2021 ANNUAL REPORT

CELEBRATING ARCH 20 YEARS

ARCH CAPITAL GROUP LTD.

FINANCIAL HIGHLIGHTS[1]

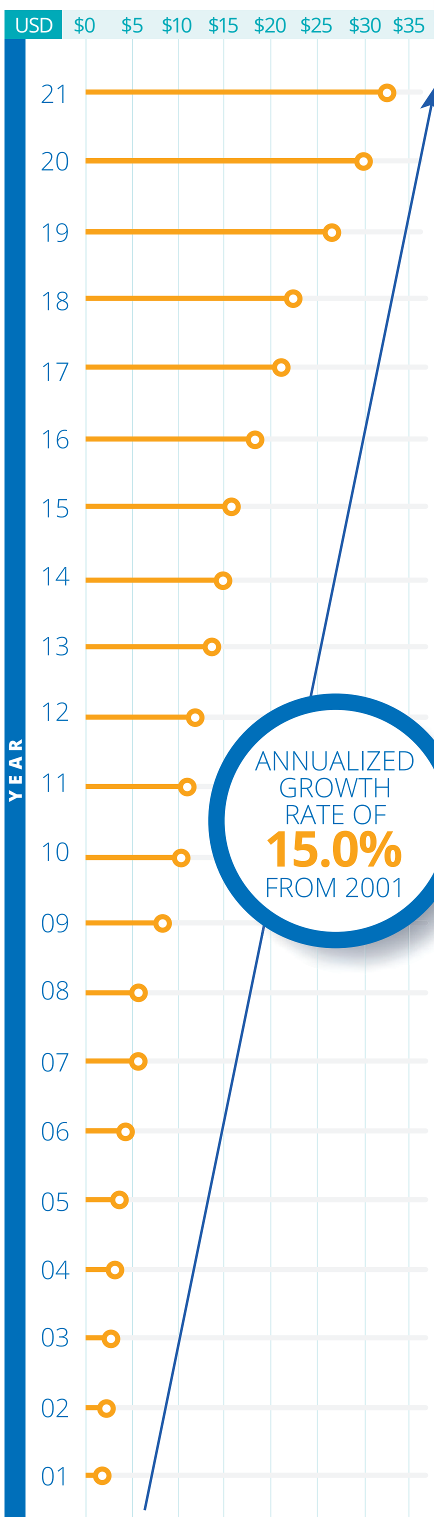
GROSS PREMIUMS WRITTEN[2] **$12.5B**

NET LOSS RESERVES[2] **$12.2B**

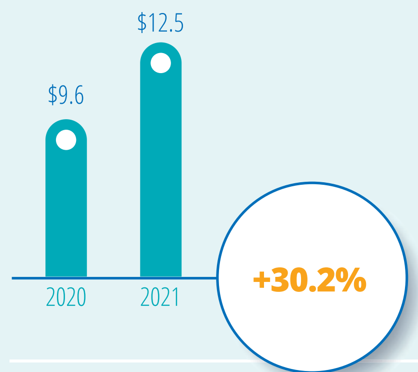
TOTAL CAPITALIZATION[2] **$16.3B**

TOTAL ASSETS[2] **$45.1B**

BOOK VALUE PER COMMON SHARE[3]

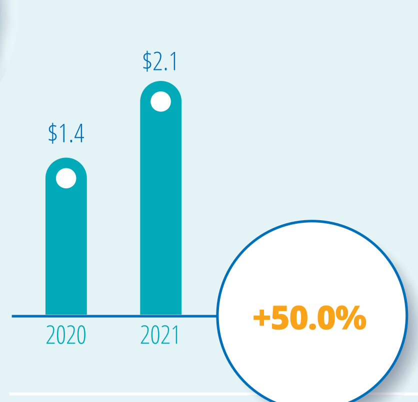


GROSS PREMIUMS WRITTEN ($B)[2]

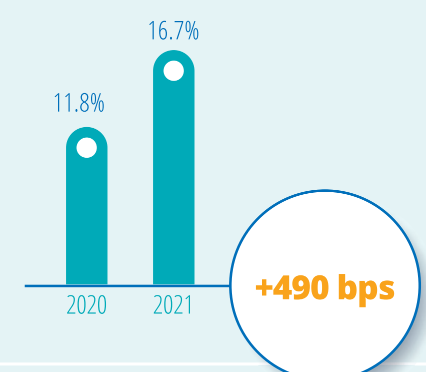


UNDERWRITING INCOME ($B)[2]

