

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

WASHINGTON, D.C. 20549

FORM 10-Q

☒ QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the quarterly period ended June 30, 2023

Or

☐ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

Commission file number: 001-16209



ARCH CAPITAL GROUP LTD.

(Exact name of registrant as specified in its charter)

Bermuda

(State or other jurisdiction of incorporation or organization)

98-0374481

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

Waterloo House, Ground Floor

100 Pitts Bay Road, Pembroke HM 08, Bermuda

(Address of principal executive offices)

(441) 278-9250

(Registrant's telephone number, including area code)

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

Title of each class	Trading Symbol (s)	Name of each exchange on which registered	
Common shares, \$0.0011 par value per share	ACGL	NASDAQ	Stock Market
Depository shares, each representing a 1/1000th interest in a 5.45% Series F preferred share	ACGLO	NASDAQ	Stock Market
Depository shares, each representing a 1/1000th interest in a 4.55% Series G preferred share	ACGLN	NASDAQ	Stock Market

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

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

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

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

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

Indicate by check mark whether the Registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

As of July 28, 2023, there were 372,954,263 common shares, \$0.0011 par value per share, of the registrant outstanding.

ARCH CAPITAL GROUP LTD.

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PART I. FINANCIAL INFORMATION

Cautionary Note Regarding Forward-Looking Statements

The Private Securities Litigation Reform Act of 1995 (“PSLRA”) provides a “safe harbor” for forward-looking statements. This report or any other written or oral statements made by or on behalf of us may include forward-looking statements, which reflect our current views with respect to future events and financial performance. All statements other than statements of historical fact included in or incorporated by reference in this report are forward-looking statements. Forward-looking statements, for purposes of the PSLRA or otherwise, can generally be identified by the use of forward-looking terminology such as “may,” “will,” “expect,” “intend,” “estimate,” “anticipate,” “believe” or “continue” and similar statements of a future or forward-looking nature or their negative or variations or similar terminology.

Forward-looking statements involve our current assessment of risks and uncertainties. Actual events and results may differ materially from those expressed or implied in these statements. Important factors that could cause actual events or results to differ materially from those indicated in such statements are discussed below and elsewhere in this report and in our periodic reports filed with the Securities and Exchange Commission (“SEC”), and include:

- our ability to successfully implement our business strategy during “soft” as well as “hard” markets;
- acceptance of our business strategy, security and financial condition by rating agencies and regulators, as well as by brokers and our insureds and reinsureds;
- our ability to consummate acquisitions and integrate the business we have acquired or may acquire into our existing operations;
- our ability to maintain or improve our ratings, which may be affected by our ability to raise additional equity or debt financings, by ratings agencies’ existing or new policies and practices, as well as other factors described herein;
- general economic and market conditions (including inflation, interest rates, unemployment, housing prices, foreign currency exchange rates, prevailing credit terms and the depth and duration of a recession, including those resulting from COVID-19) and conditions specific to the reinsurance and insurance markets in which we operate;
- competition, including increased competition, on the basis of pricing, capacity (including alternative sources of capital), coverage terms, or other factors;
- developments in the world’s financial and capital markets and our access to such markets;
- our ability to successfully enhance, integrate and maintain operating procedures (including information technology) to effectively support our current and new business;
- the loss and addition of key personnel;
- material differences between actual and expected assessments for guaranty funds and mandatory pooling arrangements;
- accuracy of those estimates and judgments utilized in the preparation of our financial statements, including those related to revenue recognition, insurance and other reserves, reinsurance recoverables, investment valuations, intangible assets, bad debts, income taxes, contingencies and litigation, and any determination to use the deposit method of accounting;
- greater than expected loss ratios on business written by us and adverse development on claim and/or claim expense liabilities related to business written by our insurance, reinsurance and mortgage subsidiaries;
- the adequacy of the Company’s loss reserves;
- severity and/or frequency of losses;
- greater frequency or severity of unpredictable natural and man-made catastrophic events;
- claims for natural or man-made catastrophic events or severe economic events in our insurance, reinsurance and mortgage businesses could cause large losses and substantial volatility in our results of operations;
- the effect of climate change on our business;
- the effect of contagious diseases (including COVID-19) on our business;
- acts of terrorism, political unrest and other hostilities or other unforecasted and unpredictable events;

- availability to us of reinsurance to manage our gross and net exposures and the cost of such reinsurance;
- the failure of reinsurers, managing general agents, third party administrators or others to meet their obligations to us;
- the timing of loss payments being faster or the receipt of reinsurance recoverables being slower than anticipated by us;
- our investment performance, including legislative or regulatory developments that may adversely affect the fair value of our investments;
- changes in general economic conditions, including sovereign debt concerns or downgrades of U.S. securities by credit rating agencies, which could affect our business, financial condition and results of operations;
- the volatility of our shareholders' equity from foreign currency fluctuations, which could increase due to us not matching portions of our projected liabilities in foreign currencies with investments in the same currencies;
- changes in accounting principles or policies or in our application of such accounting principles or policies;
- changes in the political environment of certain countries in which we operate or underwrite business;
- a disruption caused by cyber attacks or other technology breaches or failures on us or our business partners and service providers, which could negatively impact our business and/or expose us to litigation;
- statutory or regulatory developments, including as to tax matters and insurance and other regulatory matters such as the adoption of proposed legislation that would affect Bermuda-headquartered companies and/or Bermuda-based insurers or reinsurers and/or changes in regulations or tax laws applicable to us, our subsidiaries, brokers or customers, including the implementation of the Organization for Economic Cooperation and Development ("OECD") Pillar I and Pillar II initiatives; and
- the other matters set forth under Item 1A "Risk Factors," Item 7 "Management's Discussion and Analysis of Financial Condition and Results of Operations" and other sections of our Annual Report on Form 10-K for the year ended December 31, 2022, as well as the other factors set forth in our other documents on file with the SEC, and management's response to any of the aforementioned factors.

All subsequent written and oral forward-looking statements attributable to us or persons acting on our behalf are expressly qualified in their entirety by these cautionary statements. The foregoing review of important factors should not be construed as exhaustive and should be read in conjunction with other cautionary statements that are included herein or elsewhere. We undertake no obligation to publicly update or revise any forward-looking statement, whether as a result of new information, future events or otherwise.

ITEM 1. CONSOLIDATED FINANCIAL STATEMENTS

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Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of Arch Capital Group Ltd.

Results of Review of Interim Financial Statements

We have reviewed the accompanying consolidated balance sheet of Arch Capital Group Ltd. and its subsidiaries (the "Company") as of June 30, 2023, and the related consolidated statements of income, comprehensive income, and changes in shareholders' equity for the three month and six month periods ended June 30, 2023 and 2022 and the consolidated statements of cash flows for the six month periods ended June 30, 2023 and 2022, including the related notes (collectively referred to as the "interim financial statement"). Based on our reviews, we are not aware of any material modifications that should be made to the accompanying interim financial statements for them to be in conformity with accounting principles generally accepted in the United States of America.

We have previously audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2022, and the related consolidated statements of income, comprehensive income, changes in shareholders' equity, and cash flows for the year then ended (not presented herein), and in our report dated February 24, 2023, we expressed an unqualified opinion on those consolidated financial statements. In our opinion, the information set forth in the accompanying consolidated balance sheet as of December 31, 2022, is fairly stated, in all material respects, in relation to the consolidated balance sheet from which it has been derived.

Basis for Review Results

These interim financial statements are the responsibility of the Company's management. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB. We conducted our review in accordance with the standards of the PCAOB. A review of interim financial information consists principally of applying analytical procedures and making inquiries of persons responsible for financial and accounting matters. It is substantially less in scope than an audit conducted in accordance with the standards of the PCAOB, the objective of which is the expression of an opinion regarding the financial statements taken as a whole. Accordingly, we do not express such an opinion.

/s/ PricewaterhouseCoopers LLP

New York, New York
August 2, 2023

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS
(U.S. dollars and shares in millions)

	(Unaudited)	
	June 30, 2023	December 31, 2022
Assets		
Investments:		
Fixed maturities available for sale, at fair value (amortized cost: \$ 22,739 and \$ 21,282 ; net of allowance for credit losses: \$ 61 and \$ 41)	\$ 21,434	\$ 19,683
Short-term investments available for sale, at fair value (amortized cost: \$ 1,701 and \$ 1,333 ; net of allowance for credit losses: \$ 0 and \$ 0)	1,702	1,332
Equity securities, at fair value	911	860
Other investments, at fair value	1,846	1,644
Investments accounted for using the equity method	4,073	3,774
Total investments	29,966	27,293
Cash	904	855
Accrued investment income	233	159
Investment in operating affiliates	973	965
Premiums receivable (net of allowance for credit losses: \$ 34 and \$ 35)	5,296	3,625
Reinsurance recoverable on unpaid and paid losses and loss adjustment expenses (net of allowance for credit losses: \$ 22 and \$ 22)	6,717	6,564
Contractholder receivables (net of allowance for credit losses: \$ 3 and \$ 3)	1,761	1,731
Ceded unearned premiums	2,459	1,799
Deferred acquisition costs	1,452	1,264
Receivable for securities sold	97	12
Goodwill and intangible assets	775	804
Other assets	3,223	2,919
Total assets	\$ 53,856	\$ 47,990
Liabilities		
Reserve for losses and loss adjustment expenses	\$ 21,268	\$ 20,032
Unearned premiums	9,052	7,337
Reinsurance balances payable	2,191	1,530
Contractholder payables	1,764	1,734
Collateral held for insured obligations	275	249
Senior notes	2,726	2,725
Payable for securities purchased	526	95
Other liabilities	1,411	1,367
Total liabilities	39,213	35,069
Commitments and contingencies (refer to Note 10)		
Redeemable noncontrolling interests	2	11
Shareholders' Equity		
Non-cumulative preferred shares	830	830
Common shares (\$ 0.0011 par, shares issued: 591.2 and 588.3)	1	1
Additional paid-in capital	2,278	2,211
Retained earnings	17,258	15,892
Accumulated other comprehensive income (loss), net of deferred income tax	(1,319)	(1,646)
Common shares held in treasury, at cost (shares: 218.3 and 217.9)	(4,407)	(4,378)
Total shareholders' equity available to Arch	14,641	12,910
Total liabilities, noncontrolling interests and shareholders' equity	\$ 53,856	\$ 47,990

See Notes to Consolidated Financial Statements

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF INCOME
(U.S. dollars and shares in millions, except per share data)

	(Unaudited) Three Months Ended		(Unaudited) Six Months Ended	
	June 30,		June 30,	
	2023	2022	2023	2022
Revenues				
Net premiums earned	\$ 2,965	\$ 2,326	5,848	4,447
Net investment income	242	106	441	186
Net realized gains (losses)	(123)	(267)	(106)	(559)
Other underwriting income	6	3	16	9
Equity in net income (loss) of investment funds accounted for using the equity method	69	58	117	94
Other income (loss)	3	(12)	14	(21)
Total revenues	3,162	2,214	6,330	4,156
Expenses				
Losses and loss adjustment expenses	1,491	1,103	2,962	2,104
Acquisition expenses	561	413	1,094	791
Other operating expenses	313	277	632	567
Corporate expenses	21	28	51	60
Amortization of intangible assets	24	27	47	54
Interest expense	33	33	65	66
Net foreign exchange (gains) losses	5	(88)	23	(92)
Total expenses	2,448	1,793	4,874	3,550
Income (loss) before income taxes and income (loss) from operating affiliates	714	421	1,456	606
Income tax (expense) benefit	(67)	(22)	(131)	(34)
Income (loss) from operating affiliates	22	5	61	30
Net income (loss)	\$ 669	\$ 404	\$ 1,386	\$ 602
Net (income) loss attributable to noncontrolling interests	2	—	—	(2)
Net income (loss) available to Arch	671	404	1,386	600
Preferred dividends	(10)	(10)	(20)	(20)
Net income (loss) available to Arch common shareholders	\$ 661	\$ 394	\$ 1,366	\$ 580
Net income per common share and common share equivalent				
Basic	\$ 1.79	\$ 1.07	\$ 3.71	\$ 1.56
Diluted	\$ 1.75	\$ 1.04	\$ 3.62	\$ 1.52
Weighted average common shares and common share equivalents outstanding				
Basic	368.7	369.2	368.0	371.7
Diluted	378.4	377.9	377.8	380.8

See Notes to Consolidated Financial Statements

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(U.S. dollars in millions)

	(Unaudited) Three Months Ended		(Unaudited) Six Months Ended	
	June 30,		June 30,	
	2023	2022	2023	2022
Comprehensive Income				
Net income (loss)	\$ 669	\$ 404	\$ 1,386	\$ 602
Other comprehensive income (loss), net of deferred income tax				
Unrealized appreciation (decline) in value of available-for-sale investments:				
Unrealized holding gains (losses) arising during period	(173)	(598)	72	(1,282)
Reclassification of net realized (gains) losses, included in net income (loss)	149	58	248	160
Foreign currency translation adjustments	2	(68)	7	(71)
Comprehensive income (loss)	647	(204)	1,713	(591)
Net (income) loss attributable to noncontrolling interests	2	—	—	(2)
Comprehensive income (loss) available to Arch	<u>\$ 649</u>	<u>\$ (204)</u>	<u>\$ 1,713</u>	<u>\$ (593)</u>

See Notes to Consolidated Financial Statements

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CHANGES IN SHAREHOLDERS' EQUITY
(U.S. dollars in millions)

	(Unaudited) Three Months Ended June 30,		(Unaudited) Six Months Ended June 30,	
	2023	2022	2023	2022
Non-cumulative preferred shares				
Balance at beginning and end of period	\$ 830	\$ 830	\$ 830	\$ 830
Common shares				
Balance at beginning and end of period	1	1	1	1
Additional paid-in capital				
Balance at beginning of period	2,260	2,134	2,211	2,085
Amortization of share-based compensation	17	21	58	66
Other changes	1	15	9	19
Balance at end of period	2,278	2,170	2,278	2,170
Retained earnings				
Balance at beginning of period	16,597	14,642	15,892	14,456
Net income (loss)	669	404	1,386	602
Net (income) loss attributable to noncontrolling interests	2	—	—	(2)
Preferred share dividends	(10)	(10)	(20)	(20)
Balance at end of period	17,258	15,036	17,258	15,036
Accumulated other comprehensive income (loss), net of deferred income tax				
Balance at beginning of period	(1,297)	(650)	(1,646)	(65)
Unrealized appreciation (decline) in value of available-for-sale investments, net of deferred income tax:				
Balance at beginning of period	(1,168)	(569)	(1,512)	13
Unrealized holding gains (losses) during period, net of reclassification adjustment	(24)	(540)	320	(1,122)
Balance at end of period	(1,192)	(1,109)	(1,192)	(1,109)
Foreign currency translation adjustments, net of deferred income tax:				
Balance at beginning of period	(129)	(81)	(134)	(78)
Foreign currency translation adjustments	2	(68)	7	(71)
Balance at end of period	(127)	(149)	(127)	(149)
Balance at end of period	(1,319)	(1,258)	(1,319)	(1,258)
Common shares held in treasury, at cost				
Balance at beginning of period	(4,403)	(4,037)	(4,378)	(3,761)
Shares repurchased for treasury	(4)	(324)	(29)	(600)
Balance at end of period	(4,407)	(4,361)	(4,407)	(4,361)
Total shareholders' equity	\$ 14,641	\$ 12,418	\$ 14,641	\$ 12,418

See Notes to Consolidated Financial Statements

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS
(U.S. dollars in millions)

	(Unaudited)	
	Six Months Ended	
	June 30,	
	2023	2022
Operating Activities		
Net income (loss)	\$ 1,386	\$ 602
Adjustments to reconcile net income (loss) to net cash provided by operating activities:		
Net realized (gains) losses	110	555
Equity in net (income) or loss of investment funds accounted for using the equity method and other income or loss	(49)	44
Amortization of intangible assets	47	54
Share-based compensation	58	66
Changes in:		
Reserve for losses and loss adjustment expenses, net of unpaid losses and loss adjustment expenses recoverable	1,020	635
Unearned premiums, net of ceded unearned premiums	1,004	872
Premiums receivable	(1,648)	(1,086)
Deferred acquisition costs	(152)	(174)
Reinsurance balances payable	652	72
Other items, net	(314)	(186)
Net cash provided by operating activities	2,114	1,454
Investing Activities		
Purchases of fixed maturity investments	(8,840)	(9,706)
Purchases of equity securities	(104)	(656)
Purchases of other investments	(557)	(920)
Proceeds from sales of fixed maturity investments	7,079	8,079
Proceeds from sales of equity securities	161	1,490
Proceeds from sales, redemptions and maturities of other investments	201	863
Proceeds from redemptions and maturities of fixed maturity investments	368	444
Net settlements of derivative instruments	46	(44)
Net (purchases) sales of short-term investments	(333)	(440)
Purchases of fixed assets	(26)	(23)
Other	4	98
Net cash used for investing activities	(2,001)	(815)
Financing Activities		
Purchases of common shares under share repurchase program	—	(576)
Proceeds from common shares issued, net	—	(4)
Change in third party investment in redeemable noncontrolling interests	(22)	—
Other	(3)	(82)
Preferred dividends paid	(20)	(20)
Net cash used for financing activities	(45)	(682)
Effects of exchange rate changes on foreign currency cash and restricted cash	12	(43)
Increase (decrease) in cash and restricted cash	80	(86)
Cash and restricted cash, beginning of year	1,273	1,314
Cash and restricted cash, end of period	\$ 1,353	\$ 1,228

See Notes to Consolidated Financial Statements

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (UNAUDITED)

1. Basis of Presentation and Recent Accounting Pronouncements

General

Arch Capital Group Ltd. ("Arch Capital") is a publicly listed Bermuda exempted company which provides insurance, reinsurance and mortgage insurance on a worldwide basis through its wholly-owned subsidiaries. As used herein, the "Company" means Arch Capital and its subsidiaries.

Basis of Presentation

The interim consolidated financial statements have been prepared in conformity with accounting principles generally accepted in the United States of America ("GAAP"). All significant intercompany transactions and balances have been eliminated in consolidation. The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and 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. Actual results could differ materially from those estimates and assumptions. In the opinion of management, the accompanying unaudited interim consolidated financial statements reflect all adjustments (consisting of normally recurring accruals) necessary for a fair statement of results on an interim basis. The results of any interim period are not necessarily indicative of the results for a full year or any future periods. Certain information and footnote disclosures normally included in financial statements prepared in accordance with GAAP have been condensed or omitted; however, management believes that the disclosures are adequate to make the information presented not misleading. This report should be read in conjunction with the Company's Annual Report on Form 10-K for the year ended December 31, 2022 ("2022 Form 10-K"), including the Company's audited consolidated financial statements and related notes.

The Company has reclassified the presentation of certain prior year information to conform to the current presentation. Such reclassifications had no effect on the Company's net income, comprehensive income, shareholders' equity or cash flows. All amounts are in millions, except per share amounts, unless otherwise noted.

Recent Accounting Pronouncements

Recently Issued Accounting Standards Adopted

For information regarding additional accounting standards that the Company has not yet adopted, see note 3(t), "Significant Accounting Policies—Recent Accounting Pronouncements," of the notes to consolidated financial statements in the Company's 2022 Form 10-K.

2. Share Transactions

Share Repurchases

The Board of Directors of Arch Capital has authorized the investment in Arch Capital's common shares through a share repurchase program. At June 30, 2023, \$ 1.0 billion of share repurchases were available under the program. Repurchases under the program may be effected from time to time in open market or privately negotiated transactions through December 31, 2024. The timing and amount of the repurchase transactions under this program will depend on a variety of factors, including market conditions and corporate and regulatory considerations.

Employee Share Purchase Plan

Upon shareholder approval on May 4, 2023, the Amended and Restated Arch Capital Group Ltd. 2007 Employee Share Purchase Plan (the "ESPP") became effective. The total common shares that may be purchased under the ESPP was increased by 3.0 million shares for a total of 12.75 million shares authorized. The purpose of the ESPP is to give employees of the Company an opportunity to purchase common shares through payroll deductions, thereby encouraging employees to share in the economic growth and success of the Company. The ESPP is designed to qualify as an "employee share purchase plan" under Section 423 of the Internal Revenue Code of 1986, as amended. At June 30, 2023, 3.7 million shares remain available for issuance.

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (UNAUDITED)

3. Earnings Per Common Share

The following table sets forth the computation of basic and diluted earnings per common share:

	Three Months Ended		Six Months Ended	
	June 30,		June 30,	
	2023	2022	2023	2022
Numerator:				
Net income (loss)	\$ 669	\$ 404	\$ 1,386	\$ 602
Net (income) loss attributable to noncontrolling interests	2	—	—	(2)
Net income (loss) available to Arch	671	404	1,386	600
Preferred dividends	(10)	(10)	(20)	(20)
Net income (loss) available to Arch common shareholders	\$ 661	\$ 394	\$ 1,366	\$ 580
Denominator:				
Weighted average common shares and common share equivalents outstanding — basic	368.7	369.2	368.0	371.7
Effect of dilutive common share equivalents:				
Nonvested restricted shares	2.3	2.1	2.4	2.2
Stock options (1)	7.4	6.6	7.4	6.9
Weighted average common shares and common share equivalents outstanding — diluted	378.4	377.9	377.8	380.8
Earnings per common share:				
Basic	\$ 1.79	\$ 1.07	\$ 3.71	\$ 1.56
Diluted	\$ 1.75	\$ 1.04	\$ 3.62	\$ 1.52

- (1) Certain stock options were not included in the computation of diluted earnings per share where the exercise price of the stock options exceeded the average market price and would have been anti-dilutive or where, when applying the treasury stock method to in-the-money options, the sum of the proceeds, including unrecognized compensation, exceeded the average market price and would have been anti-dilutive. For the 2023 second quarter and 2022 second quarter, the number of stock options excluded were 0.3 million and 0.8 million, respectively. For the six months ended June 30, 2023 and 2022, the number of stock options excluded were 0.5 million and 0.8 million, respectively.

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (UNAUDITED)

4. Segment Information

The Company's insurance, reinsurance and mortgage segments each have managers who are responsible for the overall profitability of their respective segments and who are directly accountable to the Company's chief operating decision makers. The Chief Executive Officer, the Chief Financial Officer and Treasurer and the President and Chief Underwriting Officer are the Company's chief operating decision makers. They do not assess performance, measure return on equity or make resource allocation decisions on a line of business basis. Management measures segment performance for its three underwriting segments based on underwriting income or loss. The Company does not manage its assets by underwriting segment, with the exception of goodwill and intangible assets, and accordingly, investment income is not allocated to each underwriting segment.

The Company determined its reportable segments using the management approach described in accounting guidance regarding disclosures about segments of an enterprise and related information. The accounting policies of the segments are the same as those used for the preparation of the Company's consolidated financial statements. Intersegment business is allocated to the segment accountable for the underwriting results.

The insurance segment consists of the Company's insurance underwriting units which offer specialty product lines on a worldwide basis. Product lines include: construction and national accounts; excess and surplus casualty; professional lines; programs; property, energy, marine and aviation; travel, accident and health; warranty and lenders solutions; and other (consisting of alternative markets, excess workers' compensation and surety business).

The reinsurance segment consists of the Company's reinsurance underwriting units which offer specialty product lines on a worldwide basis. Product lines include: casualty; marine and aviation; other specialty; property catastrophe; property excluding property catastrophe (losses on a single risk, both excess of loss and pro rata); and other (consisting of life reinsurance, casualty clash and other).

The mortgage segment includes the Company's U.S. primary mortgage insurance business, investment and services related to U.S. credit-risk transfer ("CRT") which are predominately with government sponsored enterprises ("GSEs") and international mortgage insurance and reinsurance operations. Arch Mortgage Insurance Company and United Guaranty Residential Insurance Company (combined "Arch MI U.S.") are approved as eligible mortgage insurers by Federal National Mortgage Association ("Fannie Mae") and Federal Home Loan Mortgage Corporation ("Freddie Mac"), each a GSE. Arch MI U.S. also includes Arch Mortgage Guaranty Company, which is not a GSE-approved entity.

The corporate segment results include net investment income, net realized gains or losses (which includes changes in the allowance for credit losses on financial assets and net impairment losses recognized in earnings), equity in net income or loss of investments accounted for using the equity method, other income (loss), corporate expenses, transaction costs and other, amortization of intangible assets, interest expense, net foreign exchange gains or losses, income taxes, income or loss from operating affiliates and items related to the Company's non-cumulative preferred shares.

