%	0%	0%

Global Reinsurance

Global reinsurance analyzes its business on a treaty year basis rather than on an accident year basis. Treaty year data was converted to an accident year basis for the purposes of this disclosure. Mix shifts are an important consideration in these product line groupings. As proportional business and excess of loss business have different earning and loss reporting and payment patterns, this change in mix will affect the cash flow patterns across the accident years. In addition, the shift from excess to proportional business over time will make the cash flow patterns of older and more recent years difficult to compare. In general, the proportional business will pay out more quickly than the excess of loss business, as such, using older years development patterns may overstate the ultimate loss estimates in more recent years.

Global Reinsurance –Casualty - Long-tail

This product line includes proportional and excess coverages in general, automobile liability, professional liability, medical malpractice, workers' compensation and aviation, with exposures located around the world. In general, reinsurance exhibits less stable development patterns than primary business. In particular general casualty reinsurance and excess coverages are long-tailed and can be very volatile.

Net Incurred Loss and Allocated Loss Adjustment Expenses as at

(in thousands of U.S. dollars) Years ended December 31

	Unaudited										Net IBNR reserves
Accident Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2018
2009	$104,349	$106,312	$111,336	$109,618	$109,386	$104,797	$102,305	$99,945	$102,799	$102,488	$3,583
2010		$91,226	$95,477	$91,637	$91,387	$87,096	$82,315	$77,736	$77,210	$74,025	$10,749
2011			$92,222	$89,870	$88,678	$87,098	$83,058	$75,625	$75,280	$73,715	$4,758
2012				$76,367	$70,286	$70,400	$70,622	$66,092	$55,138	$54,152	$1,160
2013					$60,655	$59,217	$59,042	$57,409	$58,805	$56,779	$7,921
2014						$64,750	$59,500	$59,235	$61,663	$59,605	$8,805
2015							$67,212	$65,572	$66,881	$69,458	$10,595
2016								$78,712	$81,832	$82,762	$18,803
2017									$88,349	$86,147	$29,393
2018										$68,228	$32,272
Total										$727,359	

Net Cumulative Paid Loss and Allocated Loss Adjustment Expenses as at

(in thousands of U.S. dollars) Years ended December 31

	Unaudited									
Accident Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
2009	$12,636	$21,488	$31,323	$40,974	$51,516	$59,544	$66,505	$71,808	$77,650	$80,986
2010		$7,707	$12,894	$18,888	$25,924	$32,650	$38,230	$42,551	$47,959	$49,834
2011			$8,551	$12,094	$16,019	$21,858	$27,772	$32,636	$39,471	$43,681
2012				$9,505	$16,168	$20,934	$26,038	$32,947	$33,734	$39,153
2013					$8,367	$13,500	$17,540	$22,845	$27,973	$33,285
2014						$9,394	$17,729	$23,443	$28,746	$33,163
2015							$12,102	$19,409	$27,240	$31,498
2016								$13,595	$27,792	$35,674
2017									$15,448	$30,873
2018										$11,486
Total										$389,633

Net Liabilities for Loss and Allocated Loss Adjustment Expenses as at December 31, 2018

(in thousands of U.S. dollars)	2018
Accident years prior to 2009	$ 188,596
All Accident years	$ 526,322

Supplementary Information: Average Annual Percentage Payout of Net Incurred Claims by Age, as at December 31, 2018

Age in Years	1	2	3	4	5	6	7	8	9	10
Percentage	15%	11%	9%	9%	10%	7%	8%	6%	4%	3%

Global Reinsurance – Non-Casualty - Short-tail

This product line includes property, property catastrophe, marine, credit/surety, A&H and energy and some years may be impacted by natural catastrophes.

Net Incurred Loss and Allocated Loss Adjustment Expenses as at

(in thousands of U.S. dollars) Years ended December 31

	Unaudited										Net IBNR reserves
Accident Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2018
2009	$61,384	$75,996	$64,263	$61,518	$58,634	$56,494	$55,827	$55,900	$56,211	$56,842	$25
2010		$107,354	$126,285	$122,204	$122,978	$125,389	$125,131	$125,448	$125,977	$125,800	$4,422
2011			$174,768	$181,509	$178,741	$173,984	$173,994	$174,123	$173,512	$173,662	$843
2012				$101,474	$97,084	$91,736	$85,842	$83,310	$82,099	$80,149	$1,950
2013					$65,273	$58,047	$55,593	$53,897	$52,288	$50,629	$400
2014						$62,873	$63,956	$66,682	$68,747	$68,625	$3,300
2015							$44,540	$43,494	$46,472	$48,714	$3,679
2016								$105,027	$102,240	$104,717	$8,457
2017									$302,997	$329,443	$21,796
2018										$203,574	$63,506
Total										$1,242,155	

Net Cumulative Paid Loss and Allocated Loss Adjustment Expenses as at

(in thousands of U.S. dollars) Years ended December 31

	Unaudited									
Accident Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
2009	$19,075	$41,137	$50,290	$53,810	$55,091	$56,136	$56,414	$56,497	$56,126	$56,318
2010		$16,300	$87,920	$103,989	$111,378	$113,063	$119,243	$118,907	$121,470	$121,288
2011			$55,068	$110,946	$130,688	$150,923	$165,364	$167,852	$170,012	$171,028
2012				$19,138	$51,048	$64,706	$70,463	$72,802	$75,856	$76,855
2013					$12,155	$33,714	$42,818	$47,454	$48,322	$49,507
2014						$19,400	$41,544	$52,909	$58,820	$61,978
2015							$12,475	$27,200	$36,097	$40,182
2016								$22,801	$66,378	$85,446
2017									$159,429	$256,908
2018										$64,748
Total										$984,258

Net Liabilities for Loss and Allocated Loss Adjustment Expenses as at December 31, 2018

(in thousands of U.S. dollars)	2018
Accident years prior to 2009	$ 9,988
All Accident years	$ 267,885

Supplementary Information: Average Annual Percentage Payout of Net Incurred Claims by Age, as at December 31, 2018

Age in Years	1	2	3	4	5	6	7	8	9	10
Percentage	32%	37%	15%	9%	4%	2%	1%	0%	0%	0%

6. *Assumed life reinsurance programs involving minimum benefit guarantees under annuity contracts*

The following table presents income and expenses relating to GMDB and GLB reinsurance. GLBs include GMIBs as well as some GMABs originating in Japan.