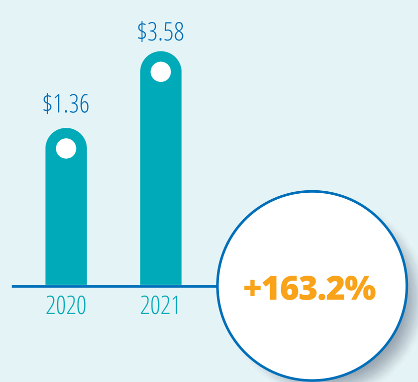
NET INCOME ($B)



NET INCOME RETURN ON AVERAGE COMMON EQUITY



AFTER-TAX OPERATING INCOME PER COMMON SHARE[1]



BOOK VALUE PER COMMON SHARE[3]

1 See "Management's Discussion and Analysis of Financial Condition and Results of Operations—Comment on Non-GAAP Financial Measures" for discussion of "non-GAAP financial measure" as defined in Regulation G.
2 Excludes results of Somers Holdings Ltd.
3 Excludes the effects of stock options and restricted stock units outstanding.

	2021	2020	Change
Book value per common share at year end	$33.56	$30.31	11%
Net income available to common shareholders	$2,093	$1,364	54%
Per share	$5.23	$3.32	58%
Net income return on average common equity	16.7%	11.8%	
After-tax operating income*	$1,435	$557	158%
Per share	$3.58	$1.36	163%
Operating return on average common equity*	11.5%	4.8%	

*This letter contains several non-GAAP financial measures, including after-tax operating income, operating return on average common equity and underwriting income. See "Management's Discussion and Analysis of Financial Condition and Results of Operations – Comment on Non-GAAP Financial Measures" on pages 59-61 of the Company's Annual Report on Form 10-K, filed with the SEC on February 25, 2022 (the "Form 10-K") and "Comments on Regulation G" on pages 7-11 of the Press Release issued by the Company on February 9, 2022 titled "Arch Capital Group Ltd. Reports 2021 Fourth Quarter Results" and filed by the Company on Form 8-K on February 9, 2022 (the "4Q Press Release") for a discussion of "non-GAAP financial measures" as defined in Regulation G. The reconciliation of our non-GAAP financial measures to the relevant GAAP financial measures can be found in the Form 10-K on page 58 under the caption "Management's Discussion and Analysis of Financial Condition and Results of Operations—Financial Measures—Operating Return on Average Common Equity," page 61 under the caption "Management's Discussion and Analysis of Financial Condition and Results of Operations—Results of Operations," pages 107-113 in note 4, "Segment Information," to our consolidated financial statements in Item 8 of our Form 10-K, and page 2 of the 4Q Press Release. A copy of the Form 10-K and 4Q Press Release is available on the Company's website, and the Form 10-K accompanies this letter.

TO OUR SHAREHOLDERS

Arch celebrated its 20th anniversary in 2021, marking a key milestone in our Company's history. Since the beginning, we have maintained a clear strategy for managing our capital in the insurance industry. First, focus on specialty lines where we can apply our expertise. Second, hire outstanding people. Third, work to ensure we are effectively allocating capital to the most attractive opportunities. And fourth, employ a cycle management philosophy that encourages our underwriting teams to grow aggressively during favorable market conditions and remain disciplined in soft markets.

MARC GRANDISSON

CHIEF EXECUTIVE OFFICER
ARCH CAPITAL GROUP LTD.

Throughout our history, we have not deviated from this playbook, and have established a culture of success and performance that — along with our exceptional people — differentiates Arch from its peers. I'm incredibly proud of what we have accomplished at Arch so far — and I am enthusiastic about our future as we usher in the next 20 years.

In 2021, despite another year of elevated catastrophes affecting the property casualty (P&C) industry, a second year of navigating the COVID-19 pandemic and economic uncertainty around the world, our employees, once again, rose to the occasion in order to deliver for our clients and shareholders in a challenging environment. Their care and compassion is broad, extending from our core philanthropic pillars of health, housing and education to causes that address current events, such as the ongoing conflict in Ukraine. All are ways our employees actively demonstrate one of our core values: "Striving to Make a Difference."

All major metrics of financial performance were favorable, as reflected in the table above. Most importantly, we continued to grow the Company's book value per share (BVPS), which we consider to be the most important measure of value creation. We delivered an increase of nearly 11% in BVPS in 2021, marking 13 consecutive years of growth. BVPS has grown at a compounded annual growth rate of 15% since the Company's founding in 2001, underscoring our commitment to create significant long-term value for our shareholders.

Historically, Arch has responded quickly to favorable market conditions, and 2021 was no different. Consistent with our cycle management philosophy, we had pared back our underwriting volumes across many P&C lines during the most recent soft market, which gave us the option to deploy substantially more capacity during the improved P&C markets of 2020 and 2021. Since 2020, we have grown substantially, writing more business in lines that provided the greatest opportunity to generate appropriate risk-adjusted returns. All told, in 2021, our net premiums written (NPW) grew by 31% in our Insurance segment and 32% in our Reinsurance segment. The combined $7.4 billion of NPW in our P&C units was a record for Arch.