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The following tables summarize the Company's underwriting income or loss by segment, together with a reconciliation of underwriting income or loss to net income available to Arch common shareholders:

	Three Months Ended			
	June 30, 2023			
	Insurance	Reinsurance	Mortgage	Total
Gross premiums written (1)	\$ 1,955	\$ 2,544	\$ 347	\$ 4,845
Premiums ceded	(501)	(835)	(82)	(1,417)
Net premiums written	1,454	1,709	265	3,428
Change in unearned premiums	(126)	(366)	29	(463)
Net premiums earned	1,328	1,343	294	2,965
Other underwriting income (loss)	—	3	3	6
Losses and loss adjustment expenses	(761)	(743)	13	(1,491)
Acquisition expenses	(264)	(290)	(7)	(561)
Other operating expenses	(195)	(68)	(50)	(313)
Underwriting income (loss)	\$ 108	\$ 245	\$ 253	606
Net investment income				242
Net realized gains (losses)				(123)
Equity in net income (loss) of investment funds accounted for using the equity method				69
Other income (loss)				3
Corporate expenses (2)				(20)
Transaction costs and other (2)				(1)
Amortization of intangible assets				(24)
Interest expense				(33)
Net foreign exchange gains (losses)				(5)
Income (loss) before income taxes and income (loss) from operating affiliates				714
Income tax (expense) benefit				(67)
Income (loss) from operating affiliates				22
Net income (loss)				669
Net (income) loss attributable to noncontrolling interests				2
Net income (loss) available to Arch				671
Preferred dividends				(10)
Net income (loss) available to Arch common shareholders				\$ 661
Underwriting Ratios				
Loss ratio	57.3 %	55.3 %	(4.5) %	50.3 %
Acquisition expense ratio	19.9 %	21.6 %	2.4 %	18.9 %
Other operating expense ratio	14.7 %	5.0 %	17.1 %	10.6 %
Combined ratio	91.9 %	81.9 %	15.0 %	79.8 %
Goodwill and intangible assets	\$ 228	\$ 146	\$ 401	\$ 775

- (1) Certain amounts included in the gross premiums written of each segment are related to intersegment transactions. Accordingly, the sum of gross premiums written for each segment does not agree to the total gross premiums written as shown in the table above due to the elimination of intersegment transactions in the total.
- (2) Certain expenses have been excluded from 'corporate expenses' and reflected in 'transaction costs and other.'

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	Three Months Ended			
	June 30, 2022			
	Insurance	Reinsurance	Mortgage	Total
Gross premiums written (1)	\$ 1,705	\$ 1,793	\$ 372	\$ 3,870
Premiums ceded	(477)	(630)	(78)	(1,185)
Net premiums written	1,228	1,163	294	2,685
Change in unearned premiums	(126)	(235)	2	(359)
Net premiums earned	1,102	928	296	2,326
Other underwriting income (loss)	—	5	(2)	3
Losses and loss adjustment expenses	(630)	(538)	65	(1,103)
Acquisition expenses	(214)	(189)	(10)	(413)
Other operating expenses	(161)	(66)	(50)	(277)
Underwriting income (loss)	\$ 97	\$ 140	\$ 299	536
Net investment income				106
Net realized gains (losses)				(267)
Equity in net income (loss) of investment funds accounted for using the equity method				58
Other income (loss)				(12)
Corporate expenses (2)				(28)
Transaction costs and other (2)				—
Amortization of intangible assets				(27)
Interest expense				(33)
Net foreign exchange gains (losses)				88
Income (loss) before income taxes and income (loss) from operating affiliates				421
Income tax (expense) benefit				(22)
Income (loss) from operating affiliates				5
Net income (loss)				404
Net (income) loss attributable to noncontrolling interests				—
Net income (loss) available to Arch				404
Preferred dividends				(10)
Net income (loss) available to Arch common shareholders				\$ 394
Underwriting Ratios				
Loss ratio	57.1 %	57.9 %	(21.9)%	47.4 %
Acquisition expense ratio	19.4 %	20.4 %	3.4 %	17.8 %
Other operating expense ratio	14.6 %	7.1 %	17.0 %	11.9 %
Combined ratio	91.1 %	85.4 %	(1.5)%	77.1 %
Goodwill and intangible assets	\$ 237	\$ 166	\$ 465	\$ 868

(1) Certain amounts included in the gross premiums written of each segment are related to intersegment transactions. Accordingly, the sum of gross premiums written for each segment does not agree to the total gross premiums written as shown in the table above due to the elimination of intersegment transactions in the total.

(2) Certain expenses have been excluded from 'corporate expenses' and reflected in 'transaction costs and other.'

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	Six Months Ended			
	June 30, 2023			
	Insurance	Reinsurance	Mortgage	Total
Gross premiums written (1)	\$ 3,933	\$ 5,006	\$ 699	9,625
Premiums ceded	(1,043)	(1,569)	(164)	(2,773)
Net premiums written	2,891	3,435	526	6,852
Change in unearned premiums	(306)	(762)	64	(1,004)
Net premiums earned	2,585	2,673	590	5,848
Underwriting income (loss)	—	7	9	16
Commissions and loss adjustment expenses	(1,464)	(1,509)	11	(2,962)
Acquisition expenses	(509)	(571)	(14)	(1,094)
Other operating expenses	(390)	(142)	(100)	(632)
Underwriting income (loss)	\$ 222	\$ 458	\$ 495	1,176
Investment income				441
Net realized gains (losses)				(106)
Proportionate share of net income (loss) of investment funds accounted for using the equity method				117
Other income (loss)				14
Corporate expenses (2)				(49)
Transaction costs and other (2)				(2)
Amortization of intangible assets				(47)
Interest expense				(65)
Net foreign exchange gains (losses)				(23)
Income (loss) before income taxes and income (loss) from operating affiliates				1,456
Income tax (expense) benefit				(131)
Income (loss) from operating affiliates				61
Net income (loss)				1,386
Net (income) loss attributable to noncontrolling interests				—
Net income (loss) available to Arch				1,386
Preferred dividends				(20)
Net income (loss) available to Arch common shareholders				\$ 1,366
Underwriting Ratios				
Loss ratio	56.6%	56.5%	(1.9%)	50.6%
Acquisition expense ratio	19.7%	21.3%	2.4%	18.7%
Other operating expense ratio	15.1%	5.3%	17.0%	10.8%
Combined ratio	91.4%	83.1%	17.5%	80.1%

- (1) Certain amounts included in the gross premiums written of each segment are related to intersegment transactions. Accordingly, the sum of gross premiums written for each segment does not agree to the total gross premiums written as shown in the table above due to the elimination of intersegment transactions in the total.
- (2) Certain expenses have been excluded from 'corporate expenses' and reflected in 'transaction costs and other.'

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	Six Months Ended			
	June 30, 2022			
	Insurance	Reinsurance	Mortgage	Total
Gross premiums written (1)	\$ 3,425	\$ 3,515	\$ 735	7,671
Premiums ceded	(990)	(1,210)	(155)	(2,352)
Net premiums written	2,435	2,302	582	5,319
Change in unearned premiums	(306)	(570)	4	(872)
Net premiums earned	2,129	1,732	586	4,447
Underwriting income (loss)	—	6	3	9
Commissions and loss adjustment expenses	(1,231)	(992)	119	(2,104)
Acquisition expenses	(410)	(361)	(20)	(791)
Other operating expenses	(328)	(136)	(103)	(567)
Underwriting income (loss)	\$ 169	\$ 249	\$ 585	994
Investment income				186
Net realized gains (losses)				(559)
Proportionate share of net income (loss) of investment funds accounted for using the equity method				94
Other income (loss)				(21)
Corporate expenses (2)				(60)
Transaction costs and other (2)				—
Amortization of intangible assets				(54)
Interest expense				(66)
Net foreign exchange gains (losses)				92
Income (loss) before income taxes and income (loss) from operating affiliates				606
Income tax (expense) benefit				(34)
Income (loss) from operating affiliates				30
Net income (loss)				602
Net (income) loss attributable to noncontrolling interests				(2)
Net income (loss) available to Arch				600
Preferred dividends				(20)
Net income (loss) available to Arch common shareholders				\$ 580
Underwriting Ratios				
Loss ratio	57.8%	57.3%	(20.4%)	47.3%
Acquisition expense ratio	19.2%	20.9%	3.5%	17.8%
Other operating expense ratio	15.4%	7.8%	17.7%	12.8%
Combined ratio	92.4%	86.0%	0.8%	77.9%

- (1) Certain amounts included in the gross premiums written of each segment are related to intersegment transactions. Accordingly, the sum of gross premiums written for each segment does not agree to the total gross premiums written as shown in the table above due to the elimination of intersegment transactions in the total.
- (2) Certain expenses have been excluded from 'corporate expenses' and reflected in 'transaction costs and other.'

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5. Reserve for Losses and Loss Adjustment Expenses

The following table represents an analysis of losses and loss adjustment expenses and a reconciliation of the beginning and ending reserve for losses and loss adjustment expenses:

	Three Months Ended		Six Months Ended	
	June 30,		June 30,	
	2023	2022	2023	2022
Reserve for losses and loss adjustment expenses at beginning of period	\$ 20,758	\$ 18,109	\$ 20,032	\$ 17,757
Unpaid losses and loss adjustment expenses recoverable	6,347	5,710	6,280	5,599
Net reserve for losses and loss adjustment expenses at beginning of period	14,411	12,399	13,752	12,158
Net incurred losses and loss adjustment expenses relating to losses occurring in:				
Current year	1,612	1,274	3,219	2,416
Prior years	(121)	(171)	(257)	(312)
Total net incurred losses and loss adjustment expenses	1,491	1,103	2,962	2,104
Net foreign exchange (gains) losses and other	44	(249)	99	(282)
Net paid losses and loss adjustment expenses relating to losses occurring in:				
Current year	(215)	(166)	(355)	(237)
Prior years	(857)	(579)	(1,584)	(1,235)
Total net paid losses and loss adjustment expenses	(1,072)	(745)	(1,939)	(1,472)
Net reserve for losses and loss adjustment expenses at end of period	14,874	12,508	14,874	12,508
Unpaid losses and loss adjustment expenses recoverable	6,394	5,686	6,394	5,686
Reserve for losses and loss adjustment expenses at end of period	\$ 21,268	\$ 18,194	\$ 21,268	\$ 18,194

Development on Prior Year Loss Reserves

2023 Second Quarter

During the 2023 second quarter, the Company recorded net favorable development on prior year loss reserves of \$ 121 million, which consisted of \$ 1.2 million from the insurance segment, \$ 2.9 million from the reinsurance segment and \$ 80 million from the mortgage segment.

The insurance segment's net favorable development of \$ 1.2 million, or 0.9 loss ratio points, for the 2023 second quarter consisted of \$ 30 million of net favorable development in short-tailed and long-tailed lines and \$ 18 million of net adverse development in medium-tailed lines. Net favorable development in short-tailed lines included \$ 1.6 million of favorable development in property (excluding marine), primarily from the 2022 accident year (*i.e.*, the year in which a loss occurred), and \$ 7 million of favorable development in warranty and lenders solutions, primarily from the 2022 accident year. Net favorable development in long-tailed lines included \$ 6 million of favorable development in executive assurance business, primarily from the 2016 and 2021 accident years. Net adverse development in medium-tailed lines included \$ 8 million of adverse development in programs business, primarily from 2020 accident year, \$ 5 million of adverse development in professional liability, across multiple accident years, and \$ 4 million of adverse

development in marine business, primarily from the 2022 accident year.

The reinsurance segment's net favorable development of \$ 29 million, or 2.2 loss ratio points, for the 2023 second quarter consisted of \$ 51 million of net favorable development in short-tailed and medium-tailed lines and \$ 2.2 million of net adverse development in long-tailed lines. Net favorable development in short-tailed lines included \$ 2.3 million of favorable development related to property other than property catastrophe business, primarily from the 2021 underwriting year (*i.e.*, all premiums and losses attributable to contracts having an inception or renewal date within the given twelve-month period), and \$ 2.1 million of favorable development related to other specialty and other short-tailed lines, primarily from the 2020 and 2021 underwriting years. Net favorable development in medium-tailed lines included \$ 7 million in marine and aviation lines, primarily from the 2019 to 2022 underwriting years. Net adverse development in long-tailed lines reflected \$ 22 million of adverse development in casualty business, primarily from the 2013 to 2019 underwriting years.

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The mortgage segment's net favorable development was \$ 80 million, or 27.2 loss ratio points, for the 2023 second quarter. Such amounts were primarily related to reductions on reserves for delinquent loans associated with the U.S. first lien portfolio from the 2020 to 2022 accident years. The Company's credit risk transfer and international businesses also contributed to the favorable development.

2022 Second Quarter

During the 2022 second quarter, the Company recorded net favorable development on prior year loss reserves of \$ 171 million, which consisted of \$ 7 million from the insurance segment, \$ 4 6 million from the reinsurance segment and \$ 118 million from the mortgage segment.

The insurance segment's net favorable development of \$ 7 million, or 0.6 loss ratio points, for the 2022 second quarter consisted of \$ 14 million of net favorable development in short-tailed lines and \$ 7 million of net adverse development in medium-tailed and long-tailed lines. Net favorable development in short-tailed lines included \$ 12 million of favorable development in warranty and lenders solutions, primarily from the 2021 accident year. Net adverse development in medium-tailed lines included \$ 6 million of adverse development in professional liability business, primarily from the 2018 and 2019 accident years, partially offset by favorable development in marine business of \$ 3 million, primarily from the 2019 and prior accident years. Net adverse development in long-tailed lines reflected \$ 6 million related to executive assurance business, primarily from the 2013 and 2020 accident years.

The reinsurance segment's net favorable development of \$ 46 million, or 5.0 loss ratio points, for the 2022 second quarter consisted of \$ 54 million of net favorable development in short-tailed and medium-tailed lines and \$ 8 million of net adverse development in long-tailed lines. Net favorable development in short-tailed lines reflected \$ 32 million of favorable development related to property other than property catastrophe business, primarily from 2016 to 2021 underwriting years, \$ 13 million of favorable development in other specialty business, primarily from the 2018 and 2021 underwriting years, and \$ 6 million of favorable development related to property catastrophe business, primarily from the 2017 to 2021 underwriting years. Net favorable development in medium-tailed lines included \$ 4 million in marine and aviation lines, across most underwriting years. Adverse development in long-tailed lines reflected an increase in casualty reserves, across several years, most notably the 2013 and 2021 underwriting years.

The mortgage segment's net favorable development was \$ 118 million, or 39.9 loss ratio points, for the 2022 second quarter, primarily related to the U.S. first lien portfolio from the 2020 accident year. The Company's credit risk transfer, international, second lien and student loan business also contributed to the favorable development.

Six Months Ended June 30, 2023

During the six months ended June 30, 2023, the Company recorded net favorable development on prior year loss reserves of \$ 257 million, which consisted of \$ 24 million from the insurance segment, \$ 82 million from the reinsurance segment and \$ 151 million from the mortgage segment.

The insurance segment's net favorable development of \$ 24 million, or 0.9 loss ratio points, for the 2023 period consisted of \$ 55 million of net favorable development in short and long-tailed lines and \$ 31 million of net adverse development in medium-tailed lines. Net favorable development in short-tailed lines reflected \$ 25 million of favorable development in property (excluding marine), primarily from the 2022 accident year, and \$ 14 million of favorable development related to warranty and lenders solutions business, primarily from the 2022 accident year. Net favorable development in long-tailed lines included \$ 16 million of favorable development in executive assurance business, primarily from the 2019 to 2022 accident years, and \$ 5 million of favorable development in alternative markets business, primarily from 2021 and prior accident years, partially offset by \$ 5 million of adverse development in healthcare, primarily from the 2018 and 2021 accident years. Net adverse development in medium-tailed lines included \$ 24 million of adverse development in professional liability business, primarily from the 2017 and 2020 accident years, and \$ 6 million of adverse development in programs business, primarily from the 2020 accident year.

The reinsurance segment's net favorable development of \$ 82 million, or 3.0 loss ratio points, for the 2023 period consisted of \$ 103 million of net favorable development from short and medium-tailed lines, partially offset by \$ 21 million of net adverse development from long-tailed lines. Net favorable development in short-tailed lines reflected \$ 46 million of favorable development from property other than property catastrophe business, primarily from the 2018 to 2022 underwriting years, \$ 7 million of favorable development from property catastrophe, primarily from the 2019 underwriting year, \$ 27 million from other specialty business, primarily from the 2021 underwriting year, and \$ 13 million of favorable development from other lines of business, primarily from the 2020 underwriting year. Net favorable development in medium-tailed lines included \$ 9 million in marine and aviation lines, primarily from the 2016 to 2021 underwriting years. Net adverse development in long-tailed lines primarily reflected \$ 19 million in casualty, primarily from the 2013 to 2019 underwriting years.

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The mortgage segment's net favorable development was \$ 151 million, or 25.6 loss ratio points, for the 2023 period, with the largest contributor being reserve releases associated with the U.S. first lien portfolio from the 2020 to 2022 accident years. The Company's credit risk transfer, international, second lien and student loan businesses also contributed to the favorable development.

Six Months Ended June 30, 2022

During the six months ended June 30, 2022, the Company recorded net favorable development on prior year loss reserves of \$ 312 million, which consisted of \$ 14 million from the insurance segment, \$ 78 million from the reinsurance segment, \$ 220 million from the mortgage segment.

The insurance segment's net favorable development of \$ 14 million, or 0.7 loss ratio points, for the 2022 period consisted of \$ 33 million of net favorable development in short-tailed and \$ 19 million of net adverse development in medium and long-tailed lines. Net favorable development in short-tailed lines reflected \$ 31 million of favorable development in warranty and lenders solutions, primarily from the 2021 accident year. Net adverse development in medium-tailed lines included \$ 14 million of adverse development in professional liability business, primarily from the 2018 and 2019 accident years, and \$ 6 million of adverse development in contract binding business, across most accident years, partially offset by \$ 6 million of favorable development in marine business, across most accident years, and \$ 5 million of favorable development in program business, primarily from the 2020 accident year. Net adverse development in long-tailed lines primarily reflected \$ 8 million of adverse development related to construction and national accounts, primarily from the 2020 and 2021 accident year.

The reinsurance segment's net favorable development of \$ 78 million, or 4.6 loss ratio points, for the 2022 period consisted of \$ 90 million of net favorable development from short-tailed and medium-tailed lines, partially offset by \$ 11 million of net adverse development from long-tailed lines. Net favorable development of \$ 75 million in short-tailed lines reflected \$ 47 million of favorable development from property other than property catastrophe business, primarily from the 2015 to 2021 underwriting years, \$ 18 million of favorable development from other specialty business, primarily from the 2016 and 2021 underwriting years, and \$ 10 million from property catastrophe, primarily from the 2018 and 2019 underwriting years. Net favorable development in medium-tailed lines included \$ 15 million in marine and aviation lines, across most underwriting years. Adverse development in long-tailed lines reflected an increase in casualty reserves, primarily from the 2021 underwriting year.

The mortgage segment's net favorable development was \$ 220 million, or 37.6 loss ratio points, for the 2022 period,

with the largest contributor being reserve releases associated with the U.S. first lien portfolio from the 2020 accident year. The Company's credit risk transfer, international, second lien and student loan business also contributed to the favorable development.

6. Allowance for Expected Credit Losses

Premiums Receivable

The following table provides a roll forward of the allowance for expected credit losses of the Company's premium receivables:

	Premium Receivables, Net of Allowance	Allowance for Expected Credit Losses
Three Months Ended June 30, 2023		
Balance at beginning of period	\$ 4,513	\$ 36
Change for provision of expected credit losses (1)		\$ (2)
Balance at end of period	\$ 5,296	\$ 34
Three Months Ended June 30, 2022		
Balance at beginning of period	\$ 3,224	\$ 39
Change for provision of expected credit losses (1)		\$ (1)
Balance at end of period	\$ 3,634	\$ 38
Six Months Ended June 30, 2023		
Balance at beginning of period	\$ 3,625	\$ 35
Change for provision of expected credit losses (1)		(1)
Balance at end of period	\$ 5,296	\$ 34
Six Months Ended June 30, 2022		
Balance at beginning of period	\$ 2,633	\$ 40
Change for provision of expected credit losses (1)		(2)
Balance at end of period	\$ 3,634	\$ 38

(1) Amounts deemed uncollectible are written-off in operating expenses. For the 2023 second quarter and 2022 second quarter, amounts written off were \$ 1 million and \$ 3 million, respectively. For the six months ended June 30, 2023 and 2022 period, amounts written off were \$ 2 million and \$ 5 million, respectively.

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Reinsurance Recoverables

The following table provides a roll forward of the allowance for expected credit losses of the Company's reinsurance recoverables:

	Reinsurance Recoverables, Net of Allowance	Allowance for Expected Credit Losses
Three Months Ended June 30, 2023		
Balance at beginning of period	\$ 6,612	\$ 21
Change for provision of expected credit losses		1
Balance at end of period	\$ 6,717	\$ 22
Three Months Ended June 30, 2022		
Balance at beginning of period	\$ 5,941	\$ 18
Change for provision of expected credit losses		(3)
Balance at end of period	\$ 5,939	\$ 15
Six Months Ended June 30, 2023		
Balance at beginning of period	\$ 6,564	\$ 22
Change for provision of expected credit losses		—
Balance at end of period	\$ 6,717	\$ 22
Six Months Ended June 30, 2022		
Balance at beginning of period	\$ 5,881	\$ 13
Change for provision of expected credit losses		2
Balance at end of period	\$ 5,939	\$ 15

The following table summarizes the Company's reinsurance recoverables on paid and unpaid losses (not including ceded unearned premiums):

	June 30, 2023		December 31 2022	
Reinsurance recoverable on unpaid and paid losses and loss adjustment expenses \$	6,717	\$	6,564	
% due from carriers with A.M. Best rating of "A-" or better	67.8	%	68.8	%
% due from all other rated carriers	0.2	%	0.1	%
% due from all other carriers with no A.M. Best rating (1)	32.0	%	31.1	%
Largest balance due from any one carrier as % of total shareholders' equity	8.6	%	9.0	%

(1) At June 30, 2023 and December 31, 2022 over 95 % of such amount were collateralized through reinsurance trusts, funds withheld arrangements, letters of credit or other, respectively .