(in thousands of U.S. dollars)	2018	2017
GMDB		
Net premiums earned	$ 47,477	$ 50,240
Policy benefits and other reserve adjustments	19,685	40,624
GLB		
Net premiums earned	96,269	109,815
Policy benefits and other reserve adjustments	110,333	105,182
Net realized gains	(250,421)	362,967
Gains recognized in Net income	(264,485)	367,600
Net cash received and other	47,146	65,091
Net decrease in liability	$ (311,631)	$ 302,509

Net realized gains (losses) in the table above include gains (losses) related to foreign exchange and fair value adjustments on insurance derivatives and exclude gains (losses) on futures used to partially offset the risk in the GLB reinsurance portfolio. Refer to Note 9 for additional information.

At December 31, 2018 and 2017, the reported liability for GMDB reinsurance was $117 million and $129 million, respectively. At December 31, 2018 and 2017, the reported liability for GLB reinsurance was $861 million and $550 million, respectively, which includes a fair value derivative adjustment of $452 million and $204 million, respectively. Reported liabilities for both GMDB and GLB reinsurance are determined using internal valuation models. Such valuations require considerable judgment and are subject to significant uncertainty. The valuation of these products is subject to fluctuations arising from, among other factors, changes in interest rates, changes in equity markets, changes in credit markets, changes in the allocation of the investments underlying annuitants' account values, and assumptions regarding future policyholder behavior. These models and the related assumptions are regularly reviewed by management and enhanced, as appropriate, based upon improvements in modeling assumptions and availability of updated information, such as market conditions and demographics of in-force annuities.

Variable Annuity Net Amount at Risk

The net amount at risk is defined as the present value of future claim payments assuming policy account values and guaranteed values are fixed at the valuation date (December 31, 2018 and 2017, respectively) and reinsurance coverage ends at the earlier of the maturity of the underlying variable annuity policy or the reinsurance treaty. In addition, the following assumptions were used:

(in millions of U.S. dollars, except for percentages)		Net amount at risk		2018		
Reinsurance covering		**2018**	**2017**	**Future claims discount rate**	**Other assumptions**	**Total claims at 100% mortality at December 31, 2018[1]**
GMDB Risk		$ 408	$ 279	3.30% - 3.50%	No lapses or withdrawals Mortality according to 100% of the Annuity 2000 mortality table	$ 177
GLB Risk Only		$ 1,233	$ 691	4.00% - 4.30%	No deaths, lapses or withdrawals Annuitization at a frequency most disadvantageous to Chubb [2] Claim calculated using interest rates in line with rates used to calculate reserve	N/A
Both Risks: [3]	GMDB	$ 103	$ 81	4.00% - 4.30%	No lapses or withdrawals Mortality according to 100% of the Annuity 2000 mortality table	$ 18
	GLB	$ 517	$ 392	4.00% - 4.30%	Annuitization at a frequency most disadvantageous to Chubb[2] Claim calculated using interest rates in line with rates used to calculate reserve	N/A

(1) Takes into account all applicable reinsurance treaty claim limits.

(2) Annuitization at a level that maximizes claims taking into account the treaty limits.

(3) Covering both the GMDB and GLB risks on the same underlying policyholders.

The average attained age of all policyholders for all risk categories above, weighted by the guaranteed value of each reinsured policy, is approximately 71 years.

7. Reinsurance

The Company purchases reinsurance to manage various exposures including catastrophic risks. Although reinsurance agreements contractually obligate the Company's reinsurers to reimburse it for the agreed upon portion of its gross paid losses, they do not discharge the primary liability of the Company. The amounts for net premiums written and net premiums earned in the Consolidated statements of operations are net of reinsurance.

The following table presents assumed and ceded premiums for the years ended December 31, 2018 and 2017.

(in thousands of U.S. dollars)	2018	2017
Premiums written		
Assumed	$ 3,702,127	$ 5,205,889
Ceded	(476,780)	(420,992)
Net	3,225,347	4,784,897
Premiums earned		
Assumed	4,095,223	5,098,692
Ceded	(482,545)	(413,401)
Net	$ 3,612,678	$ 4,685,291

The following table presents the composition of the Company's reinsurance recoverable at December 31, 2018 and 2017.

(in thousands of U.S. dollars)	2018	2017
Reinsurance recoverable on paid losses and loss expenses, net of a provision for uncollectible reinsurance	$ 114,951	$ 50,277
Reinsurance recoverable on unpaid losses and loss expenses, net of a provision for uncollectible reinsurance	926,753	1,061,478
Reinsurance recoverable on future policy benefits	7,447	2,056
Net reinsurance recoverable	$ 1,049,151	$ 1,113,811

The Company evaluates the financial condition of its reinsurers and potential reinsurers on a regular basis and also monitors concentrations of credit risk with reinsurers. The provision for uncollectible reinsurance is required principally due to the failure of reinsurers to indemnify the Company, primarily because of disputes under reinsurance contracts and insolvencies. Provisions have been established for amounts estimated to be uncollectible. At December 31, 2018 and 2017, the Company carried a provision for uncollectible reinsurance of $17 million and $13.5 million, respectively.

The following tables present a listing, at December 31, 2018 and 2017, of the categories of the Company's reinsurers. The first category, largest reinsurers, represents all groups of reinsurers where the gross recoverable exceeds one percent of the Company's total shareholder's equity. The provision for uncollectible reinsurance is principally based on an analysis of the credit quality of the reinsurer and collateral balances.

(in thousands of U.S. dollars)	2018	2017
Largest reinsurers	$ 324,735	$ 460,014
Other reinsurers balances rated A- or better	613,982	560,080
Other reinsurers with ratings lower than A-	110,434	93,717
Total	$ 1,049,151	$ 1,113,811

Largest Reinsurers

ABR Reinsurance Capital Holdings Ltd
Munich Re Group
HDI Haftpflichtverband Der Deutschen Industrie VAG (Hannover)

8. *Related party business*

The Company reinsures a number of affiliates for property, casualty, marine and accident and health risks and, through a reinsurance contract with affiliate ACE Life Insurance Company, reinsures traditional life risks.

The related statement of operations and balance sheet account balances for the years ended December 31, 2018 and 2017 have been affected by these intercompany reinsurance agreements as follows:

(in thousands of U.S. dollars)		2018		2017
Gross premiums written	$	3,216,592	$	4,654,071
Reinsurance premiums ceded		(47,594)		(28,198)
Net premiums earned		3,523,927		4,189,504
Losses and loss expenses		1,707,715		2,587,181
Future policy benefits		92,120		14,147
Policy acquisition costs		1,023,008		1,374,446
Reinsurance balances receivable		431,402		777,092
Prepaid reinsurance premiums		12,425		7,486
Reinsurance recoverables		10,211		9,170
Deferred policy acquisition costs		350,681		425,551
Value of reinsurance business assumed		160,965		183,684
Unpaid losses and loss expenses		6,275,741		6,907,011
Future policy benefits		98,769		910,671
Unearned premiums		1,038,653		1,419,471
Reinsurance balances payable	$	280,951	$	314,648

There are amounts due from related parties of $128.3 million and $78.1 million and due to related parties of $59.2 million and $43.3 million as at December 31, 2018 and 2017, respectively. The noncontrolling interest in Oasis Investments is held by a related party. Further, the Company has entered into an interest rate swap and a foreign currency forward contract with a related party. The aggregate balance of the asset related to these instruments at December 31, 2018 and 2017 was $23.4 million and $21.9 million, respectively. Refer to Note 9.