Diversification is an important part of our playbook, and we believe it provides shareholders with superior returns through market cycles. Since entering the mortgage insurance business in 2013, our Mortgage segment has provided both diversification and performance to our global operations. During the soft market, when opportunities in the P&C business were relatively limited, we grew our Mortgage segment into another highly profitable earnings engine. Those efforts are paying dividends as the Mortgage team delivered over $950 million of pre-tax underwriting income in 2021.

On the heels of a profitable 2021, we believe we're well positioned to continue the upward trajectory in 2022 and beyond. We believe market conditions remain attractive and our diversified model and strong balance sheet enable us to actively pursue the opportunities that generate the most value for our shareholders.

Financial Results*

After-tax operating income was $3.58 per share in 2021, increasing 163% over 2020. Operating return on average common equity was 11.5% and BVPS grew by approximately 11% for the year. Cash flow from operations remained strong at $3.4 billion, up from $2.7 billion in 2020.

Underwriting Results*

Underwriting income was $1.2 billion in 2021, more than double 2020's $481 million. We achieved these results despite a second consecutive year of elevated losses from catastrophic events including Hurricane Ida and Winter Storm Uri in the United States and severe flooding in Central Europe. All three of our business segments — Insurance, Reinsurance and Mortgage — had underwriting profits in 2021. We're proud of this accomplishment and believe it represents only a portion of the earnings potential of our diversified platform.

Investment Results

Investable assets totaled $27.4 billion at the end of 2021, up slightly from a year earlier in a challenging environment for fixed income investors. In managing our portfolio, we emphasize total return (net investment income, net realized gains and losses, changes in unrealized gains and losses, and equity in the net income or losses of investment funds accounted for using the equity method), which contributes to BVPS growth. Total return was 1.9% in 2021, lower than the 7.8% returned in 2020. The increase in interest rates, combined with investor concerns about inflation, led to a decrease in unrealized gains on our balance sheet for many fixed income securities and adversely affected our performance.

At the end of 2021, approximately 74% of the portfolio was invested in fixed maturity and short-term securities with an average credit quality of "AA-/Aa3" and an average effective duration of a relatively short 2.7 years, reflecting our view of the risk and return trade-offs in the fixed income markets. In addition to investing in fixed income securities, we invest a portion of the portfolio in equities and alternative investments, which performed well in 2021.

Net investment income was $347 million in 2021, down 11% from 2020 on a per-share basis primarily due to lower interest rates affecting our fixed income portfolio. Net investment income does not include equity in net income of investment funds accounted for using the equity method. These investments, which are primarily of a fixed income nature, contributed $366 million to pre-tax income in 2021, or $0.92 per share, more than double their contribution in 2020.

Segment Performance

Arch is a global company based in Bermuda. We write commercial property casualty insurance and reinsurance primarily from operations in Bermuda, the United States, Canada, Europe and the United Kingdom, and write mortgage insurance and reinsurance primarily in the United States, Bermuda, Europe and Australia.

Insurance: Net premiums written were $4.1 billion in 2021, increasing 31% from 2020. Underwriting income was $117 million in 2021, compared with an underwriting loss in 2020, even though both years saw significant catastrophe losses for the P&C industry. We have leaned into a hardening insurance market for the past two years as rate increases have been above long-term loss cost trends. In 2021, business growth occurred across most sectors, with Professional Lines and Programs exhibiting strong advances.

Reinsurance: Net premiums written were $3.3 billion in 2021, advancing 32% over 2020. Underwriting income was $170 million, up sharply from $16 million in 2020. We grew in nearly every reinsurance line, reflecting our diversified specialty mix of business and our larger participation in quota share reinsurance, which allows us to participate directly in the improved premium rates of cedents. Despite substantial growth across most of our portfolio, we remain underweight in property catastrophe reinsurance as the current rate environment does not justify deploying more capital into this sector.

Mortgage: Net premiums written were $1.3 billion in 2021, essentially unchanged from 2020 as refinance activity declined in 2021. The segment's underwriting income remained excellent, improving to $953 million in 2021 from $594 million in 2020. Insurance in force, the ultimate driver of mortgage insurance earnings, increased to $460.6 billion at the end of 2021 from $423.5 billion a year earlier. We continue to focus on the more attractive returns available in higher credit quality business instead of broadly chasing top-line growth — a luxury afforded to us by our diversified model.