Contractholder Receivables

The following table provides a roll forward of the allowance for expected credit losses of the Company's contractholder receivables:

	Contract-holder Receivables, Net of Allowance	Allowance for Expected Credit Losses
Three Months Ended June 30, 2023		
Balance at beginning of period	\$ 1,750	\$ 2
Change for provision of expected credit losses		1
Balance at end of period	\$ 1,761	\$ 3
Three Months Ended June 30, 2022		
Balance at beginning of period	\$ 1,810	\$ 4
Change for provision of expected credit losses		(1)
Balance at end of period	1,758	\$ 3
Six Months Ended June 30, 2023		
Balance at beginning of period	\$ 1,731	\$ 3
Change for provision of expected credit losses		—
Balance at end of period	\$ 1,761	\$ 3
Six Months Ended June 30, 2022		
Balance at beginning of period	\$ 1,829	\$ 3
Change for provision of expected credit losses		—
Balance at end of period	1,758	\$ 3

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7. Investment Information

Available For Sale Investments

The following table summarizes the fair value and cost or amortized cost of the Company's securities classified as available for sale:

	Estimated Fair Value	Gross Unrealized Gains	Gross Unrealized Losses	Allowance for Expected Credit Losses	Cost or Amortized Cost
June 30, 2023					
Fixed maturities:					
Corporate bonds	\$ 9,977	\$ 54	\$ (693)	\$ (50)	\$ 10,666
Residential mortgage backed securities	860	3	(87)	—	944
Municipal bonds	306	1	(27)	—	332
Commercial mortgage backed securities	1,082	—	(49)	(2)	1,133
U.S. government and government agencies	4,529	4	(176)	—	4,701
Non-U.S. government securities	2,277	20	(204)	(3)	2,464
Asset backed securities	2,403	5	(95)	(6)	2,499
Total	21,434	87	(1,331)	(61)	22,739
Short-term investments	1,702	2	(1)	—	1,701
Total	\$ 23,136	\$ 89	\$ (1,332)	\$ (61)	\$ 24,440
December 31, 2022					
Fixed maturities:					
Corporate bonds	\$ 8,020	\$ 55	\$ (781)	\$ (30)	\$ 8,776
Residential mortgage backed securities	795	5	(87)	—	877
Municipal bonds	419	3	(33)	—	449
Commercial mortgage backed securities	1,047	1	(58)	(3)	1,107
U.S. government and government agencies	5,162	15	(343)	—	5,490
Non-U.S. government securities	2,313	9	(238)	(2)	2,544
Asset backed securities	1,927	1	(107)	(6)	2,039
Total	19,683	89	(1,647)	(41)	21,282
Short-term investments	1,332	1	(2)	—	1,333
Total	\$ 21,015	\$ 90	\$ (1,649)	\$ (41)	\$ 22,615

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The following table summarizes, for all available for sale securities in an unrealized loss position, the fair value and gross unrealized loss by length of time the security has been in a continual unrealized loss position:

	Less than 12 Months		12 Months or More		Total	
	Estimated Fair Value	Gross Unrealized Losses	Estimated Fair Value	Gross Unrealized Losses	Estimated Fair Value	Gross Unrealized Losses
June 30, 2023						
Fixed maturities:						
Corporate bonds	\$ 4,083	\$ (118)	\$ 5,184	\$ (575)	\$ 9,267	\$ (693)
Residential mortgage backed securities	441	(24)	330	(63)	771	(87)
Municipal bonds	126	(7)	169	(20)	295	(27)
Commercial mortgage backed securities	127	(4)	892	(45)	1,019	(49)
U.S. government and government agencies	3,362	(61)	1,085	(115)	4,447	(176)
Non-U.S. government securities	1,242	(61)	981	(143)	2,223	(204)
Asset backed securities	695	(25)	1,046	(70)	1,741	(95)
Total	10,076	(300)	9,687	(1,031)	19,763	(1,331)
Short-term investments	251	(1)	—	—	251	(1)
Total	\$ 10,327	\$ (301)	\$ 9,687	\$ (1,031)	\$ 20,014	\$ (1,332)
December 31, 2022						
Fixed maturities:						
Corporate bonds	\$ 4,823	\$ (393)	\$ 2,559	\$ (388)	\$ 7,382	\$ (781)
Residential mortgage backed securities	546	(52)	154	(35)	700	(87)
Municipal bonds	364	(30)	16	(3)	380	(33)
Commercial mortgage backed securities	598	(35)	445	(23)	1,043	(58)
U.S. government and government agencies	3,557	(197)	1,443	(146)	5,000	(343)
Non-U.S. government securities	1,703	(154)	542	(84)	2,245	(238)
Asset backed securities	1,148	(66)	512	(41)	1,660	(107)
Total	12,739	(927)	5,671	(720)	18,410	(1,647)
Short-term investments	237	(2)	—	—	237	(2)
Total	\$ 12,976	\$ (929)	\$ 5,671	\$ (720)	\$ 18,647	\$ (1,649)

At June 30, 2023, on a lot level basis, approximately 10,400 security lots out of a total of approximately 13,490 security lots were in an unrealized loss position and the largest single unrealized loss from a single lot in the Company's fixed maturity portfolio was \$ 7 million. At December 31, 2022, on a lot level basis, approximately 9,810 security lots out of a total of approximately 12,590 security lots were in an unrealized loss position and the largest single unrealized loss from a single lot in the Company's fixed maturity portfolio was \$ 7 million.

The contractual maturities of the Company's fixed maturities are shown in the following table. Expected maturities, which are management's best estimates, will differ from contractual maturities because borrowers may have the right to call or prepay obligations with or without call or prepayment penalties.

	June 30, 2023		December 31, 2022	
	Estimated Fair Value	Amortized Cost	Estimated Fair Value	Amortized Cost
Maturity				
Due in one year or less	\$ 576	\$ 603	\$ 511	\$ 537
Due after one year through five years	12,033	12,606	11,016	11,715
Due after five years through 10 years	4,449	4,889	3,984	4,527
Due after 10 years	31	65	403	480
	17,089	18,163	15,914	17,259
Residential mortgage backed securities	860	944	795	877
Commercial mortgage backed securities	1,082	1,133	1,047	1,107
Asset backed securities	2,403	2,499	1,927	2,039
Total	\$ 21,434	\$ 22,739	\$ 19,683	\$ 21,282

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Equity Securities, at Fair Value

At June 30, 2023, the Company held \$ 911 million of equity securities, at fair value, compared to \$ 860 million at December 31, 2022. Such holdings include publicly traded common stocks primarily in the consumer cyclical and non-cyclical, technology, communication and financial sectors and exchange-traded funds in fixed income, equity and other sectors.

Other Investments, at Fair Value

The following table summarizes the Company's other investments and other investable assets:

	June 30, 2023	December 31, 2022
Fixed maturities	\$ 659	\$ 554
Other investments	1,172	1,043
Short-term investments	8	33
Equity securities	7	14
Total	<u>\$ 1,846</u>	<u>\$ 1,644</u>

The following table summarizes the Company's other investments, as detailed in the previous table, by strategy:

	June 30, 2023	December 31, 2022
Lending	\$ 451	\$ 406
Investment grade fixed income	265	271
Term loan investments	228	164
Private equity	149	123
Credit related funds	60	56
Energy	19	23
Total	<u>\$ 1,172</u>	<u>\$ 1,043</u>

Investments Accounted For Using the Equity Method

The following table summarizes the Company's investments accounted for using the equity method, by strategy:

	June 30, 2023	December 31, 2022
Credit related funds	\$ 1,200	\$ 1,136
Private equity	1,028	917
Real estate	590	535
Lending	567	531
Infrastructure	280	245
Equities	168	169
Fixed income	134	130
Energy	106	111
Total	<u>\$ 4,073</u>	<u>\$ 3,774</u>

Certain of the Company's other investments are in investment funds for which the Company has the option to redeem at agreed upon values as described in each investment fund's subscription agreement. Depending on the terms of the various subscription agreements, investments in investment funds may be redeemed daily, monthly, quarterly or on other terms. Two common redemption restrictions which may impact the Company's ability to redeem these investment funds are gates and lockups. A gate is a suspension of redemptions which may be implemented by the general partner or investment manager of the fund in order to defer, in whole or in part, the redemption request in the event the aggregate amount of redemption requests exceeds a predetermined percentage of the investment fund's net assets which may otherwise hinder the general partner or investment manager's ability to liquidate holdings in an orderly fashion in order to generate the cash necessary to fund extraordinarily large redemption payouts. A lockup period is the initial amount of time an investor is contractually required to hold the security before having the ability to redeem. If the investment funds are eligible to be redeemed, the time to redeem such fund can take weeks or months following the notification.

Limited Partnership Interests

In the normal course of its activities, the Company invests in limited partnerships as part of its overall investment strategy. Such amounts are included in 'investments accounted for using the equity method' and 'investments accounted for using the fair value option.' The Company has determined that it is not required to consolidate these investments because it is not the primary beneficiary of the funds. The Company's maximum exposure to loss with respect to these investments is limited to the investment carrying amounts reported in the Company's consolidated balance sheet and any unfunded commitment.

The following table summarizes investments in limited partnership interests where the Company has a variable interest by balance sheet line item:

	June 30, 2023	December 31, 2022
Investments accounted for using the equity method (1)	\$ 4,073	\$ 3,774
Investments accounted for using the fair value option (2)	127	131
Total	<u>\$ 4,200</u>	<u>\$ 3,905</u>

- (1) Aggregate unfunded commitments were \$ 2.5 billion at June 30, 2023, compared with \$ 2.6 billion at December 31, 2022.
- (2) Aggregate unfunded commitments were \$ 66 million at June 30, 2023, compared to \$ 17 million at December 31, 2022.

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Net Investment Income

The components of net investment income were derived from the following sources:

	June 30,	
	2023	2022
Three Months Ended		
Fixed maturities	\$ 214	\$ 105
Equity securities	6	6
Short-term investments	15	4
Other (1)	25	8
Gross investment income	260	123
Investment expenses	(18)	(17)
Net investment income	\$ 242	\$ 106
Six Months Ended		
Fixed maturities	\$ 402	\$ 187
Equity securities	10	12
Short-term investments	29	7
Other (1)	38	20
Gross investment income	479	226
Investment expenses	(38)	(40)
Net investment income	\$ 441	\$ 186

(1) Amounts include dividends and other distributions on investment funds, term loan investments, funds held balances, cash balances and other items.

Net Realized Gains (Losses)

Net realized gains (losses), which include changes in the allowance for credit losses on financial assets and net impairment losses recognized in earnings were as follows:

	June 30,	
	2023	2022
Three Months Ended		
Available for sale securities:		
Gross gains on investment sales	\$ 22	\$ 15
Gross losses on investment sales	(169)	(57)
Change in fair value of assets and liabilities accounted for using the fair value option:		
Fixed maturities	(2)	(39)
Other investments	5	(23)
Equity securities	—	(2)
Short-term investments	—	(2)
Equity securities, at fair value:		
Net realized gains (losses) on sales during the period	17	17
Net unrealized gains (losses) on equity securities still held at reporting date	25	(106)
Allowance for credit losses:		
Investments related	(7)	(25)
Underwriting related	(1)	1
Derivative instruments (1)	(15)	(46)
Other	2	—
Net realized gains (losses)	\$ (123)	\$ (267)
Six Months Ended		
Available for sale securities:		
Gross gains on investment sales	\$ 39	\$ 35
Gross losses on investment sales	(280)	(165)
Change in fair value of assets and liabilities accounted for using the fair value option:		
Fixed maturities	4	(70)
Other investments	14	(19)
Equity securities	1	(5)
Short-term investments	—	(2)
Equity securities, at fair value:		
Net realized gains (losses) on sales during the period	36	82
Net unrealized gains (losses) on equity securities still held at reporting date	63	(282)
Allowance for credit losses:		
Investments related	(23)	(57)
Underwriting related	(1)	(3)
Derivative instruments (1)	41	(70)
Other	—	(3)
Net realized gains (losses)	\$ (106)	\$ (559)

(1) See [note 9](#) for information on the Company's derivative instruments.

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Equity in Net Income (Loss) of Investment Funds Accounted for Using the Equity Method

The Company recorded income of \$ 69 million related to investment funds accounted for using the equity method in the 2023 second quarter, compared to income of \$ 58 million for the 2022 second quarter and income of \$ 117 million for the six months ended June 30, 2023, compared to income of \$ 94 million for six months ended June 30, 2022. In applying the equity method, investments are initially recorded at cost and are subsequently adjusted based on the Company's proportionate share of the net income or loss of the funds (which include changes in the market value of the underlying securities in the funds). Such investments are generally recorded on a one to three month lag based on the availability of reports from the investment funds.

Investments in Operating Affiliates

Investments in which the Company has significant influence over the operating and financial policies are classified as 'investments in operating affiliates' on the Company's balance sheets and are accounted for under the equity method. Such investments primarily include the Company's investment in Coface SA ("Coface"), Greysbridge Holdings Ltd., ("Greysbridge") and Premia Holdings Ltd. Investments in Coface and Premia Holdings Ltd. are generally recorded on a three month lag, while the Company's investment in Greysbridge is not recorded on a lag.

As of June 30, 2023, the Company owned approximately 29.9 % of the issued shares of Coface, or 30 % excluding treasury shares, with a carrying value of \$ 518 million, compared to \$ 563 million at December 31, 2022.

As of June 30, 2023, the Company owned 40 % of Greysbridge with a carrying value of \$ 339 million, compared to \$ 306 million at December 31, 2022.

Income from operating affiliates for the 2023 second quarter was \$ 22 million, compared to \$ 5 million, for the 2022 second quarter, and income of \$ 61 million for the six months ended June 30, 2023, compared to income of \$ 30 million for six months ended June 30, 2022.

See [note 15](#) for information on Company's transactions with related parties.

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Allowance for Expected Credit Losses

The following table provides a roll forward of the allowance for expected credit losses of the Company's securities classified as available for sale:

	Structured Securities (1)	Corporate Bonds	Non-U.S. Government Securities	Total
Three Months Ended June 30, 2023				
Balance at beginning of period	\$ 8	\$ 45	\$ 3	\$ 56
Additions for current-period provision for expected credit losses	—	—	—	—
Additions (reductions) for previously recognized expected credit losses	—	6	—	6
Reductions due to disposals	—	(1)	—	(1)
Balance at end of period	<u>\$ 8</u>	<u>\$ 50</u>	<u>\$ 3</u>	<u>\$ 61</u>
Three Months Ended June 30, 2022				
Balance at beginning of period	\$ 7	\$ 27	\$ —	\$ 34
Additions for current-period provision for expected credit losses	5	13	—	18
Additions (reductions) for previously recognized expected credit losses	7	—	—	7
Reductions due to disposals	—	—	—	—
Balance at end of period	<u>\$ 19</u>	<u>\$ 40</u>	<u>\$ —</u>	<u>\$ 59</u>
Six Months Ended June 30, 2023				
Balance at beginning of period	\$ 9	\$ 30	\$ 2	\$ 41
Additions for current-period provision for expected credit losses	—	1	—	1
Additions (reductions) for previously recognized expected credit losses	(1)	21	1	21
Reductions due to disposals	—	(2)	—	(2)
Balance at end of period	<u>\$ 8</u>	<u>\$ 50</u>	<u>\$ 3</u>	<u>\$ 61</u>
Six Months Ended June 30, 2022				
Balance at beginning of period	\$ 1	\$ 2	\$ —	\$ 3
Additions for current-period provision for expected credit losses	11	38	—	49
Additions (reductions) for previously recognized expected credit losses	7	—	—	7
Reductions due to disposals	—	—	—	—
Balance at end of period	<u>\$ 19</u>	<u>\$ 40</u>	<u>\$ —</u>	<u>\$ 59</u>

(1) Includes asset backed securities, residential mortgage backed securities and commercial mortgage backed securities.

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Restricted Assets

The Company is required to maintain assets on deposit, which primarily consist of fixed maturities, with various regulatory authorities to support its underwriting operations. The Company's subsidiaries maintain assets in trust accounts as collateral for transactions with affiliated companies and also have investments in segregated portfolios primarily to provide collateral or guarantees for letters of credit to third parties. See note 18, "Commitments and Contingencies," of the notes to consolidated financial statements in the Company's 2022 Form 10-K.

The following table details the value of the Company's restricted assets:

	June 30, 2023	December 31, 2022
Assets used for collateral or guarantees:		
Affiliated transactions	\$ 4,477	\$ 4,254
Third party agreements	2,822	2,633
Deposits with U.S. regulatory authorities	797	776
Other (1)	1,217	1,038
Total restricted assets	\$ 9,313	\$ 8,701

(1) Primarily includes Funds at Lloyds, deposits with non-U.S. regulatory authorities and other restricted assets.

Reconciliation of Cash and Restricted Cash

The following table details reconciliation of cash and restricted cash within the Consolidated Balance Sheets:

	June 30, 2023	December 31, 2022
Cash	\$ 904	\$ 855
Restricted cash (included in 'other assets')	449	418
Cash and restricted cash	\$ 1,353	\$ 1,273

8. Fair Value

Accounting guidance regarding fair value measurements addresses how companies should measure fair value when they are required to use a fair value measure for recognition or disclosure purposes under GAAP and provides a common definition of fair value to be used throughout GAAP. It defines fair value as the price that would be received to sell an asset or paid to transfer a liability in an orderly fashion between market participants at the measurement date. In addition, it establishes a three-level valuation hierarchy for the disclosure of fair value measurements. The valuation hierarchy is based upon the transparency of inputs to the valuation of an asset or liability as of the measurement date. The level in the hierarchy within which a given fair value measurement falls is determined based on the lowest level input that is significant to the measurement (Level 1 being the highest priority and Level 3 being the lowest priority).

The levels in the hierarchy are defined as follows:

Level 1:	Inputs to the valuation methodology are observable inputs that reflect quoted prices (unadjusted) for <i>identical</i> assets or liabilities in <i>active markets</i>
Level 2:	Inputs to the valuation methodology include quoted prices for similar assets and liabilities in active markets, and inputs that are observable for the asset or liability, either directly or indirectly, for substantially the full term of the financial instrument
Level 3:	Inputs to the valuation methodology are unobservable and significant to the fair value measurement

Following is a description of the valuation methodologies used for securities measured at fair value, as well as the general classification of such securities pursuant to the valuation hierarchy. The Company reviews its securities measured at fair value and discusses the proper classification of such investments with investment advisers and others.

The Company determines the existence of an active market based on its judgment as to whether transactions for the financial instrument occur in such market with sufficient frequency and volume to provide reliable pricing information. The independent pricing sources obtain market quotations and actual transaction prices for securities that have quoted prices in active markets. The Company uses quoted values and other data provided by nationally recognized independent pricing sources as inputs into its process for determining fair values of its fixed maturity investments. To validate the techniques or models used by pricing sources, the Company's review process includes, but is not limited to: (i) quantitative analysis (e.g., comparing the quarterly return for each managed portfolio to its target benchmark, with significant differences identified and investigated); (ii) a review of the average number of prices obtained in the pricing process and the range of resulting fair values; (iii) initial and ongoing evaluation of methodologies used by outside parties to calculate fair value; (iv) a comparison of the fair value estimates to the Company's knowledge of the current market; (v) a comparison of the pricing services' fair values to other pricing services' fair values for the same investments; and (vi) periodic back-testing, which includes randomly selecting purchased or sold securities and comparing the executed prices to the fair value estimates from the pricing service. A price source hierarchy was maintained in order to determine which price source would be used (i.e., a price obtained from a pricing service with more seniority in the hierarchy will be used over a less senior one in all cases). The hierarchy prioritizes pricing services based on availability and reliability and assigns the highest priority to index providers. Based on the above

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review, the Company will challenge any prices for a security or portfolio which are considered not to be representative of fair value. The Company did not adjust any of the prices obtained from the independent pricing sources at June 30, 2023.

In certain circumstances, when fair values are unavailable from these independent pricing sources, quotes are obtained directly from broker-dealers who are active in the corresponding markets. Such quotes are subject to the validation procedures noted above. Where quotes are unavailable, fair value is determined by the Investment Manager using quantitative and qualitative assessments such as internally modeled values. Of the \$ 26.1 billion of financial assets and liabilities measured at fair value at June 30, 2023, approximately \$ 17 million, or 0.1 %, were priced using non-binding broker-dealer quotes or modeled valuations. Of the \$ 23.8 billion of financial assets and liabilities measured at fair value at December 31, 2022, approximately \$ 13 million, or 0.1 %, were priced using non-binding broker-dealer quotes or modeled valuations.

Fixed maturities

The Company uses the market approach valuation technique to estimate the fair value of its fixed maturity securities, when possible. The market approach includes obtaining prices from independent pricing services, such as index providers and pricing vendors, as well as to a lesser extent quotes from broker-dealers. The independent pricing sources obtain market quotations and actual transaction prices for securities that have quoted prices in active markets. Each source has its own proprietary method for determining the fair value of securities that are not actively traded. In general, these methods involve the use of "matrix pricing" in which the independent pricing source uses observable market inputs including, but not limited to, investment yields, credit risks and spreads, benchmarking of like securities, broker-dealer quotes, reported trades and sector groupings to determine a reasonable fair value.

The following describes the significant inputs generally used to determine the fair value of the Company's fixed maturity securities by asset class:

U.S. government and government agencies – valuations provided by independent pricing services, with all prices provided through index providers and pricing vendors. The Company determined that all U.S. Treasuries would be classified as Level 1 securities due to observed levels of trading activity, the high number of strongly correlated pricing quotes received on U.S. Treasuries and other factors. The fair values of U.S. government agency securities are generally determined using the spread above the risk-free yield curve. As the yields for the risk-free yield curve and the spreads for these securities are observable market inputs, the

fair values of U.S. government agency securities are classified within Level 2.

Corporate bonds – valuations provided by independent pricing services, substantially all through index providers and pricing vendors with a small amount through broker-dealers. The fair values of these securities are generally determined using the spread above the risk-free yield curve. These spreads are generally obtained from the new issue market, secondary trading and from broker-dealers who trade in the relevant security market. As the significant inputs used in the pricing process for corporate bonds are observable market inputs, the fair value of these securities are classified within Level 2. A small number of securities are included in Level 3 due to a low level of transparency on the inputs used in the pricing process.

Municipal bonds – valuations provided by independent pricing services, with all prices provided through index providers and pricing vendors. The fair values of these securities are generally determined using spreads obtained from broker-dealers who trade in the relevant security market, trade prices and the new issue market. As the significant inputs used in the pricing process for municipal bonds are observable market inputs, the fair value of these securities are classified within Level 2.

Residential mortgage-backed securities – valuations provided by independent pricing services, substantially all through pricing vendors and index providers with a small amount through broker-dealers. The fair values of these securities are generally determined through the use of pricing models (including Option Adjusted Spread) which use spreads to determine the expected average life of the securities. These spreads are generally obtained from the new issue market, secondary trading and from broker-dealers who trade in the relevant security market. The pricing services also review prepayment speeds and other indicators, when applicable. As the significant inputs used in the pricing process for mortgage-backed securities are observable market inputs, the fair value of these securities are classified within Level 2. A small number of securities are included in Level 3 due to a low level of transparency on the inputs used in the pricing process.

Commercial mortgage-backed securities – valuations provided by independent pricing services, substantially all through index providers and pricing vendors with a small amount through broker-dealers. The fair values of these securities are generally determined through the use of pricing models which use spreads to determine the appropriate average life of the securities. These spreads are generally obtained from the new issue market, secondary trading and from broker-dealers who trade in the relevant security market. The pricing services also review prepayment speeds and other indicators, when applicable. As the significant inputs used in the pricing process for commercial mortgage-

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backed securities are observable market inputs, the fair value of these securities are classified within Level 2.

Non-U.S. government securities – valuations provided by independent pricing services, with all prices provided through index providers and pricing vendors. The fair values of these securities are generally based on international indices or valuation models which include daily observed yield curves, cross-currency basis index spreads and country credit spreads. As the significant inputs used in the pricing process for non-U.S. government securities are observable market inputs, the fair value of these securities are classified within Level 2.

Asset-backed securities – valuations provided by independent pricing services, substantially all through index providers and pricing vendors with a small amount through broker-dealers. The fair values of these securities are generally determined through the use of pricing models (including Option Adjusted Spread) which use spreads to determine the appropriate average life of the securities. These spreads are generally obtained from the new issue market, secondary trading and from broker-dealers who trade in the relevant security market. The pricing services also review prepayment speeds and other indicators, when applicable. As the significant inputs used in the pricing process for asset-backed securities are observable market inputs, the fair value of these securities are classified within Level 2.

Equity securities

The Company determined that exchange-traded equity securities would be included in Level 1 as their fair values are based on quoted market prices in active markets. Certain equity securities are included in Level 2 of the valuation hierarchy as the significant inputs used in the pricing process for such securities are observable market inputs. Other equity securities are included in Level 3 due to the lack of an available independent price source for such securities. As the significant inputs used to price these securities are unobservable, the fair value of such securities are classified as Level 3.

Other investments

The Company's other investments include term loan investments for which fair values are estimated by using quoted prices of term loan investments with similar characteristics, pricing models or matrix pricing. Such investments are generally classified within Level 2. The fair values for certain of the Company's other investments are determined using net asset values as advised by external fund managers. The net asset value is based on the fund manager's valuation of the underlying holdings in accordance with the fund's governing documents. In accordance with applicable accounting guidance, certain investments that are measured at fair value using the net asset value per share (or its

equivalent) practical expedient have not been classified in the fair value hierarchy. A small number of securities are included in Level 3 due to the lack of an available independent price source for such securities.

Derivative instruments

The Company's futures contracts, foreign currency forward contracts, interest rate swaps and other derivatives trade in the over-the-counter derivative market. The Company uses the market approach valuation technique to estimate the fair value for these derivatives based on significant observable market inputs from third party pricing vendors, non-binding broker-dealer quotes and/or recent trading activity. As the significant inputs used in the pricing process for these derivative instruments are observable market inputs, the fair value of these securities are classified within Level 2.

Short-term investments

The Company determined that certain of its short-term investments held in highly liquid money market-type funds, Treasury bills and commercial paper would be included in Level 1 as their fair values are based on quoted market prices in active markets. The fair values of other short-term investments are generally determined using the spread above the risk-free yield curve and are classified within Level 2.

Residential mortgage loans

The Company's residential mortgage loans (included in 'other assets' in the consolidated balance sheets) include amounts related to the Company's whole mortgage loan purchase and sell program. Fair values of residential mortgage loans are generally determined based on market prices. As significant inputs used in pricing process for these residential mortgage loans are observable market inputs, the fair value of these securities are classified within Level 2.

Other liabilities

The Company's other liabilities include contingent and deferred consideration liabilities related to the Company's acquisitions. Contingent consideration liabilities are remeasured at fair value at each balance sheet date with changes in fair value recognized in 'net realized gains (losses).' To determine the fair value of contingent consideration liabilities, the Company estimates the future payments using an income approach based on modeled inputs which include a weighted average cost of capital. Deferred consideration liabilities are measured at fair value on the transaction date. The Company determined that contingent and deferred consideration liabilities would be included within Level 3.