9. *Commitments, contingencies and guarantees*

(a) Derivative Instruments

The Company maintains positions in derivative instruments such as futures, options, swaps, and foreign currency forward contracts for which the primary purposes are to manage duration and foreign currency exposure, yield enhancement, or to obtain an exposure to a particular financial market. The Company also maintains positions in convertible securities that contain embedded derivatives. Investment derivative instruments are recorded in either Other assets (OA) or Accounts payable, accrued expenses, and other liabilities (AP), convertible bonds are recorded in Fixed maturities available for sale (FM AFS) and convertible equity securities are recorded in Equity securities (ES) in the Consolidated balance sheets. These are the most numerous and frequent derivative transactions. In addition, the Company from time to time purchases to be announced mortgage-backed securities (TBAs) as part of its investing activities.

Under reinsurance programs covering GLBs, the Company assumes the risk of GLBs, (principally GMIB), associated with variable annuity contracts. The GMIB risk is triggered if, at the time the contract holder elects to convert the accumulated account value to a periodic payment stream (annuitize), the accumulated account value is not sufficient to provide a guaranteed minimum level of monthly income. The GLB reinsurance product meets the definition of a derivative instrument. Benefit reserves in respect of GLBs are classified as Future policy benefits (FPB) while the fair value derivative adjustment is classified within AP. The Company also generally maintains positions in exchange-traded equity futures contracts on equity market indices to limit equity exposure in the GMDB and GLB books of business.

The following table presents the balance sheet locations, fair values in an asset or (liability) position, and notional values/payment provisions of the Company's derivative instruments at December 31, 2018 and 2017.

(in thousands of U.S. dollars)	2018				2017			
	Consolidated Balance sheet Location [1]	Fair Value Derivative Asset	Fair Value Derivative (Liability)	Notional Value / Payment Provision	Consolidated Balance sheet Location [1]	Fair Value Derivative Asset	Fair Value Derivative (Liability)	Notional Value / Payment Provision
Investment and embedded derivative instruments								
Foreign currency forward contracts	OA/(AP)	$ 2,309	$ (4,178)	$ 436,718	OA/(AP)	$ 2,583	$ (2,496)	$ 283,854
Futures contracts on notes and bonds	OA/(AP)	1,320	(5,715)	271,335	OA/(AP)	700	(317)	127,089
Convertible securities	FMAFS	-	-	-	FMAFS	31	-	77
		3,629	(9,893)	708,053		3,314	(2,813)	411,020
Other derivative instruments								
Future contracts on equities[2]	OA/(AP)	22,636	-	507,392	OA	-	(21,342)	1,552,547
Interest rate swap	OA	23,438	-	650,000	OA	21,860	-	650,000
GLB[3]	AP/FPB	-	(861,743)	1,751,000	AP/FPB	-	(550,112)	1,083,000
		$ 46,074	$ (861,743)	$ 2,908,392		$ 21,860	$ (571,454)	$ 3,285,547

(1) Other assets (OA), Fixed maturities available for sale (FM AFS) and Equity securities (ES)

(2) Related to GMDB and GLB blocks of business.

(3) Includes both future policy benefits reserves and fair value derivative adjustment. Refer to Note 6 for additional information. Note that the payment provision related to GLB is the net amount at risk. The concept of a notional value does not apply to the GLB reinsurance contracts.

At December 31, 2018 and December 31, 2017, derivative assets of $16.4 million and derivative liabilities of $20.9 million, respectively, included in the table above were subject to a master netting agreement. The remaining derivatives included in the table above were not subject to a master netting agreement.

The following table presents net realized gains (losses) related to derivative instrument activity in the Consolidated statements of operations:

(in thousands of U.S. dollars)		2018		2017
Investment and embedded derivative instruments				
Foreign currency forward contracts	$	1,593	$	(6,043)
Future contracts on money market instruments		999		(997)
Convertible bonds		46		(46)
Total investment and embedded derivative instruments	$	2,638	$	(7,086)
GLB and other derivative instruments				
GLB(1)	$	(248,228)	$	364,060
Futures contracts on equities(2)		(3,768)		(261,252)
Interest rate swaps		3,310		(19,256)
Total GLB and other derivative instruments		(248,686)		83,552
	$	(246,048)	$	76,466

(1) Excludes foreign exchange gains (losses) related to GLB.

(2) Related to GMDB and GLB blocks of business.

(b) Derivative instrument objectives

(i) Foreign currency exposure management

A foreign currency forward contract (forward) is an agreement between participants to exchange specific foreign currencies at a future date. The Company uses forwards to minimize the effect of fluctuating foreign currencies.

(ii) Duration management and market exposure

Futures

Futures contracts give the holder the right and obligation to participate in market movements, determined by the index or underlying security on which the futures contract is based. Settlement is made daily in cash by an amount equal to the change in value of the futures contract times a multiplier that scales the size of the contract. Exchange-traded futures contracts on money market instruments, notes and bonds are used in fixed maturity portfolios to more efficiently manage duration, as substitutes for ownership of the money market instruments, bonds and notes without significantly increasing the risk in the portfolio. Investments in futures contracts may be made only to the extent that there are assets under management not otherwise committed.

Exchange-traded equity futures contracts are used to limit exposure to a severe equity market decline, which would cause an increase in expected claims and therefore, an increase in reserves for GMDB and GLB reinsurance business.

(iii) Convertible security investments

A convertible security is a debt instrument that can be converted into a predetermined amount of the issuer's equity. The convertible option is an embedded derivative within the host instruments which are classified in the investment portfolio as either available for sale or as an equity security. The Company purchases convertible bonds for their total return and not specifically for the conversion feature.

(iv) To be announced mortgage-backed securities (TBA)

By acquiring a TBA, the Company makes a commitment to purchase a future issuance of mortgage-backed securities. For the period between purchase of the TBA and issuance of the underlying security, the Company accounts for the position as a derivative in the Consolidated financial statements. The Company purchases TBAs both for their total return and for the flexibility they provide related to the mortgage-backed security strategy.