Corporate Initiatives

We continued to increase our fee-based, third-party capital management business in which we leverage our skills to write insurance and reinsurance for others. In July, we acquired Watford Holdings Ltd. (Watford) alongside two private equity partners. In November, Watford was rebranded Somers Group Holdings Ltd.

Other acquisitions in 2021 included Westpac Lenders Mortgage Insurance in Australia, strengthening our non-U.S. mortgage insurance business; Somerset Bridge Group Limited, Southern Rock Holdings Limited and affiliates, which includes Somerset's motor managing general agent, distribution capabilities and fully integrated claims operation; and a 29.5% minority stake in Coface, a French-based global leader in trade credit insurance. The Somerset and Coface investments support our strategy of developing diversified sources of underwriting income.

Doing the right thing every day is core to our character. In line with our values, the Company believes environmental, social and governance (ESG) considerations are integral to our business' operations and daily decision-making. We are proud of our reputation as a company that places ethics and integrity at the forefront and our consistent efforts to support and give back to the communities where we live and work. We are committed to sharing ESG disclosures and heightened transparency around our strategy and risk mitigation efforts.

Capital Allocation and Management

Arch is recognized as a reliable manager of capital with a strong balance sheet and a history of optimizing opportunities for capital deployment. Capital management is an integral part of our overall strategy and we have always had a two-pronged approach: primarily, to deploy capital into strengthening or expanding our operations and, secondarily, to return it to our shareholders — preferably through share repurchases.

In 2021, we were able to both reinvest in our businesses and return capital to shareholders. We reacquired $1.2 billion of our common stock — fully 7.7% of the shares outstanding at the start of the year. Over the course of our 20-year history, we have returned more than $5.3 billion through stock buybacks. We remain steadfast in allocating our capital to the areas with the greatest opportunity to enhance shareholder returns.

With respect to the structure of our capital, we have always utilized a conservative level of leverage. At the end of 2021, the Company's ratio of debt and hybrids to total capital was 21.8%, down from 22.1% at the end of 2020.

Arch People

In an industry where talent is a key differentiator, Arch boasts more than 5,000 exceptional employees around the world who work every day to help our clients, shareholders, communities and one another achieve their greatest potential. In 2021, we made several new hires to enhance our capabilities while promoting high performers from our deep bench to ensure continuity among our talented management team.

Corporate

Christine Todd joined Arch as Senior Vice President, Chief Investment Officer. She previously was Head of Fixed Income, U.S., for Amundi U.S., one of the world's largest asset management firms. Todd succeeded Preston Hutchings, who retired from the Company after 16 years.

Insurance

Peter Danza was promoted to Executive Vice President, Human Resources for Arch Insurance North America. Danza has been with Arch since 2003.

Anne Hardner was promoted to Executive Vice President, Executive Assurance for Arch Insurance North America. Hardner has been with Arch since 2009.

Catherine Kelly was promoted to Executive Vice President, Corporate Underwriting for Arch Insurance North America. Kelly has been with Arch since 2009.

Jason Kittinger was promoted to Chief Operating Officer of Arch Insurance International. Kittinger has been with Arch since 2002.

Silvia Martinez joined Arch Insurance International as Senior Vice President and General Counsel. Martinez previously served as Group General Counsel and Company Secretary for Aspen Insurance Group.

Tom Rivers joined Arch Insurance International as Chief Risk Officer. Rivers previously served as Chief Risk Officer for AXIS Managing Agency.

Mark Rowe joined Arch Insurance International as Chief Compliance Officer. Rowe previously served as Head of Compliance for AXIS Managing Agency.

Kirsten Valder was promoted to Chief Administrative Officer of Arch Insurance International. She has been with Arch since 2014.

Reinsurance

Jessica Bongiorno was promoted to Chief Underwriting Officer Property & Specialty of Arch Reinsurance Company (U.S.). Bongiorno has been with Arch since 2006.

Joshua Hackett was promoted to Chief Underwriting Officer Casualty & Specialty of Arch Reinsurance Company (U.S.). Hackett joined Arch in 2016.

Santiago "Santi" Hernandez was promoted to Chief Executive Officer of Arch Re Facultative. Hernandez joined Arch Re Facultative in 2007 and most recently served as President.

Peder Moeller was promoted to Chief Executive Officer of Arch Reinsurance Company (U.S.). Moeller joined Arch in 2007 and, prior to his recent promotion, served as Chief Underwriting Officer for Arch Reinsurance Company (U.S.).

Scott Montgomery was promoted to President, Arch Re Facultative. Montgomery joined Arch in 2007.

Vanessa Hardy Pickering joined Arch Re Ltd. as Chief Financial Officer. She previously was Chief Financial Officer of Hamilton Re and Group Treasurer of Hamilton Insurance Group.