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The following table presents the Company's financial assets and liabilities measured at fair value by level at June 30, 2023:

	Estimated Fair Value Measurements Using:			
	Estimated Fair Value	Quoted Prices in	Significant	
		Active Markets	Other	Significant
		for Identical Assets (Level 1)	Observable Inputs (Level 2)	Unobservable Inputs (Level 3)
<u>Assets measured at fair value:</u>				
Available for sale securities:				
Fixed maturities:				
Corporate bonds	\$ 9,977	\$ —	\$ 9,877	\$ 100
Residential mortgage backed securities	860	—	860	—
Municipal bonds	306	—	306	—
Commercial mortgage backed securities	1,082	—	1,082	—
U.S. government and government agencies	4,529	4,507	22	—
Non-U.S. government securities	2,277	—	2,277	—
Asset backed securities	2,403	—	2,403	—
Total	21,434	4,507	16,827	100
Short-term investments	1,702	1,599	103	—
Equity securities, at fair value	911	876	30	5
Derivative instruments (2)	125	—	125	—
Residential mortgage loans	2	—	2	—
Fair value option:				
Corporate bonds	639	—	639	—
Non-U.S. government bonds	10	—	10	—
Asset backed securities	2	—	2	—
U.S. government and government agencies	8	8	—	—
Short-term investments	8	1	7	—
Equity securities	7	3	—	4
Other investments	313	—	227	86
Other investments measured at net asset value (1)	859			
Total	1,846	12	885	90
Total assets measured at fair value	\$ 26,020	\$ 6,994	\$ 17,972	\$ 195
<u>Liabilities measured at fair value:</u>				
Other liabilities	\$ (19)	\$ —	\$ —	\$ (19)
Derivative instruments (2)	(62)	—	(62)	—
Total liabilities measured at fair value	\$ (81)	\$ —	\$ (62)	\$ (19)

(1) In accordance with applicable accounting guidance, certain investments that are measured at fair value using the net asset value per share (or its equivalent) practical expedient have not been classified in the fair value hierarchy. The fair value amounts presented in this table are intended to permit reconciliation of the fair value hierarchy to the amounts presented in the consolidated balance sheets.

(2) See [note 9](#).

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The following table presents the Company's financial assets and liabilities measured at fair value by level at December 31, 2022:

	Estimated Fair Value Measurements Using:			
	Estimated Fair Value	Quoted Prices in	Significant	
		Active Markets	Other	Significant
		for Identical Assets (Level 1)	Observable Inputs (Level 2)	Unobservable Inputs (Level 3)
<u>Assets measured at fair value:</u>				
Available for sale securities:				
Fixed maturities:				
Corporate bonds	\$ 8,020	\$ —	\$ 7,899	\$ 121
Residential mortgage backed securities	795	—	795	—
Municipal bonds	419	—	419	—
Commercial mortgage backed securities	1,047	—	1,047	—
U.S. government and government agencies	5,162	5,145	17	—
Non-U.S. government securities	2,313	—	2,313	—
Asset backed securities	1,927	—	1,927	—
Total	19,683	5,145	14,417	121
Short-term investments	1,332	1,198	134	—
Equity securities, at fair value	860	829	28	3
Derivative instruments (2)	149	—	149	—
Residential mortgage loans	2	—	2	—
Fair value option:				
Corporate bonds	543	—	543	—
Non-U.S. government bonds	4	—	4	—
Asset backed securities	2	—	2	—
U.S. government and government agencies	5	5	—	—
Short-term investments	33	1	32	—
Equity securities	14	10	—	4
Other investments	196	—	163	33
Other investments measured at net asset value (1)	847			
Total	1,644	16	744	37
Total assets measured at fair value	\$ 23,670	\$ 7,188	\$ 15,474	\$ 161
<u>Liabilities measured at fair value:</u>				
Other liabilities	\$ (14)	\$ —	\$ —	\$ (14)
Derivative instruments (2)	(76)	—	(76)	—
Total liabilities measured at fair value	\$ (90)	\$ —	\$ (76)	\$ (14)

(1) In accordance with applicable accounting guidance, certain investments that are measured at fair value using the net asset value per share (or its equivalent) practical expedient have not been classified in the fair value hierarchy. The fair value amounts presented in this table are intended to permit reconciliation of the fair value hierarchy to the amounts presented in the consolidated balance sheets.

(2) See [note 9](#).

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (UNAUDITED)

The following table presents a reconciliation of the beginning and ending balances for all financial assets and liabilities measured at fair value on a recurring basis using Level 3 inputs:

	Assets						Liabilities					
	Available For Sale		Fair Value Option		Fair Value		Other Liabilities					
	Structured Securities (1)	Corporate Bonds	Other Investments	Equity Securities	Equity Securities							
Three Months Ended June 30, 2023												
Balance at beginning of period	\$	—	\$	69	\$	46	\$	4	\$	5	\$	(14)
Total gains or (losses) (realized/unrealized)												
Included in earnings (2)		—		—		—		—		—		—
Included in other comprehensive income		—		—		—		—		—		—
Purchases, issuances, sales and settlements												
Purchases		—		43		40		—		—		—
Issuances		—		—		—		—		—		(5)
Sales		—		—		—		—		—		—
Settlements		—		(12)		—		—		—		—
Transfers in and/or out of Level 3		—		—		—		—		—		—
Balance at end of period	\$	—	\$	100	\$	86	\$	4	\$	5	\$	(19)
Three Months Ended June 30, 2022												
Balance at beginning of period	\$	3	\$	4	\$	23	\$	5	\$	3	\$	(18)
Total gains or (losses) (realized/unrealized)												
Included in earnings (2)		—		—		—		—		—		—
Included in other comprehensive income		—		—		—		—		—		1
Purchases, issuances, sales and settlements												
Purchases		—		—		11		—		—		—
Issuances		—		—		—		—		—		—
Sales		—		—		—		—		—		—
Settlements		—		—		—		—		—		—
Transfers in and/or out of Level 3		—		—		—		—		—		—
Balance at end of period	\$	3	\$	4	\$	34	\$	5	\$	3	\$	(17)
Six Months Ended June 30, 2023												
Balance at beginning of year	\$	—	\$	121	\$	33	\$	4	\$	4	\$	(14)
Total gains or (losses) (realized/unrealized)												
Included in earnings (2)		—		1		(1)		—		—		—
Included in other comprehensive income		—		—		—		—		—		—
Purchases, issuances, sales and settlements												
Purchases		—		43		58		—		1		—
Issuances		—		—		—		—		—		(5)
Sales		—		—		(4)		—		—		—
Settlements		—		(65)		—		—		—		—
Transfers in and/or out of Level 3		—		—		—		—		—		—
Balance at end of period	\$	—	\$	100	\$	86	\$	4	\$	5	\$	(19)
Six Months Ended June 30, 2022												
Balance at beginning of year	\$	3	\$	—	\$	28	\$	5	\$	3	\$	(17)
Total gains or (losses) (realized/unrealized)												
Included in earnings (2)		—		—		—		—		—		—
Included in other comprehensive income		—		—		—		—		—		—
Purchases, issuances, sales and settlements												
Purchases		—		—		11		—		—		—
Issuances		—		—		—		—		—		—
Sales		—		—		(2)		—		—		—
Settlements		—		—		(3)		—		—		—
Transfers in and/or out of Level 3		—		4		—		—		—		—
Balance at end of period	\$	3	\$	4	\$	34	\$	5	\$	3	\$	(17)

(1) Includes asset backed securities, residential mortgage backed securities and commercial mortgage backed securities.

(2) Gains or losses were included in net realized gains (losses).

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
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Financial Instruments Disclosed, But Not Carried, At Fair Value

The Company uses various financial instruments in the normal course of its business. The carrying values of cash, accrued investment income, receivable for securities sold, certain other assets, payable for securities purchased and certain other liabilities approximated their fair values at June 30, 2023, due to their respective short maturities. As these financial instruments are not actively traded, their respective fair values are classified within Level 2.

At June 30, 2023, the Company's senior notes were carried at their cost, net of debt issuance costs, of \$ 2.7 billion and had a fair value of \$ 2.4 billion. At December 31, 2022, the Company's senior notes were carried at their cost, net of debt issuance costs, of \$ 2.7 billion and had a fair value of \$ 2.4 billion. The fair values of the senior notes were obtained from a third party pricing service and are based on observable market inputs. As such, the fair values of the senior notes are classified within Level 2.

9. Derivative Instruments

The Company's investment strategy allows for the use of derivative instruments. The Company's derivative instruments are recorded on its consolidated balance sheets at fair value. The Company utilizes exchange traded U.S. Treasury note, Eurodollar and other futures contracts and commodity futures to manage portfolio duration or replicate investment positions in its portfolios and the Company routinely utilizes foreign currency forward contracts, currency options, index futures contracts and other derivatives as part of its total return objective. In addition, certain of the Company's investments are managed in portfolios which incorporate the use of foreign currency forward contracts which are intended to provide an economic hedge against foreign currency movements.

From time to time, the Company purchases to-be-announced mortgage backed securities ("TBAs") as part of its investment strategy. TBAs represent commitments to purchase a future issuance of agency mortgage backed securities. For the period between purchase of a TBA and issuance of the underlying security, the Company's position is accounted for as a derivative. The Company purchases TBAs in both long and short positions to enhance investment performance and as part of its overall investment strategy.

The following table summarizes information on the fair values and notional values of the Company's derivative instruments:

	Estimated Fair Value		
	Asset Derivatives	Liability	Notional
	(1)	Derivatives (1)	Value (2)
<u>June 30, 2023</u>			
Futures contracts	\$ 83	\$ (27)	\$ 3,015
Foreign currency forward contracts	16	(15)	1,299
Other (3)	26	(20)	98
Total	\$ 125	\$ (62)	
<u>December 31, 2022</u>			
Futures contracts	\$ 51	\$ (17)	\$ 3,138
Foreign currency forward contracts	39	(35)	1,136
Other (3)	59	(24)	3,592
Total	\$ 149	\$ (76)	

- (1) The fair value of asset derivatives are included in ' other assets ' and the fair value of liability derivatives are included in ' other liabilities .'
- (2) Represents the absolute notional value of all outstanding contracts, consisting of long and short positions.
- (3) Includes swaps, options and other derivatives contracts.

The Company did not hold any derivatives which were designated as hedging instruments at June 30, 2023 or December 31, 2022.

The Company's derivative instruments can be traded under master netting agreements, which establish terms that apply to all derivative transactions with a counterparty. In the event of a bankruptcy or other stipulated event of default, such agreements provide that the non-defaulting party may elect to terminate all outstanding derivative transactions, in which case all individual derivative positions (loss or gain) with a counterparty are closed out and netted and replaced with a single amount, usually referred to as the termination amount, which is expressed in a single currency. The resulting single net amount, where positive, is payable to the party "in-the-money" regardless of whether or not it is the defaulting party, unless the parties have agreed that only the non-defaulting party is entitled to receive a termination payment where the net amount is positive and is in its favor. Contractual close-out netting reduces derivatives credit exposure from gross to net exposure.

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
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At June 30, 2023, asset derivatives and liability derivatives of \$ 125 million and \$ 58 million, respectively, were subject to a master netting agreement, compared to \$ 147 million and \$ 73 million, respectively, at December 31, 2022. The remaining derivatives included in the preceding table were not subject to a master netting agreement.

Realized and unrealized contract gains and losses on the Company's derivative instruments are reflected in 'net realized gains (losses)' in the consolidated statements of income, as summarized in the following table:

Derivatives not designated as hedging instruments:	June 30,	
	2023	2022
Three Months Ended		
Net realized gains (losses):		
Futures contracts	\$ (25)	\$ (39)
Foreign currency forward contracts	15	(26)
Other (1)	(5)	19
Total	\$ (15)	\$ (46)
Six Months Ended		
Net realized gains (losses):		
Futures contracts	\$ 14	\$ (86)
Foreign currency forward contracts	24	(28)
Other (1)	3	44
Total	\$ 41	\$ (70)

(1) Includes realized gains and losses on swaps, options and other derivatives contracts .

10. Commitments and Contingencies

Investment Commitments

The Company's investment commitments, which are primarily related to agreements entered into by the Company to invest in funds and separately managed accounts when called upon, were approximately \$ 2.8 billion at June 30, 2023, compared to \$ 2.9 billion at December 31, 2022.

Interest Paid

Interest paid on the Company's senior notes and other borrowings was \$ 63 million for the six months ended June 30, 2023, compared to \$ 65 million for the 2022 period .

11. Variable Interest Entities

Bellemeade Re

The Company has entered into aggregate excess of loss mortgage reinsurance agreements with various special purpose reinsurance companies domiciled in Bermuda (the "Bellemeade Agreements"). At the time the Bellemeade Agreements were entered into, the applicability of the accounting guidance that addresses VIEs was evaluated. As a result of the evaluation of the Bellemeade Agreements, the Company concluded that these entities are VIEs. However, given that the ceding insurers do not have the unilateral power to direct those activities that are significant to their economic performance, the Company does not consolidate such entities in its consolidated financial statements. The Company's on-balance sheet liability was \$ 5 million at June 30, 2023, compared to \$ 2 million at December 31, 2022, while the maximum off-balance sheet exposure to loss was \$ 1.9 million at June 30, 2023, compared to \$ 2.7 million at December 31, 2022. The Company's maximum exposure to loss associated with these VIEs is calculated as the maximum historical observable spread between the benchmark index for each respective transaction and short term invested trust asset yields. The benchmark index for agreements effective prior to 2021 is based on one-month LIBOR, while the benchmark index for 2021 and later agreements is based on the Secured Overnight Financing Rate ("SOFR"). SOFR is a measure of the cost of borrowing cash overnight, collateralized by U.S. Treasury securities, and is based on directly observable U.S. Treasury-backed repurchase transactions.

The following table summarizes the total assets of the Bellemeade entities:

Bellemeade Entities (Issue Date)	June 30, 2023	December 31, 2022	
	Total VIE Assets	Coverage Remaining from Reinsurers (1)	Total VIE Assets
2017-1 Ltd. (Oct-17)	\$ —	\$ —	\$ 37
2018-1 Ltd. (Apr-18)	64	—	90
2018-3 Ltd. (Oct-18)	165	—	199
2019-1 Ltd. (Mar-19)	89	—	108
2019-2 Ltd. (Apr-19)	286	—	325
2019-3 Ltd. (Jul-19)	146	—	223
2019-4 Ltd. (Oct-19)	234	—	266
2020-2 Ltd. (Sep-20)	71	—	105
2020-3 Ltd. (Nov-20)	203	5	244
2020-4 Ltd. (Dec-20)	77	3	98
2021-1 Ltd. (Mar-21)	413	22	467
2021-2 Ltd. (Jun-21)	404	63	458
2021-3 Ltd. (Sep-21)	465	121	490
2022-1 Ltd. (Jan-22)	280	32	284
2022-2 Ltd. (Sep-22)	201	126	201
Total	\$ 3,098	\$ 372	\$ 3,595

(1) Coverage from a separate panel of reinsurers remaining at June 30, 2023.

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (UNAUDITED)

12. Other Comprehensive Income (Loss)

The following tables present details about amounts reclassified from accumulated other comprehensive income and the tax effects allocated to each component of other comprehensive income (loss):

		Amounts Reclassified from AOCI			
Details About AOCI Components	Consolidated Statement of Income Line Item That Includes Reclassification	Three Months Ended		Six Months Ended	
		June 30,		June 30,	
		2023	2022	2023	2022
Unrealized appreciation (decline) on available-for-sale investments					
	Net realized gains (losses)	\$ (147)	\$ (42)	\$ (241)	\$ (130)
	Provision for credit losses	(7)	(25)	(23)	(57)
	Total before tax	(154)	(67)	(264)	(187)
	Income tax (expense) benefit	5	9	16	27
	Net of tax	\$ (149)	\$ (58)	\$ (248)	\$ (160)
		Before Tax Amount	Tax Expense (Benefit)	Net of Tax Amount	
<u>Three Months Ended June 30, 2023</u>					
Unrealized appreciation (decline) in value of investments:					
	Unrealized holding gains (losses) arising during period	\$ (204)	\$ (31)	\$ (173)	
	Less reclassification of net realized gains (losses) included in net income	(154)	(5)	(149)	
	Foreign currency translation adjustments	2	—	2	
	Other comprehensive income (loss)	\$ (48)	\$ (26)	\$ (22)	
<u>Three Months Ended June 30, 2022</u>					
Unrealized appreciation (decline) in value of investments:					
	Unrealized holding gains (losses) arising during period	\$ (676)	\$ (78)	\$ (598)	
	Less reclassification of net realized gains (losses) included in net income	(67)	(9)	(58)	
	Foreign currency translation adjustments	(68)	—	(68)	
	Other comprehensive income (loss)	\$ (677)	\$ (69)	\$ (608)	
<u>Six Months Ended June 30, 2023</u>					
Unrealized appreciation (decline) in value of investments:					
	Unrealized holding gains (losses) arising during period	\$ 77	\$ 5	\$ 72	
	Less reclassification of net realized gains (losses) included in net income	(264)	(16)	(248)	
	Foreign currency translation adjustments	7	—	7	
	Other comprehensive income (loss)	\$ 348	\$ 21	\$ 327	
<u>Six Months Ended June 30, 2022</u>					
Unrealized appreciation (decline) in value of investments:					
	Unrealized holding gains (losses) arising during period	\$ (1,460)	\$ (178)	\$ (1,282)	
	Less reclassification of net realized gains (losses) included in net income	(187)	(27)	(160)	
	Foreign currency translation adjustments	(71)	—	(71)	
	Other comprehensive income (loss)	\$ (1,344)	\$ (151)	\$ (1,193)	

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (UNAUDITED)

13. Income Taxes

The Company's income tax provision on income before income taxes, including income (loss) from operating affiliates, resulted in an effective tax rate of 8.6 % for the six months ended June 30, 2023, compared to 5.3 % for the six months ended June 30, 2022. The Company's effective tax rate, which is based upon the expected annual effective tax rate, may fluctuate from period to period based on the relative mix of income or loss reported by jurisdiction and the varying tax rates in each jurisdiction.

The Company had a net deferred tax asset of \$ 467 million at June 30, 2023, compared to a net deferred tax asset of \$ 531 million at December 31, 2022. The change is primarily a result of market value fluctuations in the Company's investment portfolio. In addition, the Company paid \$ 73 million and \$ 129 million of income taxes for the six months ended June 30, 2023 and 2022, respectively.

14. Legal Proceedings

The Company, in common with the insurance industry in general, is subject to litigation and arbitration in the normal course of its business. As of June 30, 2023, the Company was not a party to any litigation or arbitration which is expected by management to have a material adverse effect on the Company's results of operations and financial condition and liquidity.

15. Transactions with Related Parties

Premia Reinsurance Ltd. is a multi-line Bermuda reinsurance company (and its affiliates together with Premia Holdings Ltd., "Premia"). The Company has entered into certain reinsurance transactions with Premia. For the six months ended June 30, 2023, the Company recorded net premiums written and earned of \$ 75 million, compared to a de minimis amount for the six months ended June 30, 2022. At June 30, 2023, the Company recorded a funds held asset from Premia of \$ 191 million, compared to \$ 119 million at December 31, 2022.

Somers Group Holdings Ltd. and its wholly owned subsidiaries (collectively, "Somers") are wholly owned by Greysbridge. The Company has entered into certain reinsurance transactions with Somers. For the six months ended June 30, 2023, the Company's net premiums written was reduced by \$ 314 million, compared to \$ 347 million for the six months ended June 30, 2022. In addition, Somers paid certain acquisition costs and administrative fees to the Company. At June 30, 2023, the Company recorded a reinsurance recoverable on unpaid and paid losses from Somers of \$ 1.3 billion and a reinsurance balance payable to Somers of \$ 485 million, compared to \$ 1.2 billion and \$ 414 million, respectively, at December 31, 2022.

ITEM 2. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following is a discussion and analysis of our financial condition and results of operations. This should be read in conjunction with our consolidated financial statements included in Item 1 of this report and also our Management's Discussion and Analysis of Financial Condition and Results of Operations contained in our Annual Report on Form 10-K for the year ended December 31, 2022 ("2022 Form 10-K"). In addition, readers should review "Risk Factors" set forth in Item 1A of Part I of our 2022 Form 10-K and ["ITEM 1A—Risk Factors"](#) of this Form 10-Q. All amounts are in millions, except per share amounts, unless otherwise noted.

Arch Capital Group Ltd. ("Arch Capital" and, together with its subsidiaries, "Arch", "we", "our" or "us") is a publicly listed Bermuda exempted company with approximately \$17.4 billion in capital at June 30, 2023 and, through operations in Bermuda, the United States, Europe, Canada and Australia, writes insurance, reinsurance and mortgage insurance on a worldwide basis.

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CURRENT OUTLOOK

Our objective in 2023 remains the same, to deliver long term value for our shareholders. Through our commitment to underwriting acumen, prudent reserving and cycle-focused capital allocation, we were able to deliver another quarter of profitable growth with each segment generating over \$100 million of underwriting results. The 2023 second quarter financial highlights included book value per share growth of 4.8% and an annualized net income and operating return on average common equity of 19.6% and 21.5%, respectively. See ["Comment on Non-GAAP Financial Measures."](#)

Our property and casualty underwriting teams continue to lean into attractive market conditions where excellent risk-adjusted returns remain available. The property and casualty environment continues to offer opportunities, as evidenced by the growth in our premiums written. We continue to execute our cycle management strategy by actively allocating capital to the sectors where rates allow for returns that are higher than our cost of capital.

Being an effective underwriting cycle manager means that our underwriters know that they have degrees of freedom in choosing to deploy capital across our diversified, specialty-focused platform. Our belief is that, because we have a wide range of choices to allocate underwriting capital at any time, we can generate more consistent and stable underwriting income over the long run.

In our insurance segment, we continue to take advantage of favorable market conditions. Our results reflect the compound rate increases captured over the last several years for most property and casualty lines. Although there are lines where pricing has declined, such as large public D&O lines, the property and casualty markets generally continue to provide adequate returns.

In the reinsurance property market, renewals saw significant improvement in rate adequacy and we were ready to provide valuable capacity to our clients. Overall exposure to property catastrophe risk remains well within our threshold and, because of our diversified portfolio and broad set of opportunities, we retain the flexibility to pursue the most attractive returns across lines and geographies.

Inflation continues to be a focus for our industry. We proactively analyze available data and we incorporate emerging trends into our pricing and reserving. We believe that this discipline, coupled with increases in future investment returns and prudent reserving, helps us somewhat mitigate inflation's impact.

Our mortgage segment operates on a different cycle than the property and casualty segments but remains a significant contributor to earnings, generating \$253 million of underwriting income in the 2023 second quarter. Our

mortgage portfolio was shaped with a focus on credit quality and data-driven risk selection as demonstrated by our 1.61% delinquency rate at June 30, 2023, the lowest level since the onset of the COVID pandemic. Our disciplined underwriting approach has produced a portfolio with a favorable risk profile, including higher FICO scores and favorable loan-to-value and debt-to-income ratios.

FINANCIAL MEASURES

Management uses the following three key financial indicators in evaluating our performance and measuring the overall growth in value generated for Arch Capital's common shareholders:

Book Value per Share

Book value per share represents total common shareholders' equity available to Arch divided by the number of common shares outstanding. Management uses growth in book value per share as a key measure of the value generated for our common shareholders each period and believes that book value per share is the key driver of Arch Capital's share price over time. Book value per share is impacted by, among other factors, our underwriting results, investment returns and share repurchase activity, which has an accretive or dilutive impact on book value per share depending on the purchase price. Book value per share was \$37.04 at June 30, 2023, compared to \$35.35 at March 31, 2023, and \$31.37 at June 30, 2022. The 4.8% increase in book value per share for the 2023 second quarter reflected strong underwriting results.