(v) GLB

Under the GLB program, as the assuming entity, the Company is obligated to provide coverage until the expiration or maturity of the underlying deferred annuity contracts or the expiry of the reinsurance treaty. Premiums received under the reinsurance treaties are classified as premium. Expected losses allocated to premiums received are classified as Future policy benefits and valued similar to GMDB reinsurance. Other changes in fair value, principally arising from changes in expected losses allocated to expected future premiums, are classified as Net realized gains (losses). Fair value represents management's estimate of an exit price and thus, includes a risk margin. We may recognize a realized loss for other changes in fair value due to adverse changes in the capital markets (e.g., declining interest rates and/or declining equity markets) and changes in actual or estimated future policyholder behavior (e.g., increased annuitization or decreased lapse rates) although we expect the business to be profitable. We believe this presentation provides the most meaningful disclosure of changes in the underlying risk within the GLB reinsurance programs for a given reporting period.

(vi) Interest rate swaps

The Company has entered into an interest rate swap for the purpose of minimizing the effect of fluctuation interest rates.

(c) Secured borrowings

The Company participates in a securities lending program operated by a third-party banking institution whereby certain assets are loaned to qualified borrowers and from which we earn an incremental return. At December 31, 2018 and 2017, the Company's securities lending payable, reflecting our obligation to return the collateral plus interest, was $343.6 million and $293.2 million, respectively, and the Company's securities lending collateral was $343.6 million and $293.2 million, respectively. The securities lending collateral can only be drawn down by the Company in the event that the institution borrowing the securities is in default under the lending agreement. An indemnification agreement with the lending agent protects us in the event a borrower becomes insolvent or fails to return any of the securities on loan. The collateral is recorded in Securities lending collateral and the liability is recorded in Securities lending payable in the Consolidated balance sheets.

The following table presents the carrying value of collateral held under securities lending agreements by investment category and maturity date of the underlying agreements:

		Remaining contractual maturity		
		Overnight and Continuous		
(in thousands of U.S. dollars)		December 31 2018		December 31 2017
Collateral held under securities lending agreements:				
Cash	$	333,204	$	286,816
U.S. Treasury and agency		10,380		6,390
		343,584		293,206
Gross amount of recognized liabilities for securities lending payable		343,648		293,239
Difference[(1)]	$	(64)	$	(33)

(1) The carrying value of the securities lending collateral held is lower than the securities lending payable due to accrued interest recorded in the securities lending payable.

The Company has executed repurchase agreements with certain counterparties under which the Company agreed to sell securities and repurchase them at a future date for a predetermined price. At December 31, 2018 and 2017, there was $556.7 million and $551.8 million, respectively of repurchase agreements outstanding with a weighted average interest rate of 2.53 percent and 1.62 percent, respectively. These agreements were fully collateralized.

In contrast to securities lending programs, the use of cash received is not restricted for the repurchase obligations. The fair value of the underlying securities sold remains in Fixed maturities available for sale and the repurchase agreement obligation is recorded in Repurchase agreements in the Consolidated balance sheets.

The following table presents the carrying value of collateral pledged under repurchase agreements by investment category and maturity date of the underlying agreements as at December 31, 2018 and 2017:

(in thousands of U.S. dollars)	**2018**			
	Remaining contractual maturity			
Collateral pledged under repurchase agreements	Up to 30 days	30 – 90 days	Greater than 90 days	Total
U.S. Treasury and agency	$ -	$ -	$ 249,730	$ 249,730
Mortgage-backed securities	-	-	332,138	332,138
	$ -	$ -	$ 581,868	581,868
Gross amount of recognized liabilities for repurchase agreements				556,664
Difference[(1)]				$ 25,204

(1) Per the repurchase agreements, the amount of collateral posted is required to exceed the amount of gross liability.

(in thousands of U.S. dollars)	**2017**			
	Remaining contractual maturity			
Collateral pledged under repurchase agreements	Up to 30 days	30 – 90 days	Greater than 90 days	Total
U.S. Treasury and agency	$ -	$ -	$ 230,134	$ 230,134
Mortgage-backed securities	-	-	342,140	342,140
	$ -	$ -	$ 572,274	572,274
Gross amount of recognized liabilities for repurchase agreements				$ 551,840
Difference[(1)]				$ 20,434

(1) Per the repurchase agreements, the amount of collateral posted is required to exceed the amount of gross liability.

Potential risks exist in our secured borrowing transactions due to market conditions and counterparty exposure. With collateral that we pledge, there is a risk that the collateral may not be returned at the expiration of the agreement. If the counterparty fails to return the collateral, the Company will have free use of the borrowed funds until our collateral is returned. In addition, we may encounter the risk that the Company may not be able to renew outstanding borrowings with a new term or with an existing counterparty due to market conditions including a decrease in demand as well as more restrictive terms from banks due to increased regulatory and capital constraints. Should this condition occur, the Company may seek alternative borrowing sources or reduce borrowings. Additionally, increased margins and collateral requirements due to market conditions would increase our restricted assets as we are required to provide additional collateral to support the transaction.

(d) Concentrations of credit risk

The Company's investment portfolio is managed following prudent standards of diversification. Specific provisions limit the allowable holdings of a single issue and issuer. The Company believes that there are no significant concentrations of credit risk associated with the investment portfolio. Our three largest exposures by issuer at December 31, 2018, were Wells Fargo & Co, Microsoft Corp and The Goldman Sachs Group Inc. Our largest exposure by industry at December 31, 2018 was financial services.

(e) Other investments

At December 31, 2018, included in Other investments in the Consolidated balance sheet are investments in limited partnerships and partially-owned investment companies with a carrying value of $2.7 billion. In connection with these investments, we have commitments that may require funding of up to $3.2 billion over the next several years.

(f) Letters of Credit

On October 25, 2017, Chubb entered into a credit facility that provides for up to $1.0 billion of availability. Chubb and its participating subsidiaries (including the Company) may use the facility for the issuance of letters of credit and for revolving loans. Chubb has the ability to increase the capacity under their existing credit facility to $2.0 billion under certain conditions, but any such increase would not raise the sub-limit for revolving loans above $1.0 billion. The Company's existing credit facility has a remaining term expiring in October 2022. At December 31, 2018, outstanding LOCs issued under this facility were $398 million.

(g) Guarantee

During October 2007, the Company placed $200 million in a trust account for the benefit of an affiliated company, Chubb Property and Casualty Insurance Company, to secure the affiliate's reinsurance amounts due from other reinsurance companies.

In 2011, the Company entered into a funds withheld security arrangement with Chubb Insurance Limited (Chubb Australia), under which the Company agreed to provide collateral to support reinsurance balances recoverable that Chubb Australia carries in connection with business reinsured from CTR and other Chubb affiliates. The agreement requires collateral to be provided in connection with reinsurance balances recoverable from events that occurred at least two years prior. At December 31, 2018 the funds withheld balance totaled AUD $393.3 million ($277 million) of which a maximum of AUD $66.6 million ($46.9 million) could be used to support affiliate balances. At December 31, 2017 the funds withheld balance totaled AUD $302.1 million ($232.4 million) of which a maximum of AUD $80.8 million ($62.2 million) could be used to support affiliate balances.