Eileen Sorabella was promoted to Executive Vice President and General Counsel of the Worldwide Reinsurance Group. Sorabella joined Arch in 2017 and previously held the role of General Counsel, Reinsurance North America.

Mortgage

Bruce Hope-MacLellan was hired as the Chief Operating Officer for Arch LMI (Australia). Hope-MacLellan previously held the role of Director, Enterprise Transformation for DQA.

Parker Ross was hired as the Global Chief Economist for the Global Mortgage Group. Ross previously served as the Head of Corporate Economics for JPMorgan Chase & Co.

Allan Voltz was promoted to Chief Strategy Officer, Global Mortgage Group. Voltz joined Arch in 2017 and most recently served as Senior Vice President of Pricing and Analytics for Arch U.S. MI.

Arch Board of Directors

In 2021, we also welcomed two new members to the Arch Capital Board of Directors, bringing new perspectives and broadening the Board's talent and outlook for the next stage of our growth.

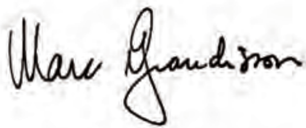
Francis Ebong has an extensive background in technology and innovation and is currently Managing Director, Program Management at X, Alphabet's in-house research and development division.

Eileen Mallesch has broad finance and business strategy expertise in the insurance, telecommunications and consumer products industries, including serving as Senior Vice President and Chief Financial Officer for Nationwide's Property and Casualty segment.

Outlook

The industry faces many challenges at this time, including inflation, cyberthreats, continued low interest rates and the impact of climate change. We do not downplay any of these challenges. Nonetheless, we believe opportunities abound in the current market for a well-capitalized, highly focused insurer like Arch. Although every year is different and markets aren't always predictable, we have demonstrated an ability to perform well relative to our peers over a variety of insurance market and economic conditions. I remain enthusiastic about the coming year and the opportunities available to Arch in each of its three business segments.

In closing, we thank our distributors and clients. We deeply appreciate your business and strive at all times to serve your needs. We thank our employees for their amazing contributions and extraordinary dedication. And we thank you, our shareholders, for your confidence and support.



Marc Grandisson
Chief Executive Officer
Arch Capital Group Ltd.

Arch | Insurance

Key Ratios	2021	2020
Loss Ratio	64.6%	72.9%
Underwriting Expense Ratio	32.1%	31.6%
Combined Ratio	96.7%	104.5%