Operating Return on Average Common Equity

Operating return on average common equity ("Operating ROAE") represents annualized after-tax operating income available to Arch common shareholders divided by the average of beginning and ending common shareholders' equity available to Arch during the period. After-tax operating income available to Arch common shareholders, a non-GAAP financial measure as defined in Regulation G, represents net income available to Arch common shareholders, excluding net realized gains or losses (which includes changes in the allowance for credit losses on financial assets and net impairment losses recognized in earnings), equity in net income or loss of investment funds accounted for using the equity method, net foreign exchange gains or losses, transaction costs and other, loss on redemption of preferred shares and income taxes. Management uses Operating ROAE as a key measure of the return generated to common shareholders. See ["Comment on Non-GAAP Financial Measures."](#)

Our annualized net income return on average common equity was 19.6% for the 2023 second quarter, compared to 13.3% for the 2022 second quarter, and 21.1% for the six months ended June 30, 2023, compared to 9.5% for the 2022 period. Our Operating ROAE was 21.5% for the 2023 second quarter, compared to 17.1% for the 2022 second quarter, and 21.3% for the six months ended June 30, 2023, compared to 15.3% for the 2022 period. The 2023 periods reflected strong underwriting and investment results, while the 2022 periods reflected strong underwriting results, partially offset by a higher level of net realized losses which included mark-to-market losses on equities.

Total Return on Investments

Total return on investments includes investment income, equity in net income or loss of investment funds accounted for using the equity method, net realized gains and losses (excluding changes in the allowance for credit losses on non-investment related financial assets) and the change in unrealized gains and losses generated by Arch's investment portfolio. Total return is calculated on a pre-tax basis and before investment expenses and reflects the effect of financial market conditions along with foreign currency fluctuations. In addition, total return incorporates the timing of investment returns during the periods. The following table summarizes our total return compared to the benchmark return against which we measured our portfolio during the periods. See ["Comment on Non-GAAP Financial Measures."](#)

	Arch Portfolio	Benchmark Return
Pre-tax total return (before investment expenses):		
2023 Second Quarter	0.56 %	0.68 %
2022 Second Quarter	(3.02)%	(5.37) %
Six Months Ended June 30, 2023	3.10 %	3.33 %
Six Months Ended June 30, 2022	(6.00)%	(9.13) %

Total return for the 2023 periods primarily reflected strong returns in our fixed income portfolio with most of our strategies delivering positive returns. We continue to maintain a relatively short duration on our portfolio of 3.03 years at June 30, 2023. Our interest rate positioning with a slightly shorter duration helped minimize the impact of the increase in interest rates during the quarter.

The benchmark return index is a customized combination of indices intended to approximate a target portfolio by asset mix and average credit quality while also matching the approximate estimated duration and currency mix of our insurance and reinsurance liabilities. Although the estimated duration and average credit quality of this index will move as the duration and rating of its constituent securities change, generally we do not adjust the composition of the benchmark return index except to incorporate changes to the mix of liability currencies and durations noted above. The

benchmark return index should not be interpreted as expressing a preference for or aversion to any particular sector or sector weight. The index is intended solely to provide, unlike many master indices that change based on the size of their constituent indices, a relatively stable basket of investable indices. At June 30, 2023, the benchmark return index had an average credit quality of "A1" by Moody's Investors Service ("Moody's"), and an estimated duration of 2.78 years.

The benchmark return index included weightings to the following indices:

	%
ICE BofA 1-10 Year U.S. Corporate Index	28.50
Yield on 3-5 Year U.S. Treasury Index plus 6%	16.50
ICE BofA 1-10 Year U.S. Treasury Index	15.75
ICE BofA U.S. High Yield Constrained Index	8.00
ICE BofA 1-5 Year U.K. Gilt Index	5.50
JPM CLOIE Investment Grade	4.50
ICE BofA German Government 1-10 Year Index	4.00
S&P 500 Total Return Index	4.00
ICE BofA 0-3 Month U.S. Treasury Index	3.00
ICE BofA U.S. ABS & CMBS Index	3.00
ICE BofA 1-5 Year Canada Government Index	2.50
ICE BofA 1-5 Year Australia Government Index	2.50
ICE BofA U.S. Mortgage Backed Securities Index	1.50
ICE BofA 15+ Year Canada Government Index	0.50
ICE BofA 1-5 Year Japan Government Index	0.25
Total	100.00 %

COMMENT ON NON-GAAP FINANCIAL MEASURES

Throughout this filing, we present our operations in the way that we believe will be the most meaningful and useful to investors, analysts, rating agencies and others who use our financial information in evaluating the performance of our company. This presentation includes the use of after-tax operating income available to Arch common shareholders, which is defined as net income available to Arch common shareholders, excluding net realized gains or losses (which includes changes in the allowance for credit losses on financial assets and net impairment losses recognized in earnings), equity in net income or loss of investment funds accounted for using the equity method, net foreign exchange gains or losses, transaction costs and other, income taxes, and the use of annualized operating return on average common equity. The presentation of after-tax operating income available to Arch common shareholders and annualized operating return on average common equity are non-GAAP financial measures as defined in Regulation G. The reconciliation of such measures to net income available to Arch common shareholders and annualized net income return on average common equity (the most directly comparable

GAAP financial measures) in accordance with Regulation G is included under "Results of Operations" below.

We believe that net realized gains or losses, equity in net income or loss of investment funds accounted for using the equity method, net foreign exchange gains or losses, transaction costs and other in any particular period are not indicative of the performance of, or trends, in our business. Although net realized gains or losses, equity in net income or loss of investment funds accounted for using the equity method and net foreign exchange gains or losses are an integral part of our operations, the decision to realize these items, are independent of the insurance underwriting process and result, in large part, from general economic and financial market conditions. Furthermore, certain users of our financial information believe that, for many companies, the timing of the realization of investment gains or losses is largely opportunistic. In addition, changes in the allowance for credit losses and net impairment losses recognized in earnings on our investments represent other-than-temporary declines in expected recovery values on securities without actual realization.

The use of the equity method on certain of our investments is driven by the ownership structure of such funds (either limited partnerships or limited liability companies). In applying the equity method, these investments are initially recorded at cost and are subsequently adjusted based on our proportionate share of the net income or loss of the funds (which include changes in the market value of the underlying securities in the funds). This method of accounting is different from the way that we account for our other investments and the timing of the recognition of equity in net income or loss of investment funds accounted for using the equity method may differ from gains or losses in the future upon sale or maturity of such investments.

Transaction costs and other include advisory, financing, legal, severance, incentive compensation and other transaction costs related to acquisitions. We believe that transaction costs and other, due to their non-recurring nature, are not indicative of the performance of, or trends in, our business performance.

Due to these reasons, we exclude net realized gains or losses, equity in net income or loss of investment funds accounted for using the equity method, net foreign exchange gains or losses and transaction costs and other from the calculation of after-tax operating income available to Arch common shareholders.

We believe that showing net income available to Arch common shareholders exclusive of the items referred to above reflects the underlying fundamentals of our business since we evaluate the performance of and manage our business to produce an underwriting profit. In addition to presenting the net income available to Arch common shareholders, we believe that this presentation enables

investors and other users of our financial information to analyze our performance in a manner similar to how management analyzes performance. We also believe that this measure follows industry practice and, therefore, allows the users of financial information to compare our performance with our industry peer group. We believe that the equity analysts and certain rating agencies which follow us and the insurance industry as a whole generally exclude these items from their analyses for the same reasons.

Our segment information includes the presentation of consolidated underwriting income or loss. Such measures represent the pre-tax profitability of our underwriting operations and include net premiums earned plus other underwriting income, less losses and loss adjustment expenses, acquisition expenses and other operating expenses. Other operating expenses include those operating expenses that are incremental and/or directly attributable to our individual underwriting operations. Underwriting income or loss does not incorporate items included in our corporate segment. While these measures are presented in [note 4, "Segment Information,"](#) of the notes accompanying our consolidated financial statements, they are considered non-GAAP financial measures when presented elsewhere on a consolidated basis. The reconciliations of underwriting income or loss to income before income taxes (the most directly comparable GAAP financial measure) on a consolidated basis, in accordance with Regulation G, is shown in [note 4, "Segment Information"](#) to our consolidated financial statements.

We measure segment performance for our three underwriting segments based on underwriting income or loss. We do not manage our assets by underwriting segment, with the exception of goodwill and intangibles and, accordingly, investment income and other non-underwriting related items are not allocated to each underwriting segment.

Our presentation of segment information includes the use of a current year loss ratio which excludes favorable or adverse development in prior year loss reserves. This ratio is a non-GAAP financial measure as defined in Regulation G. The reconciliation of such measure to the loss ratio (the most directly comparable GAAP financial measure) in accordance with Regulation G is shown on the individual segment pages. Management utilizes the current year loss ratio in its analysis of the underwriting performance of each of our underwriting segments.

Total return on investments includes investment income, equity in net income or loss of investment funds accounted for using the equity method, net realized gains and losses (excluding changes in the allowance for credit losses on non-investment related financial assets) and the change in unrealized gains and losses generated by Arch's investment portfolio. Total return is calculated on a pre-tax basis and before investment expenses, and reflects the effect of

financial market conditions along with foreign currency fluctuations. In addition, total return incorporates the timing of investment returns during the periods. There is no directly comparable GAAP financial measure for total return. Management uses total return on investments as a key measure of the return generated to Arch common shareholders, and compares the return generated by our investment portfolio against benchmark returns during the periods.

RESULTS OF OPERATIONS

The following table summarizes our consolidated financial data, including a reconciliation of net income or loss available to Arch common shareholders to after-tax operating income or loss available to Arch common shareholders. See ["Comment on Non-GAAP Financial Measures."](#)

	Three Months Ended		Six Months Ended	
	June 30,		June 30,	
	2023	2022	2023	2022
Net income available to Arch common shareholders	\$ 661	\$ 394	\$ 1,366	\$ 580
Net realized (gains) losses	123	267	106	559
Equity in net (income) loss of investment funds accounted for using the equity method	(69)	(58)	(117)	(94)
Net foreign exchange (gains) losses	6	(88)	24	(92)
Transaction costs and other	2	—	1	—
Income tax expense (benefit) (1)	3	(9)	—	(25)
After-tax operating income available to Arch common shareholders	\$ 726	\$ 506	\$ 1,380	\$ 928
Beginning common shareholders' equity	\$ 13,158	\$ 12,090	\$ 12,080	\$ 12,716
Ending common shareholders' equity	13,811	11,588	13,811	11,588
Average common shareholders' equity	\$ 13,485	\$ 11,839	\$ 12,946	\$ 12,152
Annualized net income return on average common equity %	19.6	13.3	21.1	9.5
Annualized operating return on average common equity %	21.5	17.1	21.3	15.3

(1) Income tax expense on net realized gains or losses, equity in net income or loss of investment funds accounted for using the equity method, net foreign exchange gains or losses and transaction costs and other reflects the relative mix reported by jurisdiction and the varying tax rates in each jurisdiction.

Segment Information

We classify our businesses into three underwriting segments: insurance, reinsurance and mortgage. Our insurance, reinsurance and mortgage segments each have managers who are responsible for the overall profitability of their respective segments and who are directly accountable to our chief operating decision makers. The Chief Executive Officer, the Chief Financial Officer and Treasurer and the President and Chief Underwriting Officer are the Company's chief operating decision makers. They do not assess performance, measure return on equity or make resource allocation decisions on a line of business basis. Management measures segment performance for our three underwriting segments based on underwriting income or loss. We do not manage our assets by underwriting segment, with the exception of goodwill and intangible assets, and accordingly, investment income is not allocated to each underwriting segment.

We determined our reportable segments using the management approach described in accounting guidance regarding disclosures about segments of an enterprise and related information. The accounting policies of the segments are the same as those used for the preparation of our consolidated financial statements. Intersegment business is allocated to the segment accountable for the underwriting results.

Insurance Segment

The following tables set forth our insurance segment's underwriting results:

	Three Months Ended June 30,		
	2023	2022	% Change
Gross premiums written	\$ 1,955	\$ 1,705	14.7
Premiums ceded	(501)	(477)	
Net premiums written	1,454	1,228	18.4
Change in unearned premiums	(126)	(126)	
Net premiums earned	1,328	1,102	20.5
Losses and loss adjustment expenses	(761)	(630)	
Acquisition expenses	(264)	(214)	
Other operating expenses	(195)	(161)	
Underwriting income (loss)	\$ 108	\$ 97	11.3
Underwriting Ratios			% Point Change
Loss ratio	57.3 %	57.1 %	0.2
Acquisition expense ratio	19.9 %	19.4 %	0.5
Other operating expense ratio	14.7 %	14.6 %	0.1
Combined ratio	91.9 %	91.1 %	0.8

	Six Months Ended June 30,		
	2023	2022	% Change
Gross premiums written	\$ 3,934	\$ 3,425	14.9
Premiums ceded	(1,043)	(990)	
Net premiums written	2,891	2,435	18.7
Change in unearned premiums	(306)	(306)	
Net premiums earned	2,585	2,129	21.4
Losses and loss adjustment expenses	(1,464)	(1,231)	
Acquisition expenses	(509)	(410)	
Other operating expenses	(390)	(328)	
Underwriting income (loss)	\$ 222	\$ 160	38.8
Underwriting Ratios			% Point Change
Loss ratio	56.6 %	57.8 %	(1.2)
Acquisition expense ratio	19.7 %	19.2 %	0.5
Other operating expense ratio	15.1 %	15.4 %	(0.3)
Combined ratio	91.4 %	92.4 %	(1.0)

The insurance segment consists of our insurance underwriting units which offer specialty product lines on a worldwide basis. Product lines include:

Construction and national accounts: primary and excess casualty coverages for middle market and large construction accounts, a comprehensive range of products for middle market accounts in specialty industries and casualty solutions for large national accounts, including loss sensitive primary insurance programs (large deductible, self-insured retention and retrospectively rated programs).

Excess and surplus casualty: primary and excess casualty insurance coverages written on a non-admitted basis.

Professional lines: directors' and officers' liability, errors and omissions liability, employment practices liability, fiduciary liability, crime, professional indemnity and other financial related coverages for corporate, private equity, venture capital, real estate investment trust, limited partnership, financial institution and not-for-profit clients of all sizes, cyber insurance, and medical professional and general liability insurance coverages for the healthcare industry. The business is predominately written on a claims-made basis.

Programs: primarily targeting program managers with unique expertise and niche products offering some combination of general liability, commercial automobile, property, inland marine, umbrella and workers' compensation.

Property, energy, marine and aviation: primary and excess general property insurance coverages, including catastrophe-exposed property coverage, for commercial clients. Coverages for marine include hull, cargo, war, specie and liability. Aviation, stand-alone terrorism and political risks

are also offered. Coverage may be provided for operational and construction risk.

Travel, accident and health: specialty travel and accident and related insurance products for individual, group travelers, travel agents and suppliers, as well as accident and health, which provides accident, disability and medical plan insurance coverages for employer groups, medical plan members, students and other participant groups.

Warranty and lenders solutions: collateral protection, debt cancellation and service contract reimbursement products to banks, credit unions, automotive dealerships and original equipment manufacturers and other specialty programs that pertain to automotive lending and leasing.

Other: includes alternative market risks (including captive insurance programs), excess workers' compensation and employer's liability insurance coverages for qualified self-insured groups, associations and trusts, and contract, commercial and transactional surety coverages.

Premiums Written.

The following tables set forth our insurance segment's net premiums written by major line of business:

	Three Months Ended June 30,			
	2023		2022	
	Amount	%	Amount	%
Professional lines	\$ 342	23.5	\$ 349	28.4
Property, energy, marine and aviation	320	22.0	246	20.0
Programs	210	14.4	163	13.3
Construction and national accounts	144	9.9	101	8.2
Excess and surplus casualty	135	9.3	121	9.9
Travel, accident and health	126	8.7	106	8.6
Warranty and lenders solutions	42	2.9	36	2.9
Other	135	9.3	106	8.6
Total	\$ 1,454	100.0	\$ 1,228	100.0

2023 Second Quarter versus 2022 Period. Gross premiums written by the insurance segment in the 2023 second quarter were 14.7% higher than in the 2022 second quarter, while net premiums written were 18.4% higher. Growth in net premiums written reflected increases in most lines of business, due in part to new business opportunities, increases in existing accounts and rate changes. In addition, the insurance segment retained more business in the 2023 second quarter than in the 2022 second quarter.

	Six Months Ended June 30,			
	2023		2022	
	Amount	%	Amount	%
Professional lines	\$ 670	23.2	\$ 697	28.6
Property, energy, marine and aviation	595	20.6	447	18.4
Programs	351	12.1	292	12.0
Construction and national accounts	317	11.0	237	9.7
Excess and surplus casualty	266	9.2	221	9.1
Travel, accident and health	306	10.6	271	11.1
Warranty and lenders solutions	131	4.5	61	2.5
Other	255	8.8	209	8.6
Total	\$ 2,891	100.0	\$ 2,435	100.0

Six Months Ended June 30, 2023 versus 2022 period. Gross premiums written by the insurance segment for the six months ended June 30, 2023 were 14.9% higher than in the 2022 period, while net premiums written were 18.7% higher than in the 2022 period. The increase in net premiums written reflected growth in most lines of business, primarily due to rate increases, new business opportunities and growth in existing accounts. In addition, the insurance segment retained more business in the 2023 period than in the 2022.

Net Premiums Earned.

The following tables set forth our insurance segment's net premiums earned by major line of business:

	Three Months Ended June 30,			
	2023		2022	
	Amount	%	Amount	%
Professional lines	\$ 355	26.7	\$ 314	28.5
Property, energy, marine and aviation	237	17.8	181	16.4
Programs	162	12.2	149	13.5
Construction and national accounts	133	10.0	99	9.0
Excess and surplus casualty	116	8.7	98	8.9
Travel, accident and health	147	11.1	130	11.8
Warranty and lenders solutions	49	3.7	28	2.5
Other	129	9.7	103	9.3
Total	\$ 1,328	100.0	\$ 1,102	100.0

	Six Months Ended June 30,			
	2023		2022	
	Amount	%	Amount	%
Professional lines	\$ 704	27.2	\$ 604	28.4
Property, energy, marine and aviation	464	17.9	355	16.7
Programs	306	11.8	289	13.6
Construction and national accounts	259	10.0	196	9.2
Excess and surplus casualty	227	8.8	189	8.9
Travel, accident and health	275	10.6	235	11.0
Warranty and lenders solutions	99	3.8	59	2.8
Other	251	9.7	202	9.5
Total	\$ 2,585	100.0	\$ 2,129	100.0

Net premiums written are primarily earned on a pro rata basis over the terms of the policies for all products, usually 12 months. Net premiums earned reflect changes in net premiums written over the previous five quarters. For the 2023 second quarter, net premiums earned were 20.5% higher than in the 2022 second quarter. Net premiums earned for the six months ended June 30, 2023 were 21.4% higher than in the 2022 period.

Losses and Loss Adjustment Expenses.

The table below shows the components of the insurance segment's loss ratio:

	Three Months Ended		Six Months Ended	
	June 30,		June 30,	
	2023	2022	2023	2022
Current year	58.2 %	57.7 %	57.5 %	58.5 %
Prior period reserve development	(0.9) %	(0.6) %	(0.9) %	(0.7) %
Loss ratio	57.3 %	57.1 %	56.6 %	57.8 %

Current Year Loss Ratio.

2023 Second Quarter versus 2022 Period. The insurance segment's current year loss ratio in the 2023 second quarter was 0.5 points higher than in the 2022 second quarter. The 2023 second quarter loss ratio reflected 2.7 points of current year catastrophic activity, spread across a series of global events, compared to 1.2 points of catastrophic activity for the 2022 second quarter.

Six Months Ended June 30, 2023 versus 2022 Period. The insurance segment's current year loss ratio for the six months ended June 30, 2023 was 1.0 points lower than in the 2022 period and reflected 2.1 points of current year catastrophic activity, spread across series of global events, compared to 2.1 points in the 2022 period. The balance of the change in the 2023 loss ratios resulted, in part, from changes in mix of business.

Prior Period Reserve Development.

The insurance segment's net favorable development was \$12 million, or 0.9 points, for the 2023 second quarter, compared to \$7 million, or 0.6 points, for the 2022 second quarter, and \$24 million, or 0.9 points, for the six months ended June 30, 2023, compared to \$14 million, or 0.7 points, for the 2022 period. See [note 5, "Reserve for Losses and Loss Adjustment Expenses,"](#) to our consolidated financial statements for information about the insurance segment's prior year reserve development.

Underwriting Expenses.

2023 Second Quarter versus 2022 Period. The insurance segment's underwriting expense ratio was 34.6% in the 2023 second quarter, compared to 34.0% in the 2022 second quarter, reflecting higher acquisition expenses which were primarily due to lower ceding commissions received as the insurance segment retained more business, along with changes in mix of business.

Six Months Ended June 30, 2023 versus 2022 period . The insurance segment's underwriting expense ratio was 34.8% for the six months ended June 30, 2023, compared to 34.6% for the 2022 period, with the increase primarily due to lower ceding commissions received as the insurance segment retained more business, along with changes in mix of business.

Reinsurance Segment

The following tables set forth our reinsurance segment's underwriting results:

	Three Months Ended June 30,		
	2023	2022	% Change
Gross premiums written	\$ 2,544	\$ 1,793	41.9
Premiums ceded	(835)	(630)	
Net premiums written	1,709	1,163	46.9
Change in unearned premiums	(366)	(235)	
Net premiums earned	1,343	928	44.7
Other underwriting income (loss)	3	5	
Losses and loss adjustment expenses	(743)	(538)	
Acquisition expenses	(290)	(189)	
Other operating expenses	(68)	(66)	
Underwriting income (loss)	\$ 245	\$ 140	75.0
Underwriting Ratios			
Loss ratio	55.3 %	57.9 %	(2.6)
Acquisition expense ratio	21.6 %	20.4 %	1.2
Other operating expense ratio	5.0 %	7.1 %	(2.1)
Combined ratio	81.9 %	85.4 %	(3.5)

	Six Months Ended June 30,		
	2023	2022	% Change
Gross premiums written	\$ 5,004	\$ 3,512	42.5
Premiums ceded	(1,569)	(1,210)	
Net premiums written	3,435	2,302	49.2
Change in unearned premiums	(762)	(570)	
Net premiums earned	2,673	1,732	54.3
Other underwriting income	7	6	
Losses and loss adjustment expenses	(1,509)	(992)	
Acquisition expenses	(571)	(361)	
Other operating expenses	(142)	(136)	
Underwriting income (loss)	\$ 458	\$ 249	83.9
Underwriting Ratios			
Loss ratio	56.5 %	57.3 %	(0.8)
Acquisition expense ratio	21.3 %	20.9 %	0.4
Other operating expense ratio	5.3 %	7.8 %	(2.5)
Combined ratio	83.1 %	86.0 %	(2.9)

The reinsurance segment consists of our reinsurance underwriting units which offer specialty product lines on a worldwide basis. Reinsurance agreements are typically offered on a proportional and/or excess of loss basis and provide coverage to ceding company clients for specific underlying written policies. Product lines include:

Casualty: provides coverage on third party liability exposures including, among others, executive assurance, professional liability, excess and umbrella liability, excess motor and healthcare business, and workers' compensation. Business is assumed primarily on a treaty basis, with some facultative coverages also offered.

Marine and aviation: provides coverage for energy, hull, cargo, specie, liability and transit, and aviation business, including airline and general aviation risks. Business written may also include space business, which includes coverages for satellite assembly, launch and operation for commercial space programs.

Other specialty: provides coverage for proportional motor reinsurance, whole account multi-line treaties, cyber, trade credit and surety, accident and health, workers' compensation catastrophe, agriculture and political risk, among others.

Property catastrophe: provides protection for most types of catastrophic losses, including hurricane, earthquake, flood, tornado, hail and fire, and for other perils on a case-by-case basis. Excess of loss coverages are triggered when aggregate losses and loss adjustment expense from a single occurrence or aggregation of losses from a covered peril exceed the retention specified in the contract.

Property excluding property catastrophe: provides coverage for personal lines and/or commercial property exposures and principally covers buildings, structures, equipment and contents. The primary perils in this business include fire,

explosion, collapse, riot, vandalism, wind, tornado, flood and earthquake. Business is assumed on either a treaty basis or facultative basis.

Other: includes life reinsurance business, casualty clash business and, in limited instances, non-traditional business which is intended to provide insurers with risk management solutions that complement traditional reinsurance.

Premiums Written.

The following tables set forth our reinsurance segment's net premiums written by major line of business:

	Three Months Ended June 30,			
	2023		2022	
	Amount	%	Amount	%
Other specialty	\$ 479	28.0	\$ 435	37.4
Property catastrophe	469	27.4	154	13.2
Property excluding property catastrophe	457	26.7	299	25.7
Casualty	231	13.5	213	18.3
Marine and aviation	55	3.2	35	3.0
Other	18	1.1	27	2.3
Total	\$ 1,709	100.0	\$ 1,163	100.0

2023 Second Quarter versus 2022 Period. Gross premiums written by the reinsurance segment in the 2023 second quarter were 41.9% higher than in the 2022 second quarter, while net premiums written were 46.9% higher. Growth in net premiums written primarily reflected increases in property catastrophe, property excluding property catastrophe and other specialty lines, due in part to rate increases, new business opportunities and growth in existing accounts. In addition, the 2023 second quarter net premiums written reflected a lower level of retrocession activity than in the 2022 second quarter.