(h) Fixed maturities

At December 31, 2018, we have commitments to purchase fixed income securities of $39.2 million over the next several years.

(i) Claims and Other Litigation

The Company may be subject to litigation involving disputed interpretations of treaty coverages. These lawsuits, involving claims on treaties issued by our subsidiaries which are typical to the reinsurance industry in general and in the normal course of business, are considered in our loss and loss expense reserves. In addition to claims litigation, we are subject to lawsuits and regulatory actions in the normal course of business that do not arise from or directly relate to claims on reinsurance treaties. This category of business litigation typically involves, among other things, regulatory activity or disputes arising from our business ventures. In the opinion of management, our ultimate liability for these matters could be, but we believe is not likely to be, material to our consolidated financial condition and results of operations.

10. *Shareholder's equity*

The Company's authorized and issued share capital is $370,000 consisting of 370,000 Common Shares of $1 par value.

During the year ended December 31, 2018 and 2017 dividends amounting to $nil and $380 million were declared and paid.

11. *Fair value measurements*

(a) Fair value hierarchy

Fair value of financial assets and financial liabilities is estimated based on the framework established in the fair value accounting guidance. The guidance defines fair value as the price to sell an asset or transfer a liability (an exit price) in an orderly transaction between market participants and establishes a three-level valuation hierarchy based on the reliability of the inputs. The fair value hierarchy gives the highest priority to quoted prices in active markets and the lowest priority to unobservable data.

The three levels of the hierarchy are as follows:

Level 1 – Unadjusted quoted prices for identical assets or liabilities in active markets;

Level 2 – Includes, among other items, inputs other than quoted prices that are observable for the asset or liability such as interest rates and yield curves, quoted prices for similar assets and liabilities in active markets, and quoted prices for identical or similar assets and liabilities in markets that are not active; and

Level 3 – Inputs that are unobservable and reflect management's judgments about assumptions that market participants would use in pricing an asset or liability.

The Company categorizes financial instruments within the valuation hierarchy at the balance sheet date based upon the lowest level of inputs that are significant to the fair value measurement.

The Company uses pricing services to obtain fair value measurements for the majority of the Company's investment securities. Based on management's understanding of the methodologies used, these pricing services only produce an estimate of fair value if there is observable market information that would allow them to make a fair value estimate. Based on the Company's understanding of the market inputs used by the pricing services, all applicable investments have been valued in accordance with GAAP. The Company does not adjust prices obtained from pricing services. The following is a description of the valuation techniques and inputs used to determine fair values for financial instruments carried at fair value, as well as the general classification of such financial instruments pursuant to the valuation hierarchy.

(i) Fixed maturities

The Company uses pricing services to estimate fair value measurements for the majority of the Company's fixed maturities. The pricing services use market quotations for fixed maturities that have quoted prices in active markets; such securities are classified within Level 1. For fixed maturities other than U.S. Treasury securities that generally do not trade on a daily basis, the pricing services prepare estimates of fair value measurements using their pricing applications, which include available relevant market information, benchmark curves, benchmarking of like securities, sector groupings, and matrix pricing. Additional valuation factors that can be taken into account are nominal spreads, dollar basis, and liquidity adjustments. The pricing services evaluate each asset class based on relevant market and credit information, perceived market movements, and sector news. The market inputs used in the pricing evaluation, listed in the approximate order of priority include: benchmark yields, reported trades, broker/dealer quotes, issuer spreads, two-sided markets, benchmark securities, bids, offers, reference data, and industry and economic events. The extent of the use of each input is dependent on the asset class and the market conditions. Given the asset class, the priority of the use of inputs may change or some market inputs may not be relevant. Additionally, fixed maturities valuation is more subjective when markets are less liquid due to the lack of market based inputs (i.e., stale pricing), which may increase the potential that an investment's estimated fair value is not reflective of the price at which an actual transaction would occur. The overwhelming majority of fixed maturities are classified within Level 2 because the most significant inputs used in the pricing techniques are observable. For a small number of fixed maturities, the Company obtains a single broker quote (typically a market maker). Due to the disclaimers on the quotes that indicate that the price is indicative only, the Company include these fair value estimates in Level 3.

(ii) Equity securities

Equity securities with active markets are classified within Level 1 as fair values are based on quoted market prices. For equity securities in markets which are less active, fair values are based on market valuations and are classified within Level 2. Equity securities for which pricing is unobservable are classified within Level 3.

(iii) Short-term investments

Short-term investments, which comprise securities due to mature within one year of the date of purchase that are traded in active markets, are classified within Level 1 as fair values are based on quoted market prices. Securities such as commercial paper and discount notes are classified within Level 2 because these securities are typically not actively traded due to their approaching maturity and, as such, their cost approximates fair value. Short-term investments for which pricing is unobservable are classified within Level 3.

(iv) Other investments

Fair values of Other investments including investments in partially-owned investment companies and investment funds are based on their respective net asset values or equivalent (NAV) and are excluded from the fair value hierarchy table below. Other investments for which pricing is unobservable are classified within Level 3.

(v) Securities lending collateral

The underlying assets included in Securities lending collateral in the Consolidated balance sheets are fixed maturities which are classified in the valuation hierarchy on the same basis as other fixed maturities. Excluded from the valuation hierarchy is the corresponding liability related to the Company's obligation to return the collateral plus interest as it is reported at contract value and not fair value in the Consolidated balance sheets.

(vi) Investment derivative instruments

Actively traded investment derivative instruments, including futures, options, and exchange-traded forward contracts, are classified within Level 1 as fair values are based on quoted market prices. Investment derivative instruments are recorded in either Other assets or Accounts payable, accrued expenses, and other liabilities in the Consolidated balance sheets.

(vii) Other derivative instruments

The Company maintains positions in exchange-traded equity futures designed to limit exposure to a severe equity market decline, which would cause an increase in expected claims and, therefore, an increase in reserves for the Company's GMDB and GLB reinsurance business. The Company's positions in exchange-traded equity futures contracts are classified within Level 1. Further, the Company's positions in the interest rate swap and foreign currency forward contract are valued based on significant observable inputs and are therefore classified within Level 2.

(viii) Separate account assets

Separate account assets represent segregated funds where investment risks are borne by the customers, except to the extent of certain guarantees made by the Company. Separate account assets comprise mutual funds classified in the valuation hierarchy on the same basis as other equity securities traded in active markets and are classified within Level 1. Separate account assets also include fixed maturities classified within Level 2 because the most significant inputs used in the pricing techniques are observable. Excluded from the valuation hierarchy are the corresponding liabilities as they are reported at contract value and not fair value in the Consolidated balance sheets. Separate account assets are recorded in Other assets in the Consolidated balance sheets.