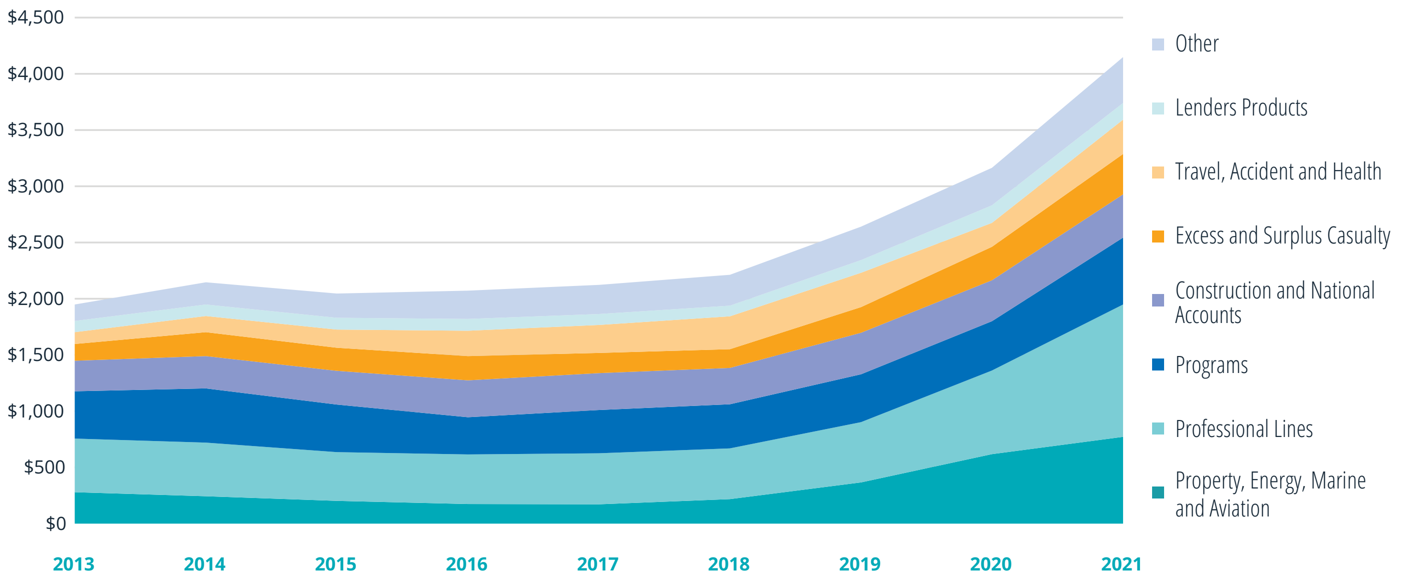
Providing Customer-Focused Solutions

Arch Insurance is a global insurer offering superior coverage and service across a wide range of industries to its clients and brokers. Our approach to doing business is based on collaboration, responsiveness and commitment. We participate in specialty lines where the talent and knowledge of our employees are a competitive differentiator and embrace a customer-focused mindset and a determination to find effective solutions.

Growth and Discipline

In 2021, Arch Insurance continued its growth trajectory despite a volatile environment. In total, the segment achieved a 31% increase in net premiums written. In addition to growing our top line, we continued to improve the underlying fundamentals of our business, resulting in a current accident year combined ratio (excluding catastrophes) of 92%, down from 95% in 2020.

Arch Insurance North America continued to embrace its role as a carrier of choice and achieved growth in all major distribution channels (retail, wholesale and delegated authority). An expanded appetite within the specialty middle market sector, specifically for Energy, Construction, Private Equity and Healthcare accounts, contributed meaningfully to our 2021 growth. Our ability to deploy capacity in response to emerging needs has always been part of our strategy, and growth in the Cyber Liability market is a prime example of executing on this strategy. We achieved pricing improvement in nearly every line of business as we continued to lean into this dynamic market. Our diverse portfolio and ability to quickly respond to changing trends has us well-positioned for continued growth and success.



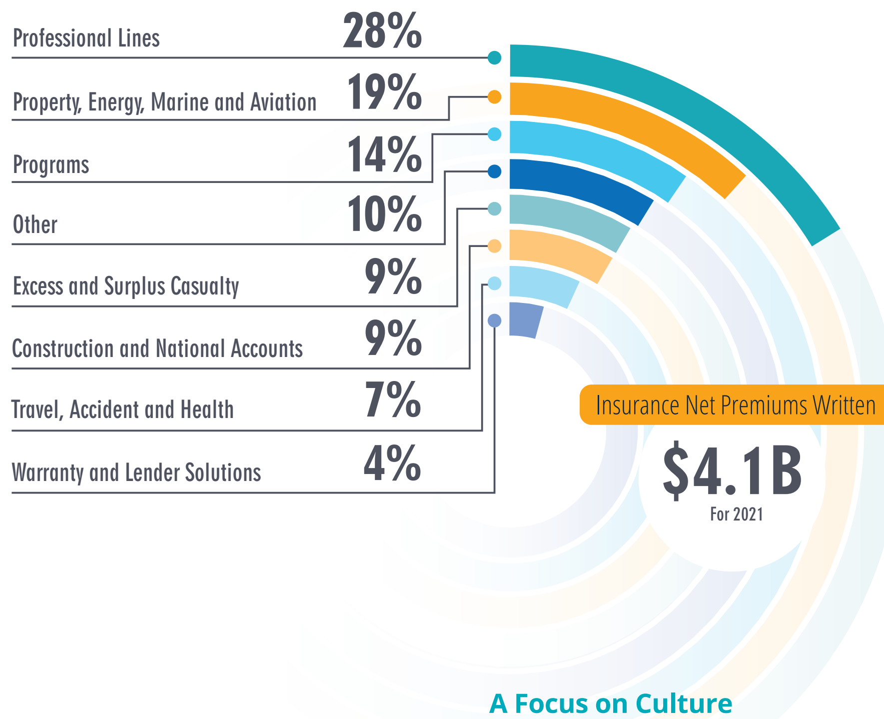
Professional Lines includes Professional Liability, Executive Assurance and Healthcare business. **Excess and Surplus Casualty** includes Casualty and Contract Binding business. **Other** includes Alternative Markets, Excess Workers' Compensation and Surety business.

OPERATIONS LAUNCHED IN UNITED KINGDOM

APPROVED TO WRITE BUSINESS IN GERMANY

TORONTO BRANCH OPENED

LLOYD'S SYNDICATE 2012 COMMENCED UNDERWRITING IN LONDON



Arch Insurance International completed integrations of Barbican Group Holdings and the UK Regional business (both acquired in 2019), and is now focused on optimizing favorable market conditions and increasing market share in lines of business where the odds of achieving strong margins are favorable. The UK Regional Division was recognized as the top Commercial Lines Insurer and top Small and Medium Enterprise (SME) Commercial Lines Insurer in the *Insurance Age* 2021 Broker Survey — an impressive accomplishment for an organization that was only founded in 2019.