	Six Months Ended June 30,			
	2023		2022	
	Amount	%	Amount	%
Other specialty	\$ 1,098	32.0	\$ 799	34.7
Property catastrophe	726	21.1	283	12.3
Property excluding property catastrophe	903	26.3	594	25.8
Casualty	514	15.0	479	20.8
Marine and aviation	154	4.5	87	3.8
Other	40	1.2	60	2.6
Total	\$ 3,435	100.0	\$ 2,302	100.0

Six Months Ended June 30, 2023 versus 2022 period . Gross premiums written by the reinsurance segment for the six months ended June 30, 2023 were 42.5% higher than in the 2022 period, while net premiums written were 49.2% higher than in the 2022 period. The increase in net premiums written reflected growth in most lines of business, primarily due to new business, rate increases and growth in existing accounts. In addition, the net premiums written in the 2023 period

reflected a lower level of retrocession activity than in the 2022 period.

Net Premiums Earned.

The following tables set forth our reinsurance segment's net premiums earned by major line of business:

	Three Months Ended June 30,			
	2023		2022	
	Amount	%	Amount	%
Other specialty	\$ 483	36.0	\$ 284	30.6
Property catastrophe	169	12.6	95	10.2
Property excluding property catastrophe	358	26.7	266	28.7
Casualty	258	19.2	215	23.2
Marine and aviation	56	4.2	42	4.5
Other	19	1.4	26	2.8
Total	\$ 1,343	100.0	\$ 928	100.0

	Six Months Ended June 30,			
	2023		2022	
	Amount	%	Amount	%
Other specialty	\$ 994	37.2	\$ 516	29.8
Property catastrophe	308	11.5	172	9.9
Property excluding property catastrophe	712	26.6	498	28.8
Casualty	511	19.1	413	23.8
Marine and aviation	107	4.0	84	4.8
Other	41	1.5	49	2.8
Total	\$ 2,673	100.0	\$ 1,732	100.0

Net premiums written, irrespective of the class of business, are generally earned on a pro rata basis over the terms of the underlying policies or reinsurance contracts. Net premiums earned by the reinsurance segment in the 2023 second quarter were 44.7% higher than in the 2022 second quarter, and reflect changes in net premiums written over the previous five quarters. Net premiums earned for the six months ended June 30, 2023 were 54.3% higher than in the 2022 period.

Other Underwriting Income (Loss).

Other underwriting income for the 2023 second quarter was \$3 million, compared to \$5 million for the 2022 second quarter, and \$7 million for the six months ended June 30, 2023, compared to \$6 million for the 2022 period.

Losses and Loss Adjustment Expenses.

The table below shows the components of the reinsurance segment's loss ratio:

	Three Months Ended		Six Months Ended	
	June 30,		June 30,	
	2023	2022	2023	2022
Current year	57.5 %	62.9 %	59.5 %	61.9 %
Prior period reserve development	(2.2) %	(5.0) %	(3.0) %	(4.6) %
Loss ratio	55.3 %	57.9 %	56.5 %	57.3 %

Current Year Loss Ratio.

2023 Second Quarter versus 2022 Period. The reinsurance segment's current year loss ratio in the 2023 second quarter was 5.4 points lower than in the 2022 second quarter. The 2023 second quarter loss ratio reflected 6.7 points of current year catastrophic activity spread across a series of global events. The 2022 second quarter included 7.5 points of current year catastrophic activity, primarily due to a series of natural events outside the U.S.

Six Months Ended June 30, 2023 versus 2022 Period. The reinsurance segment's current year loss ratio for the six months ended June 30, 2023 was 2.4 points lower than in the 2022 period and reflected 6.1 points of current year catastrophic activity, compared to 7.0 points in the 2022 period. The improvement in the 2023 current year loss ratio reflected the impact of rate increases and changes in mix of business.

Prior Period Reserve Development.

The reinsurance segment's net favorable development was \$29 million, or 2.2 points, for the 2023 second quarter, compared to \$46 million, or 5.0 points, for the 2022 second quarter, and \$82 million, or 3.0 points, for the six months ended June 30, 2023, compared to \$78 million, or 4.6 points, for the 2022 period. See [note 5, "Reserve for Losses and Loss Adjustment Expenses,"](#) to our consolidated financial statements for information about the reinsurance segment's prior year reserve development.

Underwriting Expenses.

2023 Second Quarter versus 2022 Period. The underwriting expense ratio for the reinsurance segment was 26.6% in the 2023 second quarter, compared to 27.5% in the 2022 second quarter, with the decrease primarily due to growth in net premiums earned.

Six Months Ended June 30, 2023 versus 2022 period . The underwriting expense ratio for the reinsurance segment was 26.6% for the six months ended June 30, 2023, compared to 28.7% for the 2022 period, with the decrease primarily due to growth in net premiums earned.

Mortgage Segment

Our mortgage operations include U.S. and international mortgage insurance and reinsurance operations as well as participation in GSE credit risk-sharing transactions.

The following tables set forth our mortgage segment's underwriting results:

	Three Months Ended June 30,		
	2023	2022	% Change
Gross premiums written	\$ 347	\$ 372	(6.7)
Premiums ceded	(82)	(78)	
Net premiums written	265	294	(9.9)
Change in unearned premiums	29	2	
Net premiums earned	294	296	(0.7)
Other underwriting income	3	(2)	
Losses and loss adjustment expenses	13	65	
Acquisition expenses	(7)	(10)	
Other operating expenses	(50)	(50)	
Underwriting income	\$ 253	\$ 299	(15.4)

	% Point Change		
Underwriting Ratios			
Loss ratio	(4.5)%	(21.9)%	17.4
Acquisition expense ratio	2.4 %	3.4 %	(1.0)
Other operating expense ratio	17.1 %	17.0 %	0.1
Combined ratio	15.0 %	(1.5)%	16.5

	Six Months Ended June 30,		
	2023	2022	% Change
Gross premiums written	\$ 690	\$ 737	(6.4)
Premiums ceded	(164)	(155)	
Net premiums written	526	582	(9.6)
Change in unearned premiums	64	4	
Net premiums earned	590	586	0.7
Other underwriting income	9	3	
Losses and loss adjustment expenses	11	119	
Acquisition expenses	(14)	(20)	
Other operating expenses	(100)	(103)	
Underwriting income	\$ 496	\$ 585	(15.2)

	% Point Change		
Underwriting Ratios			
Loss ratio	(1.9)%	(20.4)%	18.5
Acquisition expense ratio	2.4 %	3.5 %	(1.1)
Other operating expense ratio	17.0 %	17.7 %	(0.7)
Combined ratio	17.5 %	0.8 %	16.7

Premiums Written.

The following tables set forth our mortgage segment's net premiums written by major line of business:

	Three Months Ended June 30,			
	2023		2022	
	Amount	%	Amount	%
U.S. primary mortgage insurance	\$ 186	70.2	\$ 198	67.3
U.S. credit risk transfer (CRT) and other	54	20.4	49	16.7
International mortgage insurance/reinsurance	25	9.4	47	16.0
Total	\$ 265	100.0	\$ 294	100.0

2023 Second Quarter versus 2022 Period. Gross premiums written by the mortgage segment in the 2023 second quarter were 6.7% lower than in the 2022 second quarter, while net premiums written were 9.9% lower. The reduction in gross premiums written primarily reflected lower originations in the Australian market and a decrease in U.S. primary mortgage insurance business, which was partially offset by a higher volume of credit risk transfer transactions. Net premiums written for the 2023 second quarter reflected a higher level of ceded premiums through quota share reinsurance agreements than in the 2022 second quarter.

	Six Months Ended June 30,			
	2023		2022	
	Amount	%	Amount	%
U.S. primary mortgage insurance	\$ 372	70.7	\$ 397	68.2
U.S. credit risk transfer (CRT) and other	107	20.3	92	15.8
International mortgage insurance/reinsurance	47	8.9	93	16.0
Total	\$ 526	100.0	\$ 582	100.0

Six Months Ended June 30, 2023 versus 2022 Period . Gross premiums written by the mortgage segment for the six months ended June 30, 2023 were 6.4% lower than in the 2022 period. The reduction in gross premiums written primarily reflected lower originations in the Australian market and a decrease in U.S. primary mortgage insurance business, which was partially offset by a higher volume of credit risk transfer transactions. Net premiums written for the six months ended June 30, 2023 were 9.6% lower than in the 2022 period and reflected a higher level of premiums ceded than in the 2022 period.

The persistency rate, which represents the percentage of mortgage insurance in force at the beginning of a 12-month period that remains in force at the end of such period, was 83.0% for the Arch MI U.S. portfolio of mortgage insurance policies at June 30, 2023, reflecting a lower level of mortgage refinancing activity, compared to 71.3% at June 30, 2022.

The following tables provide details on the new insurance written ("NIW") generated by Arch MI U.S. NIW represents the original principal balance of all loans that received coverage during the period.

	Three Months Ended June 30,			
	2023		2022	
	Amount	%	Amount	%
Total new insurance written (NIW) (1)	\$ 12,292		\$ 23,499	
Credit quality (FICO):				
>=740	\$ 8,151	66.3	\$ 16,121	68.6
680-739	3,832	31.2	6,800	28.9
620-679	308	2.5	576	2.5
<620	1	0.0	2	0.0
Total	\$ 12,292	100.0	\$ 23,499	100.0

Loan-to-value (LTV):				
95.01% and above	\$ 635	5.2	\$ 1,195	5.1
90.01% to 95.00%	6,855	55.8	13,290	56.6
85.01% to 90.00%	3,516	28.6	6,591	28.0
85.00% and below	1,286	10.5	2,423	10.3
Total	\$ 12,292	100.0	\$ 23,499	100.0

Monthly vs. single:				
Monthly	\$ 11,870	96.6	\$ 22,872	97.3
Single	422	3.4	627	2.7
Total	\$ 12,292	100.0	\$ 23,499	100.0

Purchase vs. refinance:				
Purchase	\$ 12,063	98.1	\$ 23,059	98.1
Refinance	229	1.9	440	1.9
Total	\$ 12,292	100.0	\$ 23,499	100.0

(1) Represents the original principal balance of all loans that received coverage during the period.

	Six Months Ended June 30,			
	2023		2022	
	Amount	%	Amount	%
Total new insurance written (NIW) (1)	\$ 22,686		\$ 43,514	
Credit quality (FICO):				
>=740	\$ 14,823	65.3	\$ 29,273	67.3
680-739	7,322	32.3	13,054	30.0
620-679	537	2.4	1,182	2.7
<620	4	—	5	—
Total	\$ 22,686	100.0	\$ 43,514	100.0

Loan-to-value (LTV):				
95.01% and above	\$ 1,154	5.1	\$ 2,291	5.3
90.01% to 95.00%	12,898	56.9	24,068	55.3
85.01% to 90.00%	6,288	27.7	12,324	28.3
85.01% and below	2,346	10.3	4,831	11.1
Total	\$ 22,686	100.0	\$ 43,514	100.0

Monthly vs. single:				
Monthly	\$ 21,976	96.9	\$ 42,073	96.7
Single	710	3.1	1,441	3.3
Total	\$ 22,686	100.0	\$ 43,514	100.0

Purchase vs. refinance:

Purchase	\$	22,264	98.1	\$	42,216	97.0
Refinance		422	1.9		1,298	3.0
Total	\$	22,686	100.0	\$	43,514	100.0

(1) Represents the original principal balance of all loans that received coverage during the period.

Net Premiums Earned.

The following tables set forth our mortgage segment's net premiums earned by major line of business:

	Three Months Ended June 30,			
	2023		2022	
	Amount	%	Amount	%
U.S. primary mortgage insurance	\$ 194	66.0	\$ 206	69.6
U.S. credit risk transfer (CRT) and other	54	18.4	49	16.6
International mortgage insurance/reinsurance	46	15.6	41	13.9
Total	\$ 294	100.0	\$ 296	100.0

2023 Second Quarter versus 2022 Period. Net premiums earned for the 2023 second quarter were 0.7% lower than in the 2022 second quarter, primarily due to higher ceded premiums and a decrease in U.S. primary mortgage insurance business, which was partially offset by the growth in credit risk transfer and international business.

	Six Months Ended June 30,			
	2023		2022	
	Amount	%	Amount	%
U.S. primary mortgage insurance	\$ 390	66.1	\$ 413	70.5
U.S. credit risk transfer (CRT) and other	107	18.1	92	15.7
International mortgage insurance/reinsurance	93	15.8	81	13.8
Total	\$ 590	100.0	\$ 586	100.0

Six Months Ended June 30, 2023 versus 2022 Period . For the six months ended June 30, 2023, net premiums earned were 0.7% higher than in the 2022 period, primarily due to growth in credit risk transfer and international business, which was partially offset by higher ceded premiums and lower single premium policy terminations on U.S. primary mortgage insurance.

Other Underwriting Income (Loss).

Other underwriting income, which is primarily related to GSE credit risk-sharing transactions and our whole mortgage loan purchase and sell program was \$3 million for the 2023 second quarter, compared to a loss of \$2 million for the 2022 second quarter.

Losses and Loss Adjustment Expenses.

The table below shows the components of the mortgage segment's loss ratio:

	Three Months Ended		Six Months Ended	
	June 30,		June 30,	
	2023	2022	2023	2022
Current year	22.7 %	18.0 %	23.7 %	17.2 %
Prior period reserve development	(27.2)%	(39.9)%	(25.6)%	(37.6)%
Loss ratio	(4.5)%	(21.9)%	(1.9)%	(20.4)%

Current Year Loss Ratio.

2023 Second Quarter versus 2022 Period. The mortgage segment's current year loss ratio was 4.7 points higher in the 2023 second quarter than in the 2022 second quarter. The higher current year loss ratio for the 2023 second quarter reflected higher level of new delinquencies than in the 2022 second quarter.

Six Months Ended June 30, 2023 versus 2022 Period . The mortgage segment's current year loss ratio was 6.5 points higher for the six months ended June 30, 2023 than for the 2022 period. The higher current year loss ratio for the 2023 period reflected higher level of new delinquencies than in the 2022 period.

Prior Period Reserve Development.

The mortgage segment's net favorable development was \$80 million, or 27.2 points, for the 2023 second quarter, compared to \$118 million, or 39.9 points, for the 2022 second quarter, and \$151 million, or 25.6 points, for the six months ended June 30, 2023, compared to \$220 million, or 37.6 points, for the 2022 period. See [note 5, "Reserve for Losses and Loss Adjustment Expenses,"](#) to our consolidated financial statements for information about the mortgage segment's prior year reserve development.

Underwriting Expenses.

2023 Second Quarter versus 2022 Period. The underwriting expense ratio for the mortgage segment was 19.5% in the 2023 second quarter, compared to 20.4% in the 2022 second quarter. The decrease was primarily due to higher profit commissions on ceded U.S. primary mortgage insurance business.

Six Months Ended June 30, 2023 versus 2022 period . The underwriting expense ratio for the mortgage segment was 19.4% for the six months ended June 30, 2023, compared to 21.2% for the 2022 period. The decrease was primarily due to higher profit commissions on ceded U.S. primary mortgage insurance business.

Corporate Segment

The corporate segment results include net investment income, net realized gains or losses (which includes realized and unrealized changes in the fair value of equity securities and assets accounted for using the fair value option, realized and unrealized gains and losses on derivative instruments and changes in the allowance for credit losses on financial assets), equity in net income or loss of investments accounted for using the equity method, other income or loss, corporate expenses, transaction costs and other, amortization of intangible assets, interest expense, net foreign exchange gains or losses, income taxes, income from operating affiliates and items related to our non-cumulative preferred shares.

Net Investment Income.

The components of net investment income were derived from the following sources:

	Three Months Ended		Six Months Ended	
	June 30,		June 30,	
	2023	2022	2023	2022
Fixed maturities	\$ 214	\$ 105	\$ 402	\$ 187
Equity securities	6	6	10	12
Short-term investments	15	4	29	7
Other (1)	25	8	38	20
Gross investment income	260	123	479	226
Investment expenses (2)	(18)	(17)	(38)	(40)
Net investment income	\$ 242	\$ 106	\$ 441	186

(1) Amounts include dividends and other distributions on investment funds, term loan investments, funds held balances, cash balances and other items.

(2) Investment expenses were approximately 0.26% of average invested assets for the 2023 second quarter, compared to 0.27% for the 2022 second quarter, and 0.26% for the six months ended June 30, 2023, compared to 0.31% for the 2022 period.

The higher level of net investment income for the 2023 second quarter was primarily related to higher yields available in the financial market. The pre-tax investment income yield, calculated based on amortized cost and on an annualized basis, was 3.50% for the 2023 second quarter, compared to 1.76% for the 2022 second quarter, and 3.33% for the six months ended June 30, 2023, compared to 1.54% for the 2022 period.

Corporate Expenses.

Corporate expenses were \$20 million for the 2023 second quarter, compared to \$28 million for the 2022 second quarter, and \$49 million for the six months ended June 30, 2023, compared to \$60 million for the 2022 period. The decrease in corporate expenses in the 2023 periods was primarily due to lower incentive compensation costs.

Other Income or Losses.

Other income for the 2023 second quarter was \$3 million, compared to a loss of \$12 million for the 2022 second quarter, and income of \$14 million for the six months ended June 30, 2023, compared to a loss of \$21 million for the 2022 period. Amounts in both periods primarily reflect changes in the cash surrender value of our investment in corporate-owned life insurance.

Amortization of Intangible Assets.

Amortization of intangible assets for the 2023 second quarter was \$24 million, compared to \$27 million for the 2022 second quarter, and \$47 million for the six months ended June 30, 2023, compared to \$54 million for the 2022 period. Amounts in both periods primarily attributed to amortization of finite-lived intangible assets.

Interest Expense.

Interest expense was \$33 million for the 2023 second quarter, consistent with the \$33 million for the 2022 second quarter, and \$65 million for the six months ended June 30, 2023, compared to \$66 million for the 2022 period. Interest expense primarily reflects amounts related to our outstanding senior notes.

Net Realized Gains or Losses.

We recorded net realized losses of \$123 million for the 2023 second quarter, compared to net realized losses of \$267 million for the 2022 second quarter, and net realized losses of \$106 million for the six months ended June 30, 2023, compared to net realized losses of \$559 million for the 2022 period. Amounts in the 2023 periods reflected sales of investments as well as the impact of financial market movements on the Company's equity securities and investments accounted for under the fair value option method. Currently, our portfolio is actively managed to maximize total return within certain guidelines. The effect of financial market movements on the investment portfolio will directly impact net realized gains and losses as the portfolio is adjusted and rebalanced. Net realized gains or losses from the sale of fixed maturities primarily results from our decisions to reduce credit exposure, to change duration targets, to rebalance our portfolios or due to relative value determinations.

Net realized gains or losses also include realized and unrealized contract gains and losses on our derivative instruments, changes in the fair value of assets accounted for using the fair value option and in the fair value of equities, along with changes in the allowance for credit losses on financial assets and net impairment losses recognized in earnings. See [note 7, "Investment Information—Net Realized Gains \(Losses\)"](#) and [note 7, "Investment Information—Allowance for Expected Credit Losses."](#) to our consolidated financial statements for additional information.

Equity in Net Income or Losses of Investment Funds Accounted for Using the Equity Method.

Equity in net income of investment funds accounted for using the equity method was \$69 million in the 2023 second quarter, compared to income of \$58 million for the 2022 second quarter, and income of \$117 million for the six months ended June 30, 2023, compared to income of \$94 million for the 2022 period. Such investments are generally recorded on a one to three month lag based on the availability of reports from the investment funds. Investment funds accounted for using the equity method totaled \$4.1 billion at June 30, 2023, compared to \$3.8 billion at December 31, 2022. See [note 7, "Investment Information—Investments Accounted For Using the Equity Method,"](#) to our consolidated financial statements for additional information.

Net Foreign Exchange Gains or Losses.

Net foreign exchange losses for the 2023 second quarter were \$5 million, compared to gains of \$88 million for the 2022 second quarter. Net foreign exchange losses for the six months ended June 30, 2023 were \$23 million, compared to gains of \$92 million for the 2022 period. Amounts in both periods were primarily unrealized and resulted from the effects of revaluing our net insurance liabilities required to be settled in foreign currencies at each balance sheet date.

Income Tax Expense.

Our income tax provision on income or loss before income taxes, including income or loss from operating affiliates, resulted in an expense of 9.2% for the 2023 second quarter, compared to 5.2% for the 2022 second quarter, and an expense of 8.6% for the six months ended June 30, 2023, compared to 5.3% for the 2022 period. See [note 13, "Income Taxes"](#) to our consolidated financial statements for additional information.

Income or Losses from Operating Affiliates.

Income from operating affiliates for 2023 second quarter was \$22 million, compared to income of \$5 million for the 2022 second quarter, and income of \$61 million for the six months ended June 30, 2023, compared to income of \$30 million for the 2022 period. See [note 7, "Investment Information—Investments in Operating Affiliates,"](#) to our consolidated financial statements for additional information.

CRITICAL ACCOUNTING POLICIES, ESTIMATES AND RECENT ACCOUNTING PRONOUNCEMENTS

Critical accounting policies, estimates and recent accounting pronouncements are discussed in Management's Discussion and Analysis of Financial Condition and Results of Operations contained in our 2022 Form 10-K, updated where applicable in the notes accompanying our consolidated financial statements, including [note 1, "Basis of Presentation and Recent Accounting Pronouncements."](#)

FINANCIAL CONDITION

Investable Assets Held by Arch

At June 30, 2023, approximately \$20.3 billion, or 67%, of total investable assets held by Arch were internally managed, compared to \$18.8 billion, or 67%, at December 31, 2022. See [note 7, "Investment Information"](#) to our consolidated financial statements for additional information.

	June 30, 2023,	December 31, 2022
Average effective duration (in years)	3.03	2.89
Average S&P/Moody's credit ratings (1)	AA-/Aa3	AA-/Aa3

- (1) Average credit ratings on our investment portfolio on securities with ratings assigned by Standard & Poor's Rating Services ("S&P") and Moody's Investors Service ("Moody's").

The following table provides the credit quality distribution of our fixed maturities. For individual fixed maturities, S&P ratings are used. In the absence of an S&P rating, ratings from Moody's are used, followed by ratings from Fitch Ratings.

	Estimated Fair Value	% of Total
June 30, 2023		
U.S. government and gov't agencies (1)	\$ 5,282	23.9
AAA	3,985	18.0
AA	2,285	10.3
A	4,810	21.8
BBB	4,165	18.9
BB	770	3.5
B	366	1.7
Lower than B	16	0.1
Not rated	414	1.9
Total	\$ 22,093	100.0
December 31, 2022		
U.S. government and gov't agencies (1)	\$ 5,831	28.8
AAA	3,617	17.9
AA	2,214	10.9
A	3,993	19.7
BBB	3,324	16.4
BB	560	2.8
B	377	1.9
Lower than B	12	0.1
Not rated	309	1.5
Total	\$ 20,237	100.0

(1) Includes U.S. government-sponsored agency residential mortgage-backed securities and agency commercial mortgage-backed securities.

The following table provides information on the severity of the unrealized loss position as a percentage of amortized cost for all fixed maturities which were in an unrealized loss position:

Severity of gross unrealized losses:	Estimated Fair Value	Gross Unrealized Losses	% of Total Gross Unrealized Losses
June 30, 2023			
0-10%	\$ 14,990	\$ (516)	38.8
10-20%	4,329	(679)	51.0
20-30%	417	(121)	9.1
Greater than 30%	27	(15)	1.1
Total	\$ 19,763	\$ (1,331)	100.0
December 31, 2022			
0-10%	\$ 12,343	\$ (580)	35.2
10-20%	5,331	(844)	51.2
20-30%	692	(199)	12.1
Greater than 30%	44	(24)	1.5
Total	\$ 18,410	\$ (1,647)	100.0

The following table summarizes our top ten exposures to fixed income corporate issuers by fair value at June 30, 2023, excluding guaranteed amounts and covered bonds:

	Estimated Fair Value	Credit Rating (1)
Bank of America Corporation	\$ 388	A-/A1
JPMorgan Chase & Co.	318	A-/A1
Morgan Stanley	302	A-/A1
Citigroup Inc.	258	BBB+/A3
The Goldman Sachs Group, Inc.	247	BBB+/A2
Blue Owl Capital Inc.	167	BBB-/Baa3
HSBC Holdings plc	164	A-/A2
Wells Fargo & Company	155	BBB+/A1
Philip Morris International Inc.	147	A-/A2
Blackstone Inc.	145	BBB-/Baa3
Total	\$ 2,291	

(1) Average credit ratings as assigned by S&P and Moody's, respectively.