(ix) Guaranteed living benefits

The GLB arises from life reinsurance programs covering living benefit guarantees whereby we assume the risk of guaranteed minimum income benefits (GMIB) associated with variable annuity contracts. GLB's are recorded in Accounts payable, accrued expenses, and other liabilities and Future policy benefits in the Consolidated balance sheets. For GLB reinsurance, the Company estimates fair value using an internal valuation model which includes current market information and estimates of policyholder behavior. All of the treaties contain claim limits, which are factored into the valuation model. The fair value depends on a number of factors, including interest rates, equity markets, credit risk, current account value, market volatility, expected annuitization rates and other policyholder behavior, and changes in policyholder mortality.

The most significant policyholder behavior assumptions include lapse rates and the GMIB annuitization rates. Assumptions regarding lapse rates and GMIB annuitization rates differ by treaty, but the underlying methodologies to determine rates applied to each treaty are comparable.

A lapse rate is the percentage of in-force policies surrendered in a given calendar year. All else equal, as lapse rates increase, ultimate claim payments will decrease. In general, the base lapse function assumes low lapse rates (ranging from about 3 percent to 9 percent per annum) during the surrender charge period of the GMIB contract, followed by a "spike" lapse rate (ranging from about 9 percent to 33 percent per annum) in the year immediately following the surrender charge period, and then reverting to an ultimate lapse rate (generally around 10 percent per annum), typically over a 2-year period. This base rate is adjusted downward for policies with more valuable guarantees (policies with guaranteed values far in excess of their account values) by multiplying the base lapse rate by a factor ranging from 15 percent to 75 percent. Partial withdrawals and the impact of older policyholders with tax-qualified contracts (due to required minimum distributions) are also reflected in our modeling.

The GMIB annuitization rate is the percentage of policies for which the policyholder will elect to annuitize using the guaranteed benefit provided under the GMIB. All else equal, as GMIB annuitization rates increase, ultimate claim payments will increase, subject to treaty claim limits. All GMIB reinsurance treaties include claim limits to protect the Company in the event that actual annuitization behavior is significantly higher than expected. In general, the Company assumes that GMIB annuitization rates will be higher for policies with more valuable guarantees (policies with guaranteed values far in excess of their account values). The Company also assumes that GMIB annuitization rates increases as policyholders get older. In addition, we also assume that GMIB annuitization rates are higher in the first year immediately following the waiting period (the first year the policies are eligible to annuitize using the GMIB) in comparison to all subsequent years. We do not yet have fully credible annuitization experience for all clients.

The level of annuitization assumptions at December 31, 2018 are as follows:

% of total GMIB guaranteed value	Policyholder age	Maximum annuitization rate(s) (per year)
19%	Under 65 years old	1% - 21%
81%	Over 65 years old	3% - 42%

The effect of changes in key market factors on assumed lapse and annuitization rates reflect emerging trends using data available from cedants. For treaties with limited experience, rates are established in line with data received from other ceding companies adjusted, as appropriate, with industry estimates. The model and related assumptions are regularly re-evaluated by management and enhanced, as appropriate, based upon additional experience obtained related to policyholder behavior and availability of updated information such as market conditions, market participant assumptions, and demographics of in-force annuities. Because of the significant use of unobservable inputs including policyholder behavior, GLB reinsurance is classified within Level 3.

In the fourth quarter of 2018, we completed a review of policyholder behavior related to annuitizations, partial withdrawals, lapses, and mortality for our variable annuity reinsurance business.

- As annuitization experience continued to emerge, we refined our annuitization assumptions including age-based behavior. The change in annuitization assumptions had an insignificant impact on the fair value of GLB liabilities.
- We also refined our lapse assumptions based on additional emerging experience, with a focus on underlying policies eligible for annuitization. These refinements resulted in a net increase to the fair value of GLB liabilities generating a realized loss of approximately $20 million.
- Reinsured policies allow for policyholders to make periodic withdrawals from their account values without lapsing the policy. The partial withdrawal results in a reduction to the associated guaranteed value that is either equal or proportional to the amount of the reduction in account value. We further refined our assumptions around the types of partial withdrawals according to their impact on guaranteed value. This resulted in an increase to the fair value of GLB liabilities generating a realized loss of approximately $11 million.
- After having performed a mortality study for the first time in 2017, we performed a second study this year and enhanced our analysis by increasing the weight given to emerging experience, which resulted in lower mortality assumptions. The updated mortality rates increased the fair value of GLB liabilities generating a realized loss of approximately $28 million.

During the year ended December 31, 2018, we also made minor model refinements to the internal valuation model which resulted in no material impact on income.

The following tables present, by valuation hierarchy, the financial instruments measured at fair value on a recurring basis at December 31, 2018 and 2017.

(in thousands of U.S. dollars)	2018			
	Level 1	Level 2	Level 3	Total
Assets:				
Fixed maturities available for sale				
U.S. Treasury and agency	$ 761,107	$ 227,544	$ -	$ 988,651
Foreign	-	2,911,184	17,428	2,928,612
Corporate securities	-	4,690,470	51,463	4,741,933
Mortgage-backed securities	-	2,985,549	51,245	3,036,794
States, municipalities, and political subdivisions	-	212,830	-	212,830
	761,107	11,027,577	120,136	11,908,820
Equity securities	423	-	146	569
Short-term investments	213,598	164,307	-	377,905
Investment derivative instruments	3,629	-	-	3,629
Other investments(1)	2,959	-	-	2,959
Other derivative instruments	22,636	23,438	-	46,074
Securities lending collateral	-	343,584	-	343,584
Separate account assets	2,457,067	-	-	2,457,067
Total assets measured at fair value(1)	$ 3,461,419	$ 11,558,906	$ 120,282	$ 15,140,607
Liabilities:				
Investment derivative instruments	$ 9,893	$ -	$ -	$ 9,893
GLB(2)	-	-	452,834	452,834
Total liabilities measured at fair value	$ 9,893	$ -	$ 452,834	$ 462,727

(1) Excluded from the table above are partially-owned investment companies and investment funds of $2.8 billion at December 31, 2017 measured using NAV as a practical expedient.

(2) The GLB reinsurance product meets the definition of a derivative instrument for accounting purposes and is accordingly carried at fair value. Excluded from the table above is the portion of the GLB derivative liability classified as Future policy benefits in the Consolidated balance sheets. Refer to Note 6 for additional information.