Continuously Pursuing Innovation and Improvement

Our global "Speed to Market" initiative is an internal program designed to accelerate new product delivery. An emphasis on continuous improvement and finding ways to more rapidly respond to market needs remains a differentiator for Arch Insurance.

Embracing insurtech through our Digital Partners group remains a priority as we develop and deliver new products through digital distribution methods. We currently have 11 digital partners with steadily increasing premiums and a clear path for accelerating future growth.

A Focus on Culture

We continued to deliver the "Arch Experience," an internal initiative designed to instill and reinforce critical and differentiating Arch behaviors. The program provides opportunities to identify and share the stories that help drive our success and make our culture unique. Additionally, last year we introduced Arch Insurance's new brand promise, "Pursuing Better Together," a commitment to our brokers, colleagues and other partners to:

- Listen, share insights and work together to deliver informed solutions.
- Build trusting, respectful and responsive relationships.
- Understand our clients' goals and explore possibilities together.

Arch Insurance carried forward its commitment to diversity and inclusion (D&I) efforts in 2021. Across the segment, nearly all employees participated in either unconscious bias or inclusive leadership training — a key mechanism for promoting understanding and growth. We've also partnered with organizations that are committed to improving the overall representation of diverse candidates in the insurance industry, including INROADS, Gamma Iota Sigma, the International Association of Black Actuaries and the Spencer Educational Foundation, as a way to recruit more diverse talent for our internship and early career programs.

2012 — ROAMRIGHT TRAVEL ACCIDENT INSURANCE LAUNCHED
2013
2014 — ARCH INSURANCE CANADA LTD., A CANADA DOMESTIC COMPANY, COMMENCED OPERATIONS
2015
2016
2017
2018 — MCNEIL & CO. ACQUISITION
2019 — BARBICAN ACQUISITION AND UK REGIONAL DIVISION FORMED
2020
2021

Arch | Re

Key Ratios	2021	2020
Loss Ratio	67.8%	75.3%
Underwriting Expense Ratio	26.4%	24.2%
Combined Ratio	94.2%	99.5%

Specialized Reinsurance Solutions

Arch Re is a leading, diversified reinsurer offering treaty and facultative property, casualty and specialty reinsurance around the world. We focus on "Expanding the Possible" for our clients by providing creative ideas and solutions while serving as a long-term, reliable partner. Our experienced team delivers value for clients and brokers by engaging on the most complex challenges and developing customized solutions that meet our customers' needs.

A Growth Story

At Arch Re, we pride ourselves on delivering creative capital solutions to our clients, enabling them to better manage their risk appetite and navigate the volatile market environment by leveraging our global reinsurance expertise and capabilities.

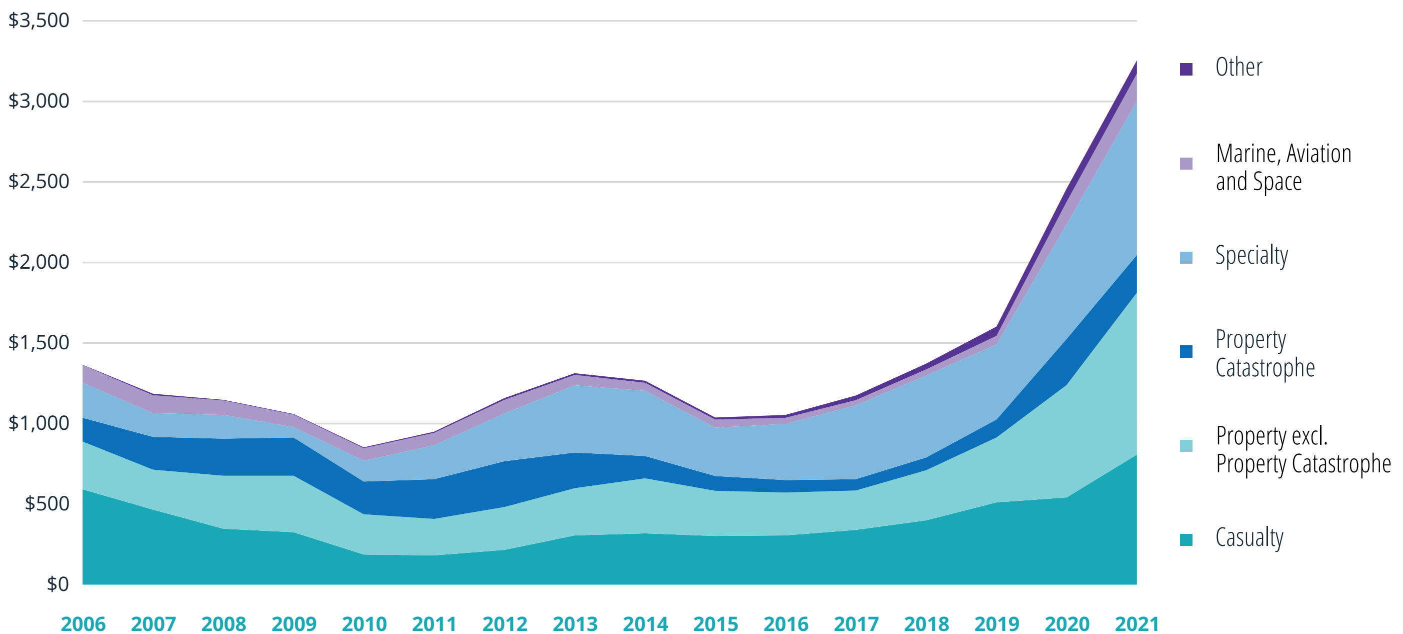
In 2021, the Reinsurance Group generated $5.1 billion of Gross Premiums Written, a 47% increase from 2020. Additionally, despite the heavy catastrophe year, we posted a 94% combined ratio (a 5.3 point improvement from 2020) and ultimately delivered $170 million of pre-tax underwriting income. Over the past 20 years, our weighted average combined ratio has been 87%.