The following table provides information on our structured securities, which includes residential mortgage-backed securities ("RMBS"), commercial mortgage-backed securities ("CMBS") and asset-backed securities ("ABS"):

	Agencies	Investment Grade	Below Investment Grade	Total
June 30, 2023				
RMBS	\$ 727	\$ 133	\$ —	\$ 860
CMBS	17	994	71	1,082
ABS	—	2,307	98	2,405
Total	\$ 744	\$ 3,434	\$ 169	\$ 4,347
December 31, 2022				
RMBS	\$ 645	\$ 134	\$ 16	\$ 795
CMBS	18	947	82	1,047
ABS	—	1,788	141	1,929
Total	\$ 663	\$ 2,869	\$ 239	\$ 3,771

The following table summarizes our equity securities, which include investments in exchange traded funds:

	June 30, 2023	December 31, 2022
Equities (1)	\$ 601	\$ 570
Exchange traded funds		
Fixed income (2)	279	272
Equity and other (3)	38	32
Total	\$ 918	\$ 874

- (1) Primarily in consumer non-cyclical, technology, communications, financial and consumer cyclical at June 30, 2023.
- (2) Primarily in corporate exposure at June 30, 2023.
- (3) Primarily in large cap stocks, foreign equities, healthcare, technology and consumer discretionary at June 30, 2023.

For details on our other investments and other investable assets, see [note 7, "Investment Information—Other Investments"](#) to our consolidated financial statements.

For details on our investments accounted for using the equity method, see [note 7, "Investment Information—Investments Accounted For Using the Equity Method,"](#) to our consolidated financial statements.

Our investment strategy allows for the use of derivative instruments. We utilize various derivative instruments such as futures contracts to enhance investment performance, replicate investment positions or manage market exposures and duration risk that would be allowed under our investment guidelines if implemented in other ways. See [note 9, "Derivative Instruments,"](#) to our consolidated financial statements for additional disclosures related to derivatives.

Accounting guidance regarding fair value measurements addresses how companies should measure fair value when they are required to use a fair value measure for recognition or disclosure purposes under GAAP and provides a common definition of fair value to be used throughout GAAP. See [note 8, "Fair Value,"](#) to our consolidated financial statements

for a summary of our financial assets and liabilities measured at fair value, segregated by level in the fair value hierarchy.

Reinsurance

The effects of reinsurance on written and earned premiums and losses and loss adjustment expenses ("LAE") with unaffiliated reinsurers were as follows:

	Three Months Ended		Six Months Ended	
	June 30,		June 30,	
	2023	2022	2023	2022
Premiums written:				
Direct	\$ 2,373	\$ 2,125	\$ 4,731	\$ 4,257
Assumed	2,472	1,745	4,894	3,414
Ceded	(1,417)	(1,185)	(2,773)	(2,352)
Net	\$ 3,428	\$ 2,685	\$ 6,852	\$ 5,319
Premiums earned:				
Direct	\$ 2,229	\$ 1,974	\$ 4,383	\$ 3,859
Assumed	1,817	1,340	3,591	2,513
Ceded	(1,081)	(988)	(2,126)	(1,925)
Net	\$ 2,965	\$ 2,326	\$ 5,848	\$ 4,447
Losses and LAE:				
Direct	\$ 1,161	\$ 899	\$ 2,232	\$ 1,789
Assumed	920	637	1,917	1,291
Ceded	(590)	(433)	(1,187)	(976)
Net	\$ 1,491	\$ 1,103	\$ 2,962	\$ 2,104

See [note 6, "Allowance for Expected Credit Losses,"](#) to our consolidated financial statements for information about our reinsurance recoverables and related allowance for credit losses.

Bellemeade Re

We have entered into aggregate excess of loss mortgage reinsurance agreements with various special purpose reinsurance companies domiciled in Bermuda (the "Bellemeade Agreements"). For the respective coverage periods, we will retain the first layer of the respective aggregate losses and the special purpose reinsurance companies will provide second layer coverage up to the outstanding coverage amount. We will then retain losses in excess of the outstanding coverage limit. The aggregate excess of loss reinsurance coverage generally decreases over a ten-year period as the underlying covered mortgages amortize, unless provisional call options embedded within certain of the Bellemeade Agreements are executed or if pre-defined delinquency triggering events occur.

The following table summarizes the respective coverages and retentions at June 30, 2023:

Bellemeade Entities (Issue Date)	Initial Coverage at Issuance	Current Coverage	Remaining Retention, Net
2018-1 Ltd. (1)	374	64	147
2018-3 Ltd. (2)	506	165	156
2019-1 Ltd. (3)	342	89	125
2019-2 Ltd. (4)	621	286	196
2019-3 Ltd. (5)	701	146	213
2019-4 Ltd. (6)	577	234	144
2020-2 Ltd. (7)	449	71	241
2020-3 Ltd. (8)	452	208	162
2020-4 Ltd. (9)	337	80	140
2021-1 Ltd. (10)	644	435	155
2021-2 Ltd. (11)	616	467	138
2021-3 Ltd. (12)	639	585	134
2022-1 Ltd. (13)	317	313	139
2022-2 Ltd. (14)	327	327	208
Total	\$ 6,902	\$ 3,470	\$ 2,298

- (1) Issued in April 2018, covering in-force policies issued between July 1, 2017 and December 31, 2017.
- (2) Issued in October 2018, covering in-force policies issued between January 1, 2018 and June 30, 2018.
- (3) Issued in March 2019, covering in-force policies primarily issued between 2005-2008 under United Guaranty Residential Insurance Company ("UGRIC"); as well as policies issued through 2015 under both UGRIC and Arch Mortgage Insurance Company.
- (4) Issued in April 2019, covering in-force policies issued between July 1, 2018 and December 31, 2018.
- (5) Issued in July 2019, covering in-force policies issued in 2016.
- (6) Issued in October 2019, covering in-force policies issued between January 1, 2019 and June 30, 2019.
- (7) Issued in September 2020, covering in-force policies issued between January 1, 2020 and May 31, 2020. \$423 million was directly funded by Bellemeade 2020-2 Ltd. with an additional \$26 million of capacity provided directly to Arch MI U.S. by a separate panel of reinsurers.
- (8) Issued in November 2020, covering in-force policies issued between June 1, 2020 and August 31, 2020. \$418 million was directly funded by Bellemeade 2020-3 Ltd. with an additional \$34 million of capacity provided directly to Arch MI U.S. by a separate panel of reinsurers.
- (9) Issued in December 2020, covering in-force policies issued between July 1, 2019 and December 31, 2019. \$321 million was directly funded by Bellemeade 2020-4 Ltd. with an additional \$16 million of capacity provided directly to Arch MI U.S. by a separate panel of reinsurers.
- (10) Issued in March 2021, covering in-force policies issued between September 1, 2020 and November 30, 2020. \$580 million was directly funded by Bellemeade Re 2021-1 Ltd. with an additional \$64 million capacity provided directly to Arch MI U.S. by a separate panel of reinsurers.
- (11) Issued in June 2021, covering in-force policies issued between December 1, 2020 and March 31, 2021. \$523 million was directly funded by Bellemeade Re 2021-2 Ltd. via insurance-linked notes, with an additional \$93 million capacity provided directly to Arch MI U.S. by a separate panel of reinsurers.
- (12) Issued in September 2021, covering in-force policies issued between April 1, 2021 and June 30, 2021. \$508 million was directly funded by Bellemeade Re 2021-3 Ltd. via insurance-linked notes, with an additional \$131 million capacity provided directly to Arch MI U.S. by a separate panel of reinsurers.

- (13) Issued in January 2022, covering in-force policies issued between July 1, 2021 and November 30, 2021. \$284 million was directly funded by Bellemeade Re 2022-1 Ltd. via insurance-linked notes, with an additional \$33 million capacity provided directly to Arch MI U.S. by a separate panel of reinsurers.
- (14) Issued in September 2022, covering in-force policies issued between November 1, 2021 and June 30, 2022. \$201 million was directly funded by Bellemeade Re 2022-2 Ltd. via insurance-linked notes, with an additional \$126 million capacity provided directly to Arch MI U.S. by a separate panel of reinsurers.

Reserve for Losses and Loss Adjustment Expenses

We establish reserve for losses and loss adjustment expenses ("Loss Reserves") which represent estimates involving actuarial and statistical projections, at a given point in time, of our expectations of the ultimate settlement and administration costs of losses incurred. Estimating Loss Reserves is inherently difficult. We utilize actuarial models as well as available historical insurance industry loss ratio experience and loss development patterns to assist in the establishment of Loss Reserves. Actual losses and loss adjustment expenses paid will deviate, perhaps substantially, from the reserve estimates reflected in our financial statements.

At June 30, 2023 and December 31, 2022, our Loss Reserves, net of unpaid losses and loss adjustment expenses recoverable, by type and by operating segment were as follows:

	June 30, 2023	December 31, 2022
Insurance segment:		
Case reserves	\$ 2,514	\$ 2,398
IBNR reserves	5,295	4,934
Total net reserves	7,809	7,332
Reinsurance segment:		
Case reserves	2,256	1,903
Additional case reserves	473	481
IBNR reserves	3,723	3,403
Total net reserves	6,452	5,787
Mortgage segment:		
Case reserves	402	447
IBNR reserves	211	186
Total net reserves	613	633
Total:		
Case reserves	5,172	4,748
Additional case reserves	473	481
IBNR reserves	9,229	8,523
Total net reserves	\$ 14,874	\$ 13,752

At June 30, 2023 and December 31, 2022, the insurance segment's Loss Reserves by major line of business, net of unpaid losses and loss adjustment expenses recoverable, were as follows:

	June 30, 2023	December 31, 2022
Insurance segment:		
Professional lines	\$ 2,261	\$ 2,070
Construction and national accounts	1,610	1,558
Programs	888	843
Excess and surplus casualty	868	786
Property, energy, marine and aviation	768	764
Travel, accident and health	144	139
Warranty and lenders solutions	60	47
Other	1,210	1,125
Total net reserves	<u>\$ 7,809</u>	<u>\$ 7,332</u>

At June 30, 2023 and December 31, 2022, the reinsurance segment's Loss Reserves by major line of business, net of unpaid losses and loss adjustment expenses recoverable, were as follows:

	June 30, 2023	December 31, 2022
Reinsurance segment:		
Casualty	\$ 2,515	\$ 2,342
Other specialty	1,864	1,476
Property excluding property catastrophe	1,074	993
Property catastrophe	538	536
Marine and aviation	321	292
Other	140	148
Total net reserves	<u>\$ 6,452</u>	<u>\$ 5,787</u>

At June 30, 2023 and December 31, 2022, the mortgage segment's Loss Reserves by major line of business, net of unpaid losses and loss adjustment expenses recoverable, were as follows:

	June 30, 2023	December 31, 2022
U.S. primary mortgage insurance (1)	\$ 403	\$ 415
U.S. credit risk transfer (CRT) and other	105	109
International mortgage insurance/ reinsurance	105	109
Total net reserves	<u>\$ 613</u>	<u>\$ 633</u>

- (1) At June 30, 2023, 33.1% of total net reserves represents policy years 2013 and prior and the remainder from later policy years. At December 31, 2022, 36.1% of total net reserves represent policy years 2013 and prior and the remainder from later policy years.

Mortgage Operations Supplemental Information

The mortgage segment's insurance in force ("IIF") and risk in force ("RIF") were as follows at June 30, 2023 and December 31, 2022:

	June 30, 2023		December 31, 2022	
	Amount	%	Amount	%
Insurance In Force (IIF) (1):				
U.S. primary mortgage insurance	\$ 293,902	56.6	\$ 295,651	57.6
U.S. credit risk transfer (CRT) and other	154,983	29.9	145,087	28.3
International mortgage insurance/reinsurance	70,117	13.5	72,315	14.1
Total	<u>\$ 519,002</u>	<u>100.0</u>	<u>\$ 513,053</u>	<u>100.0</u>

Risk In Force (RIF) (2):				
U.S. primary mortgage insurance	\$ 75,941	84.5	\$ 75,806	84.8
U.S. credit risk transfer (CRT) and other	6,556	7.3	6,245	7.0
International mortgage insurance/reinsurance	7,385	8.2	7,369	8.2
Total	<u>\$ 89,882</u>	<u>100.0</u>	<u>\$ 89,420</u>	<u>100.0</u>

- (1) Represents the aggregate dollar amount of each insured mortgage loan's current principal balance. Such amounts are shown before external reinsurance.
- (2) The aggregate dollar amount of each insured mortgage loan's current principal balance multiplied by the insurance coverage percentage specified in the policy for insurance policies issued and after contract limits and/or loss ratio caps for risk-sharing or reinsurance. Such amounts are shown before external reinsurance.

The IIF and RIF for our U.S. primary mortgage insurance business by policy year were as follows at June 30, 2023:

	IIF		RIF		Delinquency
	Amount	%	Amount	%	Rate (1)
Policy year:					
2013 and prior	\$ 11,667	4.0	\$ 2,946	3.9	6.57 %
2014	3,170	1.1	863	1.1	2.32 %
2015	5,449	1.9	1,462	1.9	1.82 %
2016	8,518	2.9	2,296	3.0	2.40 %
2017	8,494	2.9	2,257	3.0	2.85 %
2018	9,355	3.2	2,410	3.2	3.69 %
2019	17,396	5.9	4,446	5.9	2.13 %
2020	57,659	19.6	14,756	19.4	0.94 %
2021	83,650	28.5	21,394	28.2	0.89 %
2022	66,340	22.6	17,352	22.8	0.56 %
2023	22,204	7.6	5,759	7.6	0.08 %
Total	<u>\$ 293,902</u>	<u>100.0</u>	<u>\$ 75,941</u>	<u>100.0</u>	<u>1.61 %</u>

- (1) Represents the ending percentage of loans in default.

The IIF and RIF for our U.S. primary mortgage insurance business by policy year were as follows at December 31, 2022:

	IIF		RIF		Delinquency	
	Amount	%	Amount	%	Rate (1)	
<u>Policy year:</u>						
2013 and prior	\$ 12,931	4.4	\$ 3,222	4.3	7.07	%
2014	3,696	1.3	1,012	1.3	2.61	%
2015	6,236	2.1	1,680	2.2	2.08	%
2016	10,225	3.5	2,744	3.6	2.66	%
2017	9,508	3.2	2,521	3.3	3.06	%
2018	10,260	3.5	2,625	3.5	4.11	%
2019	19,096	6.5	4,840	6.4	2.36	%
2020	65,141	22.0	16,414	21.7	1.20	%
2021	89,621	30.3	22,740	30.0	0.95	%
2022	68,937	23.3	18,008	23.8	0.20	%
Total	\$ 295,651	100.0	\$ 75,806	100.0	1.77	%

(1) Represents the ending percentage of loans in default.

The following tables provide supplemental disclosures on risk in force for our U.S. primary mortgage insurance business at June 30, 2023 and December 31, 2022:

	June 30, 2023		December 31, 2022	
	Amount	%	Amount	%
<u>Credit quality (FICO):</u>				
>=740	\$ 46,978	61.9	\$ 46,812	61.8
680-739	25,083	33.0	24,945	32.9
620-679	3,622	4.8	3,772	5.0
<620	258	0.3	277	0.4
Total	\$ 75,941	100.0	\$ 75,806	100.0
Weighted average FICO score	748		750	
<u>Loan-to-value (LTV):</u>				
95.01% and above	\$ 7,151	9.4	\$ 7,289	9.6
90.01% to 95.00%	44,496	58.6	43,681	57.6
85.01% to 90.00%	20,627	27.2	20,851	27.5
85.00% and below	3,667	4.8	3,985	5.3
Total	\$ 75,941	100.0	\$ 75,806	100.0
Weighted average LTV	93.0 %		92.8 %	
Total RIF, net of external reinsurance	\$ 57,019		\$ 57,151	

	June 30, 2023		December 31, 2022	
	Amount	%	Amount	%
<u>Total RIF by State:</u>				
California	\$ 6,317	8.3	\$ 6,341	8.4
Texas	6,159	8.1	6,151	8.1
North Carolina	3,239	4.3	3,160	4.2
Florida	3,167	4.2	3,268	4.3
Georgia	3,155	4.2	3,169	4.2
Minnesota	3,023	4.0	3,003	4.0
Illinois	3,010	4.0	3,081	4.1
Massachusetts	2,834	3.7	2,809	3.7
Michigan	2,661	3.5	2,618	3.5
Virginia	2,619	3.4	2,656	3.5
Other	39,757	52.4	39,550	52.2
Total	\$ 75,941	100.0	\$ 75,806	100.0

The following table provides supplemental disclosures for our U.S. primary mortgage insurance business related to insured loans and loss metrics:

	Six Months Ended	
	June 30, 2023	June 30, 2022
<u>Roll-forward of insured loans in default:</u>		
Beginning delinquent number of loans	20,567	27,645
New notices	18,504	16,813
Cures	(20,358)	(23,393)
Paid claims	(427)	(373)
Ending delinquent number of loans (1)	18,286	20,692
Ending number of policies in force (1)	1,138,681	1,168,147
Delinquency rate (1)	1.61 %	1.77 %
<u>Losses:</u>		
Number of claims paid	427	373
Total paid claims	\$ 12,900	\$ 11,642
Average per claim	\$ 30.2	\$ 31.2
Severity (2)	71.5 %	75.2 %
Average case reserve per default (1)	\$ 23.1	\$ 30.3

(1) Includes first lien primary and pool policies.

(2) Represents total paid claims divided by RIF of loans for which claims were paid.

The risk to capital ratio, which represents total current (non-delinquent) risk in force, net of reinsurance, divided by total statutory capital, for Arch MI U.S. was approximately 6.9 to 1 at June 30, 2023, compared to 7.2 to 1 at December 31, 2022.

Shareholders' Equity and Book Value per Share

The following table presents the calculation of book value per share:

	June 30, 2023	December 31, 2022
Total shareholders' equity available to Arch	\$ 14,641	\$ 12,910
Less preferred shareholders' equity	830	830
Common shareholders' equity available to Arch	\$ 13,811	\$ 12,080
Common shares and common share equivalents outstanding, net of treasury shares (1)	372.9	370.3
Book value per share	\$ 37.04	\$ 32.62

(1) Excludes the effects of 12.9 million and 14.4 million stock options and 0.6 million and 0.6 million restricted stock units outstanding at June 30, 2023 and December 31, 2022, respectively.

LIQUIDITY

Liquidity is a measure of our ability to access sufficient cash flows to meet the short-term and long-term cash requirements of our business operations.

Arch Capital is a holding company whose assets primarily consist of the shares in its subsidiaries. Generally, Arch Capital depends on its available cash resources, liquid investments and dividends or other distributions from its subsidiaries to make payments, including the payment of debt service obligations and operating expenses it may incur and any dividends or liquidation amounts with respect to our preferred and common shares.

For the six months ended June 30, 2023, Arch Capital received dividends of \$98 million from Arch Reinsurance Ltd. ("Arch Re Bermuda"), our Bermuda based reinsurer and insurer, which can pay approximately \$3.6 billion to Arch Capital during the remainder of 2023 without providing an affidavit to the Bermuda Monetary Authority.

We expect that our liquidity needs, including our anticipated (re)insurance obligations and operating and capital expenditure needs, for at least the next twelve months and thereafter for the foreseeable future, will be met by funds generated from underwriting activities and investment income, as well as by our balance of cash, short-term investments, proceeds on the sale or maturity of our investments, and our credit facilities.

Cash Flows

The following table summarizes our cash flows from operating, investing and financing activities:

	Six Months Ended June 30,	
	2023	2022
Total cash provided by (used for):		
Operating activities	\$ 2,114	\$ 1,454
Investing activities	(2,001)	(815)
Financing activities	(45)	(682)
Effects of exchange rate changes on foreign currency cash and restricted cash	12	(43)
Increase (decrease) in cash and restricted cash	\$ 80	\$ (86)

- Cash provided by operating activities for the six months ended June 30, 2023 was higher than in the 2022 period. Activity for the six months ended June 30, 2023 primarily reflected a higher level of premiums collected than in the 2022 period.
- Cash used for investing activities for the six months ended June 30, 2023 was higher than in the 2022 period. Activity for the six months ended June 30, 2023 reflected higher net purchases of fixed maturity investments than in the 2022 period.
- Cash used for financing activities for the six months ended June 30, 2023 was lower than in the 2022 period. Activity for the six months ended June 30, 2023 reflected no repurchases under our share repurchase program, while the 2022 period included \$576 million of share repurchases.

CAPITAL RESOURCES

The following table provides an analysis of our capital structure:

	June 30, 2023	December 31, 2022
Senior notes	\$ 2,726	\$ 2,725
Shareholders' equity available to Arch:		
Series F non-cumulative preferred shares	\$ 330	\$ 330
Series G non-cumulative preferred shares	500	500
Common shareholders' equity	13,811	12,080
Total	\$ 14,641	\$ 12,910
Total capital available to Arch	\$ 17,367	\$ 15,635
Debt to total capital (%)	15.7	17.4
Preferred to total capital (%)	4.8	5.3
Debt and preferred to total capital (%)	20.5	22.7

Arch MI U.S. is required to maintain compliance with the GSEs requirements, known as the Private Mortgage Insurer Eligibility Requirements or "PMIERS." The financial requirements require an eligible mortgage insurer's available assets, which generally include only the most liquid assets of

an insurer, to meet or exceed “minimum required assets” as of each quarter end. Minimum required assets are calculated from PMIERS tables with several risk dimensions (including origination year, original loan-to-value and original credit score of performing loans, and the delinquency status of non-performing loans) and are subject to a minimum amount. Arch MI U.S. satisfied the PMIERS’ financial requirements with an estimated PMIER sufficiency ratio of 245% at June 30, 2023, compared to 236% at December 31, 2022.

Arch Capital, through its subsidiaries, provides financial support to certain of its insurance subsidiaries and affiliates, through certain reinsurance arrangements beneficial to the ratings of such subsidiaries. Historically, our insurance, reinsurance and mortgage insurance subsidiaries have entered into separate reinsurance arrangements with Arch Re Bermuda covering individual lines of business.

GUARANTOR INFORMATION

The below table provides a description of our senior notes payable at June 30, 2023:

Issuer/Due	Interest (Fixed)	Principal Amount	Carrying Amount
Arch Capital:			
May 1, 2034	7.350 %	\$ 300	\$ 298
June 30, 2050	3.635 %	1,000	989
Arch-U.S.:			
Nov. 1, 2043 (1)	5.144 %	500	495
Arch Finance:			
Dec. 15, 2026 (1)	4.011 %	500	498
Dec. 15, 2046 (1)	5.031 %	450	446
Total		\$ 2,750	\$ 2,726

(1) Fully and unconditionally guaranteed by Arch Capital.

Our senior notes were issued by Arch Capital, Arch Capital Group (U.S.) Inc. (“Arch-U.S.”) and Arch Capital Finance LLC (“Arch Finance”). Arch-U.S. is a wholly-owned subsidiary of Arch Capital and Arch Finance is a wholly-owned finance subsidiary of Arch-U.S. Our 2034 senior notes and 2050 senior notes issued by Arch Capital are unsecured and unsubordinated obligations of Arch Capital and ranked equally with all of its existing and future unsecured and unsubordinated indebtedness. The 2043 senior notes issued by Arch-U.S. are unsecured and unsubordinated obligations of Arch-U.S. and Arch Capital and rank equally and ratably with the other unsecured and unsubordinated indebtedness of Arch-U.S. and Arch Capital. The 2026 senior notes and 2046 senior notes issued by Arch Finance are unsecured and unsubordinated obligations of Arch Finance and Arch Capital and rank equally and ratably with the other unsecured and unsubordinated indebtedness of Arch Finance and Arch Capital.

Arch-U.S. and Arch Finance depend on their available cash resources, liquid investments and dividends or other distributions from their subsidiaries or affiliates to make payments, including the payment of debt service obligations and operating expenses they may incur.