(in thousands of U.S. dollars)	2017			
	Level 1	Level 2	Level 3	Total
Assets:				
Fixed maturities available for sale				
U.S. Treasury and agency	$ 707,689	$ 289,684	$ -	$ 997,373
Foreign	-	3,392,728	3,325	3,396,053
Corporate securities	-	5,494,747	44,614	5,539,361
Mortgage-backed securities	-	3,185,988	50,276	3,236,264
States, municipalities, and political subdivisions	-	260,168	-	260,168
	707,689	12,623,315	98,215	13,429,219
Equity securities	309	-	48	357
Short-term investments	237,752	124,290	-	362,042
Investment derivative instruments	3,283	-	-	3,283
Other investments(1)	-	-	52,176	52,176
Other derivative instruments	-	21,860	-	21,860
Securities lending collateral	-	293,206	-	293,206
Separate account assets	2,374,681	-	-	2,374,681
Total assets measured at fair value(1)	$ 3,323,714	$ 13,062,671	$ 150,439	$ 16,536,824
Liabilities:				
Investment derivative instruments	$ 2,813	$ -	$ -	$ 2,813
Other derivative instruments	21,342	-	-	21,342
GLB(2)	-	-	204,822	204,822
Total liabilities measured at fair value	$ 24,155	$ -	$ 204,822	$ 228,977

(1) Excluded from the table above are partially-owned investment companies and investment funds of $1.9 billion at December 31, 2016 measured using NAV as a practical expedient.

(2) The GLB reinsurance product meets the definition of a derivative instrument for accounting purposes and is accordingly carried at fair value. Excluded from the table above is the portion of the GLB derivative liability classified as Future policy benefits in the Consolidated balance sheets. Refer to Note 6 for additional information.

There were no transfers between Level 1 and Level 2 during the year ended December 31, 2018 and 2017.

(b) Fair value of alternative investments

Alternative investments include investment funds, limited partnerships, and partially-owned investment companies measured at fair value using NAV as a practical expedient.

The following table presents, by investment category, the expected liquidation period, fair values of and maximum future funding commitments related to these investments.

	December 31, 2018			December 31, 2017	
	Expected Liquidation Period	Fair Value	Maximum Future Funding Commitments	Fair Value	Maximum Future Funding Commitments
			(in thousands of U.S. dollars)		
Financial	2 to 9 Years	$ 350,134	$ 124,226	$ 263,639	$ 257,942
Real Assets	2 to 11 Years	110,891	104,738	85,905	23,622
Distressed	2 to 7 Years	253,230	94,701	240,369	126,994
Private Credit	3 to 8 Years	164,456	297,063	210,226	320,179
Traditional	2 to 14 Years	1,812,667	2,582,391	1,022,460	430,642
Vintage	1 to 2 Years	16,039	-	439	-
Investment funds	Not Applicable	82,185	-	269,772	-
		$ 2,789,602	$ 3,203,119	$ 2,092,810	$ 1,159,379

Included in all categories in the above table except for investment funds are investments for which the Company will never have the contractual option to redeem but receives distributions based on the liquidation of the underlying assets.

Included in the "Expected Liquidation Period" column above is the range in years over which the Company expects the majority of underlying assets in the respective categories to be liquidated. Further, for all categories except for Investment funds, the Company does not have the ability to sell or transfer the investments without the consent from the general partner of individual funds.

Investment Category	Consists of investments in private equity funds
Financial	targeting financial services companies such as financial institutions and insurance services worldwide.
Real Assets	targeting investments related to hard physical assets such as real estate, infrastructure and natural resources.
Distressed	targeting distressed debt/credit and equity opportunities in the U.S.
Private Credit	targeting privately originated corporate debt investments including senior secured loans and subordinated bonds.
Traditional	employing traditional private equity investment strategies such as buyout growth equity globally.
Vintage	made before 2002 or where the funds' commitment periods have already expired

Investment funds

The Company's investment funds employ various investment strategies such as long/short equity and arbitrage/distressed. Included in this category are investments for which the Company has the option to redeem at agreed upon value as described in each investment fund's subscription agreement. Depending on the terms of the various subscription agreements, investment fund investments may be redeemed monthly, quarterly, semi-annually, or annually. If the Company wishes to redeem an investment fund investment, it must first determine if the investment fund is still in a lock-up period (a time when the Company cannot redeem its investment so that the investment fund manager has time to build the portfolio). If the investment fund is no longer in its lock-up period, the Company must then notify the investment fund manager of its intention to redeem by the notification date prescribed by the subscription agreement. Subsequent to notification, the investment fund can redeem the company's investment within several months of the notification. Notice periods for redemption of the investment funds range between 5 and 120 days. The Company can redeem its investment funds without consent from the investment fund managers.

(c) Level 3 financial instruments

The following table presents the significant unobservable inputs used in the Level 3 liability valuations. Excluded from the table below are inputs used to fair value Level 3 assets which are based on single broker quotes or net asset value and contain no quantitative unobservable inputs developed by management. The majority of our fixed maturities classified as Level 3 used external pricing when markets are less liquid due to the lack of market inputs (i.e., stale pricing, broker quotes).

(in thousands of U.S. dollars)		Fair Value at December 31, 2018	Valuation Technique	Significant Unobservable Inputs	Ranges
GLB[(1)]	$	452,834	Actuarial model	Lapse rate	3% - 33%
				Annuitization rate	0% - 100%

(1) Discussion of the most significant inputs used in the fair value measurement of GLB and the sensitivity of those assumptions is discussed previously in this footnote.

The following tables present a reconciliation of the beginning and ending balances of financial instruments measured at fair value using significant unobservable inputs (Level 3):

(in thousands of U.S. dollars)	Year ended December 31, 2018					
	Assets					Liabilities
	Available-for-sale debt securities					
	Foreign	Corporate securities	MBS	Equity securities	Other investments	GLB[(1)]
Balance - Beginning of year	$ 3,325	$ 44,614	$ 50,276	$ 48	$ 52,176	$ 204,822
Transfers into Level 3	-	13,106	-	-	-	-
Transfers out of Level 3	-	-	(3,436)	-	(55,802)	-
Change in Net Unrealized Gains (Losses) included in OCI	(3,548)	(862)	(47)	-	-	-
Net Realized Gains/Losses	(24)	(168)	-	28	-	248,012
Purchases	18,004	10,794	5,201	2,168	33,570	-
Sales	(77)	(9,125)	(86)	(2,098)	-	-
Settlements	(252)	(6,896)	(663)	-	(29,944)	-
Balance-End of year	$ 17,428	$ 51,463	$ 51,245	$ 146	$ -	$ 452,834
Net Realized Gains/Losses Attributable to Changes in Fair Value at the Balance Sheet Date	$ (24)	$ -	$ -	$ 5	$ -	$ 248,012

(1) The Company's GLB reinsurance product meets the definition of a derivative instrument for accounting purposes and is accordingly carried at fair value. Excluded from the table above is the portion of the GLB derivative liability classified as Future policy benefits in the Consolidated balance sheets. Refer to Note 6 for additional information.