The following tables present condensed financial information for Arch Capital (parent guarantor) and Arch-U.S. (subsidiary issuer):

	June 30, 2023	
	Arch Capital	Arch-U.S.
Assets		
Total investments	\$ 15	\$ 99
Cash	11	12
Investment in operating affiliates	5	—
Due from subsidiaries and affiliates	2	—
Other assets	17	33
Total assets	\$ 50	\$ 144
Liabilities		
Senior notes	1,287	495
Due to subsidiaries and affiliates	—	1,005
Other liabilities	29	38
Total liabilities	\$ 1,316	\$ 1,538
Non-cumulative preferred shares	\$ 830	—

	December 31, 2022	
	Arch Capital	Arch-U.S.
Assets		
Total investments	\$ 7	\$ 79
Cash	11	10
Investment in operating affiliates	5	—
Due from subsidiaries and affiliates	2	—
Other assets	18	30
Total assets	\$ 43	\$ 119
Liabilities		
Senior notes	1,287	495
Due to subsidiaries and affiliates	—	991
Other liabilities	37	37
Total liabilities	\$ 1,324	\$ 1,523
Non-cumulative preferred shares	\$ 830	—

	Six Months Ended	
	June 30, 2023	
	Arch Capital	Arch-U.S.
Revenues		
Net investment income	\$ 1	\$ 2
Equity in net income (loss) of investments accounted for using the equity method	—	(4)
Total revenues	1	(2)
Expenses		
Corporate expenses	48	6
Interest expense	29	38
Total expenses	77	44
Income (loss) before income taxes and income (loss) from operating affiliates	(76)	(46)
Income tax (expense) benefit	—	11
Income (loss) from operating affiliates	(1)	—
Net income available to Arch	(77)	(35)
Preferred dividends	(20)	—
Net income (loss) available to Arch common shareholders	\$ (97)	\$ (35)

	Year Ended	
	December 31, 2022	
	Arch Capital	Arch-U.S.
Revenues		
Net investment income	2	1
Equity in net income (loss) of investments accounted for using the equity method	—	10
Total revenues	2	11
Expenses		
Corporate expenses	86	13
Interest expense	59	48
Total expenses	145	61
Income (loss) before income taxes and income (loss) from operating affiliates	(143)	(50)
Income tax (expense) benefit	—	10
Income (loss) from operating affiliates	(1)	—
Net income available to Arch	(144)	(40)
Preferred dividends	(41)	—
Net income (loss) available to Arch common shareholders	\$ (185)	\$ (40)

CATASTROPHIC AND SEVERE ECONOMIC EVENTS

We have large aggregate exposures to natural and man-made catastrophic events, pandemic events like COVID-19 and severe economic events. Natural catastrophes can be caused by various events, including hurricanes, floods, windstorms, earthquakes, hailstorms, tornadoes, explosions, severe winter weather, fires, droughts and other natural disasters. Man-made catastrophic events may include acts of war, acts of terrorism and political instability. Catastrophes can also cause losses in non-property business such as mortgage insurance, workers' compensation or general liability. In addition to the nature of property business, we believe that economic and

geographic trends affecting insured property, including inflation, property value appreciation and geographic concentration, tend to generally increase the size of losses from catastrophic events over time.

Our models employ both proprietary and vendor-based systems and include cross-line correlations for property, marine, offshore energy, aviation, workers compensation and personal accident. We seek to limit the probable maximum pre-tax loss to a specific level for severe catastrophic events. Currently, we seek to limit our 1-in-250 year return period net probable maximum loss from a severe catastrophic event in any geographic zone to approximately 25% of tangible shareholders' equity available to Arch (total shareholders' equity available to Arch less goodwill and intangible assets). We reserve the right to change this threshold at any time.

Based on in-force exposure estimated as of July 1, 2023, our modeled peak zone catastrophe exposure was a windstorm affecting the Florida Tri-County regions, with a net probable maximum pre-tax loss of \$1.46 billion, followed by windstorms affecting the Northeastern U.S. regions and the Gulf of Mexico with net probable maximum pre-tax losses of \$1.37 billion and \$1.31 billion, respectively. Our exposures to other perils, such as U.S. earthquake and international events, were less than the exposures arising from U.S. windstorms and hurricanes. As of July 1, 2023, our modeled peak zone earthquake exposure (San Francisco earthquake) represented approximately 54% of our peak zone catastrophe exposure, and our modeled peak zone international exposure (UK windstorm) was substantially less than both our peak zone windstorm and earthquake exposures.

We also have significant exposure to losses due to mortgage defaults resulting from severe economic events in the future. For our U.S. mortgage insurance business, we have developed a proprietary risk model ("Realistic Disaster Scenario" or "RDS") that simulates the maximum loss resulting from a severe economic downturn impacting the housing market. The RDS models the collective impact of adverse conditions for key economic indicators, the most significant of which is a decline in home prices. The RDS model projects paths of future home prices, unemployment rates, income levels and interest rates and assumes correlation across states and geographic regions. The resulting future performance of our in-force portfolio is then estimated under the economic stress scenario, reflecting loan and borrower information.

Currently, we seek to limit our modeled RDS loss from a severe economic event to approximately 25% of tangible shareholders' equity available to Arch. We reserve the right to change this threshold at any time. Based on in-force exposure estimated as of July 1, 2023, our modeled RDS loss was approximately 11% of tangible shareholders' equity available to Arch.

Net probable maximum loss estimates are net of expected reinsurance recoveries, before income tax and before excess reinsurance reinstatement premiums. RDS loss estimates are net of expected reinsurance recoveries and before income tax. Catastrophe loss estimates are reflective of the zone indicated and not the entire portfolio. Since hurricanes and windstorms can affect more than one zone and make multiple landfalls, our catastrophe loss estimates include clash estimates from other zones. Our catastrophe loss estimates and RDS loss estimates do not represent our maximum exposures and it is highly likely that our actual incurred losses would vary materially from the modeled estimates. There can be no assurances that we will not suffer pre-tax losses greater than 25% of our tangible shareholders' equity from one or more catastrophic events or severe economic events due to several factors. These factors include the inherent uncertainties in estimating the frequency and severity of such events and the margin of error in making such determinations resulting from potential inaccuracies and inadequacies in the data provided by clients and brokers, the modeling techniques and the application of such techniques or as a result of a decision to change the percentage of shareholders' equity exposed to a single catastrophic event or severe economic event. In addition, actual losses may increase if our reinsurers fail to meet their obligations to us or the reinsurance protections purchased by us are exhausted or are otherwise unavailable. See "Risk Factors—Risks Relating to Our Industry" and "Management's Discussion and Analysis of Financial Condition and Results of Operations—Catastrophic Events and Severe Economic Events" in our 2022 Form 10-K.

MARKET SENSITIVE INSTRUMENTS AND RISK MANAGEMENT

In accordance with the SEC's Financial Reporting Release No. 48, we performed a sensitivity analysis to determine the effects that market risk exposures could have on the future earnings, fair values or cash flows of our financial instruments as of June 30, 2023. Market risk represents the risk of changes in the fair value of a financial instrument and is comprised of several components, including liquidity, basis and price risks.

An analysis of material changes in market risk exposures at June 30, 2023 that affect the quantitative and qualitative disclosures presented in our 2022 Form 10-K (see section captioned "Management's Discussion and Analysis of Financial Condition and Results of Operations—Market Sensitive Instruments and Risk Management") were as follows:

Investment Market Risk

Fixed Income Securities. We invest in interest rate sensitive securities, primarily debt securities. We consider the effect of interest rate movements on the fair value of our fixed maturities, short-term investments and certain of our other investments, equity securities and investment funds accounted for using the equity method which invest in fixed income securities (collectively, "Fixed Income Securities") and the corresponding change in unrealized appreciation. As interest rates rise, the fair value of our Fixed Income Securities falls, and the converse is also true. Based on historical observations, there is a low probability that all interest rate yield curves would shift in the same direction at the same time. Furthermore, at times interest rate movements in certain credit sectors exhibit a much lower correlation to changes in U.S. Treasury yields. Accordingly, the actual effect of interest rate movements may differ materially from the amounts set forth in the following tables.

The following table summarizes the effect that an immediate, parallel shift in the interest rate yield curve would have had on our Fixed Income Securities:

(U.S. dollars in billions)	Interest Rate Shift in Basis Points				
	-100	-50	—	+50	+100
June 30, 2023					
Total fair value	\$ 29.6	\$ 29.1	\$ 28.7	\$ 28.3	\$ 27.9
Change from base	3.1 %	1.5 %		(1.5)%	(2.9)%
Change in unrealized value	\$ 0.9	\$ 0.4		\$ (0.4)	\$ (0.8)
December 31, 2022					
Total fair value	\$ 27.2	\$ 26.8	\$ 26.4	\$ 26.0	\$ 25.7
Change from base	2.9 %	1.4 %		(1.4)%	(2.7)%
Change in unrealized value	\$ 0.8	\$ 0.4		\$ (0.4)	\$ (0.7)

In addition, we consider the effect of credit spread movements on the market value of our Fixed Income Securities and the corresponding change in unrealized value. As credit spreads widen, the fair value of our Fixed Income Securities falls, and the converse is also true. In periods where the spreads on our Fixed Income Securities are much higher than their historical average due to short-term market dislocations, a parallel shift in credit spread levels would result in a much more pronounced change in unrealized value.

The following table summarizes the effect that an immediate, parallel shift in credit spreads in a static interest rate environment would have had on our Fixed Income Securities:

(U.S. dollars in billions)	Credit Spread Shift in Percentage Points				
	-100	-50	—	+50	+100
June 30, 2023					
Total fair value	\$ 30.0	\$ 29.3	\$ 28.7	\$ 28.1	\$ 27.4
Change from base	4.4 %	2.2 %		(2.2)%	(4.4)%
Change in unrealized value	\$ 1.3	\$ 0.6		\$ (0.6)	\$ (1.3)
December 31, 2022					
Total fair value	\$ 27.5	\$ 26.9	\$ 26.4	\$ 25.9	\$ 25.3
Change from base	4.1 %	2.0 %		(2.0)%	(4.1)%
Change in unrealized value	\$ 1.1	\$ 0.5		\$ (0.5)	\$ (1.1)

Another method that attempts to measure portfolio risk is Value-at-Risk ("VaR"). VaR measures the worst expected loss under normal market conditions over a specific time interval at a given confidence level. The 1-year 95th percentile parametric VaR reported herein estimates that 95% of the time, the portfolio loss in a one-year horizon would be less than or equal to the calculated number, stated as a percentage of the measured portfolio's initial value. The VaR is a variance-covariance based estimate, based on linear sensitivities of a portfolio to a broad set of systematic market risk factors and idiosyncratic risk factors mapped to the portfolio exposures. The relationships between the risk factors are estimated using historical data, and the most recent data points are generally given more weight. As of June 30, 2023, our portfolio's 95th percentile VaR was estimated to be 7.7%, compared to an estimated 8.8% at December 31, 2022. In periods where the volatility of the risk factors mapped to our portfolio's exposures is higher due to market conditions, the resulting VaR is higher than in other periods.

Equity Securities. At June 30, 2023 and December 31, 2022, the fair value of our investments in equity securities and certain investments accounted for using the equity method with underlying equity strategies totaled \$846 million and \$791 million, respectively. These investments are exposed to price risk, which is the potential loss arising from decreases in fair value. An immediate hypothetical 10% decline in the value of each position would reduce the fair value of such investments by approximately \$85 million and \$79 million at June 30, 2023 and December 31, 2022, respectively, and would have decreased book value per share by approximately \$0.23 and \$0.21, respectively. An immediate hypothetical 10% increase in the value of each position would increase the fair value of such investments by approximately \$85 million and \$79 million at June 30, 2023 and December 31, 2022, respectively, and would have increased book value per share by approximately \$0.23 and \$0.21, respectively.

Investment-Related Derivatives. At June 30, 2023, the notional value of all derivative instruments (excluding foreign currency forward contracts which are included in the foreign currency exchange risk analysis below) was \$3.0 billion, compared to \$6.6 billion at December 31, 2022. If the underlying exposure of each investment-related derivative held at June 30, 2023 depreciated by 100 basis points, it would have resulted in a reduction in net income of approximately \$30 million, and a decrease in book value per share of approximately \$0.08 per share, compared to \$66 million and \$0.18 per share, respectively, on investment-related derivatives held at December 31, 2022. If the underlying exposure of each investment-related derivative held at June 30, 2023 appreciated by 100 basis points, it would have resulted in an increase in net income of approximately \$30 million, and an increase in book value per share of approximately \$0.08 per share, compared to \$66 million and \$0.18 per share, respectively, on investment-related derivatives held at December 31, 2022. See [note 9, "Derivative Instruments,"](#) to our consolidated financial statements for additional disclosures concerning derivatives.

For further discussion on investment activity, please refer to "Financial Condition—Investable Assets."

Foreign Currency Exchange Risk

Foreign currency rate risk is the potential change in value, income and cash flow arising from adverse changes in foreign currency exchange rates. Through our subsidiaries and branches located in various foreign countries, we conduct our insurance and reinsurance operations in a variety of local currencies other than the U.S. Dollar. We generally hold investments in foreign currencies which are intended to mitigate our exposure to foreign currency fluctuations in our net insurance liabilities. We may also utilize foreign currency forward contracts and currency options as part of our investment strategy. See [note 9, "Derivative Instruments,"](#) to our consolidated financial statements for additional information.

The following table provides a summary of our net foreign currency exchange exposures, as well as foreign currency derivatives in place to manage these exposures:

	June 30, 2023	December 31, 2022
Net assets (liabilities), denominated in foreign currencies, excluding shareholders' equity and derivatives	\$ (563)	\$ (396)
Shareholders' equity denominated in foreign currencies (1)	1,119	1,056
Net foreign currency forward contracts outstanding (2)	133	312
Net exposures denominated in foreign currencies	\$ 689	\$ 972
Pre-tax impact of a hypothetical 10% appreciation of the U.S. Dollar against foreign currencies:		
Shareholders' equity	\$ (69)	\$ (97)
Book value per share	\$ (0.18)	\$ (0.26)
Pre-tax impact of a hypothetical 10% decline of the U.S. Dollar against foreign currencies:		
Shareholders' equity	\$ 69	\$ 97
Book value per share	\$ 0.18	\$ 0.26

- (1) Represents capital contributions held in the foreign currencies of our operating units.
- (2) Represents the net notional value of outstanding foreign currency forward contracts.

Although we generally attempt to match the currency of our projected liabilities with investments in the same currencies, from time to time we may elect to over or underweight one or more currencies, which could increase our exposure to foreign currency fluctuations and increase the volatility of our shareholders' equity. Historical observations indicate a low probability that all foreign currency exchange rates would shift against the U.S. Dollar in the same direction and at the same time and, accordingly, the actual effect of foreign currency rate movements may differ materially from the amounts set forth above. For further discussion on foreign exchange activity, please refer to "Results of Operations."

Effects of Inflation

General economic inflation has increased in recent quarters and may continue to remain at elevated levels for an extended period of time. The potential also exists, after a catastrophe loss or pandemic events like COVID-19, for the development of inflationary pressures in a local economy. This may have a material effect on the adequacy of our reserves for losses and loss adjustment expenses, especially in longer-tailed lines of business, and on the market value of our investment portfolio through rising interest rates. The anticipated effects of inflation are considered in our pricing models, reserving processes and exposure management, across all lines of business and types of loss including natural catastrophe events. The actual effects of inflation on our results cannot be accurately known until claims are ultimately settled and will vary by the specific type of inflation affecting each line of business.

OTHER FINANCIAL INFORMATION

The consolidated financial statements as of June 30, 2023 have been reviewed by PricewaterhouseCoopers LLP, the registrant's independent public accountants, whose report is included as an exhibit to this filing. The report of PricewaterhouseCoopers LLP states that they did not audit and they do not express an opinion on that unaudited financial information. Accordingly, the degree of reliance on their report on such information should be restricted in light of the limited nature of the review procedures applied. PricewaterhouseCoopers LLP is not subject to the liability provisions of Section 11 of the Securities Act of 1933 for their report on the unaudited financial information because that report is not a "report" or a "part" of the registration statement prepared or certified by PricewaterhouseCoopers LLP within the meaning of Sections 7 and 11 of the Securities Act of 1933.

ITEM 3. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Reference is made to the information appearing above under the subheading "Market Sensitive Instruments and Risk Management" under the caption "Management's Discussion and Analysis of Financial Condition and Results of Operations," which information is hereby incorporated by reference.

ITEM 4. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

In connection with the filing of this Form 10-Q, our management, including the Chief Executive Officer and Chief Financial Officer, conducted an evaluation, as of the end of the period covered by this report, for the purposes set forth in the applicable rules under the Securities and Exchange Act of 1934, as amended (the "Exchange Act"). Based on that evaluation, the Chief Executive Officer and Chief Financial Officer concluded that the disclosure controls and procedures were effective as of the end of and during the period covered by this report with respect to information being recorded, processed, summarized and reported within time periods specified in the SEC's rules and forms and with respect to timely communication to them and other members of management responsible for preparing periodic reports of all material information required to be disclosed in this report as it relates to Arch Capital and its consolidated subsidiaries.

We continue to enhance our operating procedures and internal controls to effectively support our business and our regulatory and reporting requirements. Our management does not expect that our disclosure controls or our internal controls will prevent all errors and all fraud. A control system, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. Further, the design of a control system must reflect the fact that there are resource constraints, and the benefits of controls must be considered relative to their costs. As a result of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, within the company have been detected. These inherent limitations include the realities that judgments in decision-making can be faulty, and that breakdowns can occur because of simple error or mistake. Additionally, controls can be circumvented by the individual acts of some persons or by collusion of two or more people. The design of any system of controls also is based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions; over time, controls may become inadequate because of changes in conditions, or the degree of compliance with the policies or procedures may deteriorate. As a result of the inherent limitations in a cost-effective control system, misstatement due to error or fraud may occur and not be detected. Accordingly, our disclosure controls and procedures are designed to provide reasonable, not absolute, assurance that the disclosure controls and procedures are met.

Changes in Internal Controls Over Financial Reporting

There have been no changes in internal control over financial reporting that occurred during the quarter ended June 30, 2023 that have materially affected, or are reasonably likely to materially affect, internal control over financial reporting. We have not experienced any material impact to our internal controls over financial reporting.

PART II. OTHER INFORMATION

ITEM 1. LEGAL PROCEEDINGS

We, in common with the insurance industry in general, are subject to litigation and arbitration in the normal course of our business. As of June 30, 2023, we were not a party to any litigation or arbitration which is expected by management to have a material adverse effect on our results of operations and financial condition and liquidity.

ITEM 1A. RISK FACTORS

There were no material changes from the risk factors previously disclosed in our Annual Report on Form 10-K for the year ended December 31, 2022.

ITEM 2. UNREGISTERED SALES OF EQUITY SECURITIES AND USE OF PROCEEDS

Issuer's Repurchases of Equity Securities

The following table summarizes our purchases of common shares for the 2023 second quarter:

Period	Total Number of Shares Purchased (1)	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs	Approximate Dollar Value of Shares that May Yet be Purchased Under the Plan or Programs (\$000's) (2)
4/1/2023-4/30/2023	31,340	\$ 72.67	—	\$ 1,000,000
5/1/2023-5/31/2023	18,419	76.02	—	\$ 1,000,000
6/1/2023-6/30/2023	391	70.08	—	\$ 1,000,000
Total	50,150	\$ 73.88	—	

- (1) This column represents (in whole shares) open market share repurchases, including an aggregate of 31,340, 18,419 and 391 shares repurchased by Arch Capital during April, May and June, respectively, other than through publicly announced plans or programs. We repurchased these shares from employees in order to facilitate the payment of withholding taxes on restricted shares granted and the exercise of stock appreciation rights, in each case at their fair value as determined by reference to the closing price of our common shares on the day the restricted shares vested or the stock appreciation rights were exercised.
- (2) This column represents the remaining approximate dollar amount available at the end of each applicable period under Arch Capital's \$1.0 billion share repurchase authorization, authorized by the Board of Directors of ACGL on December 19, 2022. Repurchases may be effected from time to time in open market or privately negotiated transactions through December 31, 2024.

ITEM 3. DEFAULTS UPON SENIOR SECURITIES

None.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

ITEM 5. OTHER INFORMATION

During the three months ended June 30, 2023, none of the Company's directors or officers (as defined in Rule 16a-1(f) of the Securities Exchange Act of 1934) adopted or terminated a Rule 10b5-1 trading arrangement or non-Rule 10b5-1 trading arrangement (as such terms are defined in Item 408 of Regulation S-K of the Securities Act of 1933).

ITEM 6. EXHIBITS

Exhibit Number	Exhibit Description	Incorporated by Reference			Filed Herewith
		Form	Original Number	Date Filed	
15	Accountants' Awareness Letter (regarding unaudited interim financial information)				X
31.1	Certification of Chief Executive Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002				X
31.2	Certification of Chief Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002				X
32.1	Certification of Chief Executive Officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002				X
32.2	Certification of Chief Financial Officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002				X
10.1	ACGL Amended and Restated 2007 Employee Share Purchase Plan	DEF 14A		March 23, 2023	
101.INS	XBRL Instance Document				
101.SCH	XBRL Taxonomy Extension Schema Document				
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document				
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document				
101.LAB	XBRL Taxonomy Extension Label Linkbase Document				
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document				
104	Cover Page Interactive Data File (embedded within the Inline XBRL document)				

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

ARCH CAPITAL GROUP LTD.

(REGISTRANT)

Date: August 2, 2023

/s/ Marc Grandisson

Marc Grandisson

Chief Executive Officer (Principal Executive Officer)

Date: August 2, 2023

/s/ François Morin

François Morin

Executive Vice President, Chief Financial Officer (Principal Financial and Accounting Officer) and Treasurer

August 2, 2023

Securities and Exchange Commission
100 F Street, N.E.
Washington, DC 20549

Commissioners:

We are aware that our report dated August 2, 2023, on our review of interim financial statements of Arch Capital Group Ltd., which appears in this Quarterly Report on Form 10-Q, is incorporated by reference in the Registration Statement on Form S-3 (No. 333-250869) and in the Registration Statements on Form S-8 (Nos. 333-265285, 333-224783, 333-211193, 333-142835, 333-181308 and 333- 203993) of Arch Capital Group Ltd.

Very truly yours,

/s/ PricewaterhouseCoopers LLP

New York, New York

**Certification
of Chief Executive Officer
Pursuant to Section 302 of the
Sarbanes-Oxley Act of 2002**

I, Marc Grandisson, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Arch Capital Group Ltd.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in the report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: August 2, 2023

By: /s/ Marc Grandisson

Name: Marc Grandisson

Title: Chief Executive Officer

**Certification
of Chief Financial Officer
Pursuant to Section 302 of the
Sarbanes-Oxley Act of 2002**

I, François Morin, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Arch Capital Group Ltd.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in the report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: August 2, 2023

By: /s/ François Morin

Name: François Morin

Title: Executive Vice President, Chief Financial Officer and
Treasurer

Certification Pursuant to Chapter 63, Title 18 United States Code §1350**As Adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002**

In connection with the Quarterly Report of Arch Capital Group Ltd. (the "Company") on Form 10-Q for the period ending June 30, 2023 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), Marc Grandisson, as Chief Executive Officer of the Company, certifies pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

- (1) the Report fully complies with the requirements of section 13(a) of the Securities Exchange Act of 1934; and
- (2) the information contained in such report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: August 2, 2023

By: /s/ Marc Grandisson

Name: Marc Grandisson

Title: Chief Executive Officer

A signed original of this written statement required by Section 906 or other document authenticating, acknowledging or otherwise adopting the signature that appears in typed form within the electronic version of this written statement required by Section 906, has been provided to Arch Capital Group Ltd. and will be retained by Arch Capital Group Ltd. and furnished to the Securities and Exchange Commission or its staff upon request.

Certification Pursuant to Chapter 63, Title 18 United States Code §1350**As Adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002**

In connection with the Quarterly Report of Arch Capital Group Ltd. (the "Company") on Form 10-Q for the period ending June 30, 2023 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), François Morin, as Executive Vice President, Chief Financial Officer and Treasurer of the Company, certifies pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

- (1) the Report fully complies with the requirements of section 13(a) of the Securities Exchange Act of 1934; and
- (2) the information contained in such report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date:	August 2, 2023
By:	<u>/s/ François Morin</u>
Name:	François Morin
Title:	Executive Vice President, Chief Financial Officer and Treasurer

A signed original of this written statement required by Section 906 or other document authenticating, acknowledging or otherwise adopting the signature that appears in typed form within the electronic version of this written statement required by Section 906, has been provided to Arch Capital Group Ltd. and will be retained by Arch Capital Group Ltd. and furnished to the Securities and Exchange Commission or its staff upon request.