(in thousands of U.S. dollars)	Year ended December 31, 2017					
	Assets					Liabilities
	Available-for-sale debt securities					
	Foreign	Corporate securities	MBS	Equity securities	Other investments	GLB[(1)]
Balance - Beginning of year	$ 3,643	$ 44,850	$ 364	$ 1,738	$ 24,856	$ 559,221
Transfers into Level 3	-	23,363	50,000	-	-	9,498
Change in Net Unrealized Gains (Losses) included in OCI	(72)	(2,193)	24	(60)	55	-
Net Realized Gains/Losses	-	(1,238)	-	(768)	-	(363,897)
Purchases	110	6,557	12	-	38,148	-
Sales	(39)	(2,751)	-	(862)	-	-
Settlements	(317)	(23,974)	(124)	-	(10,883)	-
Balance-End of year	$ 3,325	$ 44,614	$ 50,276	$ 48	$ 52,176	$ 204,822

Net Realized Gains/Losses Attributable to Changes in Fair Value at the Balance Sheet Date	$ -	$ (258)	$ -	$ (130)	$ -	$ (363,897)

(1) The Company's GLB reinsurance product meets the definition of a derivative instrument for accounting purposes and is accordingly carried at fair value. Excluded from the table above is the portion of the GLB derivative liability classified as Future policy benefits in the Consolidated balance sheets. Refer to Note 6 for additional information.

(d) Financial instruments disclosed, but not carried, at fair value

The Company uses various financial instruments in the normal course of its business. The Company's reinsurance contracts are excluded from fair value of financial instruments accounting guidance and, therefore, are not included in the amounts discussed below.

The carrying values of cash, other assets, other liabilities, and other financial instruments not included below approximated their fair values.

Investments in partially-owned insurance companies

The fair values of the Company's investments in partially-owned insurance companies are based on the share of the net assets based on the financial statements provided by those companies and are excluded from the valuation hierarchy tables below.

Repurchase agreements

Where practical, fair values of repurchase agreements are estimated using discounted cash flow calculations based principally on observable inputs including incremental borrowing rates, which reflect our credit rating, for similar types of borrowings with maturities consistent with those remaining for the debt being valued.

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The following tables present fair value, by valuation hierarchy, and carrying value of the financial instruments not measured at fair value:

December 31, 2018	Fair Value				Carrying
(in thousands of U.S. dollars)	Level 1	Level 2	Level 3	Total	Value
Assets:					
Fixed Maturities held to maturity:					
Corporate securities	$ -	$ 2,118	$ -	$ 2,118	$ 2,047
Mortgage-backed securities	-	5,181	-	5,181	5,033
Total assets	$ -	7,299	-	7,299	7,080
Liabilities:					
Repurchase agreements	$ -	$ 556,664	$ -	$ 556,664	$ -

December 31, 2017	Fair Value				Carrying
(in thousands of U.S. dollars)	Level 1	Level 2	Level 3	Total	Value
Assets:					
Fixed Maturities held to maturity:					
Corporate securities	$ -	$ 2,393	$ -	$ 2,393	$ 2,258
Mortgage-backed securities	-	6,167	-	6,167	5,881
Total assets	$ -	8,560	-	8,560	8,139
Liabilities:					
Repurchase agreements	$ -	$ 551,840	$ -	$ 551,840	$ 551,840

12. Taxation

Under current Bermuda law, the Company and its Bermuda subsidiaries are not required to pay any taxes on income or capital gains. If a Bermuda law were enacted that would impose taxes on income or capital gains, Chubb Limited and the Bermuda subsidiaries have received an undertaking from the Minister of Finance in Bermuda that would exempt such companies from Bermudian taxation until March 2035.

The Company does not consider itself to be engaged in trade or business in the United States and, accordingly, does not expect to be subject to United States taxation.

The Company does conduct business through non-US branches and subsidiaries domiciled in tax jurisdictions.

13. Statutory financial information

The Company is registered under The Insurance Act 1978 (Bermuda), amendments thereto and related regulations (the Act) as a Class E insurer. Effective January 1, 2016, Bermuda implemented a new solvency and risk management regime which has been deemed equivalent to the EU's Solvency II regime. Bermuda statutory reporting rules have been amended to introduce an economic balance sheet (EBS) framework. The Company calculates statutory capital using the Bermuda Statutory Capital Requirement (BSCR) model. The BSCR is a risk-based capital model that measures risk to determine an enhanced capital requirement and target capital level (defined as 120% of the enhanced capital requirement (ECR)) for Class E insurers. Statutory capital and surplus of the Company was $8.9 billion and $9.2 billion at December 31, 2018 and 2017, respectively. For the years ended December 31, 2018 and 2017, the ECR was $2.3 billion and $2.4 billion, respectively. The minimum solvency margin required at December 31, 2018 was $0.6 billion and was met by the Company.

CTR, as a wholly-owned subsidiary of the Company, is registered under the Act as a Class 4 insurer. The Act requires CTR to meet a minimum solvency margin and a minimum liquidity ratio. CTR has satisfied these requirements for 2018 and 2017. For Class 4 insurers, the target capital level as calculated by the BSCR is defined as 120% of the ECR. For the year ended December 31, 2018 the Company had statutory capital and surplus of $8.6 billion (2017: $8.6 billion) which exceeded the ECR of $2.2 billion (2017: $2.3 billion).

A Class 4 insurer is prohibited from declaring or paying a dividend if in breach of its ECR, solvency margin or minimum liquidity ratio or if the declaration or payment of such dividend would cause such a breach. Where 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 Bermuda Monetary Authority (the Authority). Further, a Class 4 insurer is prohibited from declaring or paying in any financial year dividends of more than 25% of its total statutory capital and surplus (as shown on its previous financial year's statutory balance sheet) unless it files (at least seven days before payment of such dividends) with the Authority an affidavit signed by at least two directors and the insurer's principal representative stating that the declaration of such dividends has not caused the insurer to fail to meet its solvency margin or minimum liquidity ratio. Class 4 insurers must obtain the Authority's prior approval for a reduction by 15% or more of the total statutory capital as set forth in its previous year's statutory financial statements.

14. Subsequent events

The Company has performed an evaluation of subsequent events through April 26, 2019, which is the date that the financial statements were issued.

Effective January 1, 2019, CTRL entered into a stop loss agreement treaty with the affiliated Chubb North American (NA) Pool ("the NA Pool") companies.

Effective January 1, 2019, AELS re-domiciled to France (see Note1).

No other significant subsequent events were identified.