In a year where Property Catastrophe rates were relatively less attractive, we focused our attention on growth areas where we can further leverage our expertise such as Specialty, Casualty and Marine.

Enhancing Our Platform

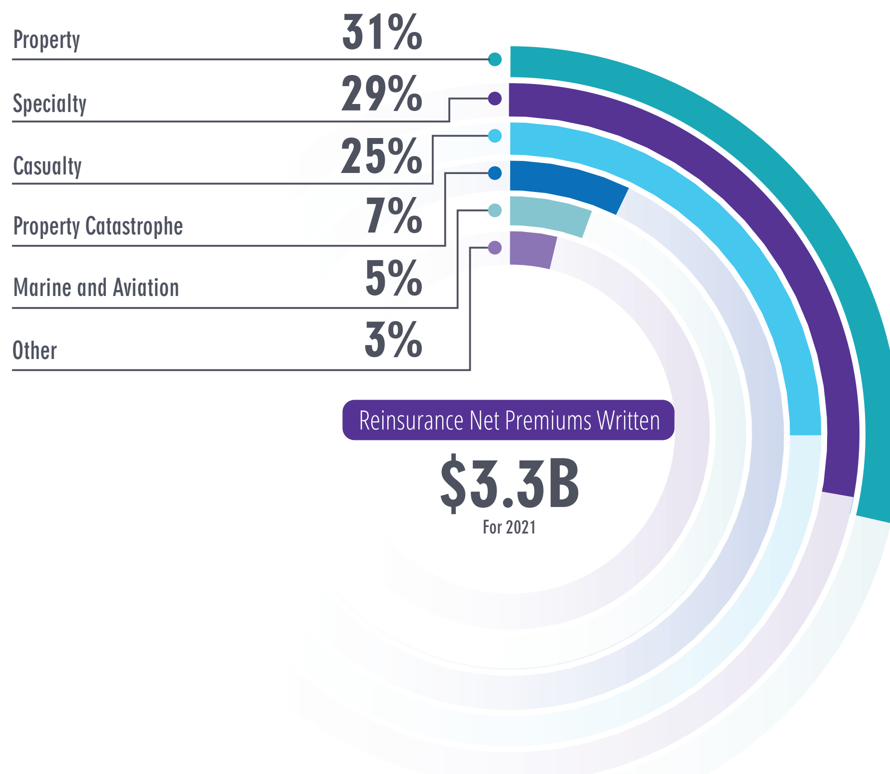
Actively seeking new opportunities to grow our reinsurance platform and further deploy our expertise is a key strategy for our long-term success. To that end, we are always looking for opportunities to acquire teams and companies that align with both our business and philosophy. In July, along with two

Calendar Year Net Premiums Written by Line ($M)



Casualty includes Executive Assurance, Professional Liability, Workers' Compensation, Healthcare, Motor XOL and Other. **Specialty** includes Proportional Motor, Surety, Accident and Health, Workers' Compensation Catastrophe, Agriculture, Trade Credit and Other. **Other** includes Life, Casualty Clash and Other.

2001 — FIRST REINSURANCE TREATY BOUND
2002
2003 — SURETY BOOK PURCHASED
2004
2005
2006 — FLATIRON RE LAUNCHED
2007 — PROPERTY FACULTATIVE UNDERWRITERS ESTABLISHED
2008
2009 — ARCH RE EUROPE UNDERWRITING DAC OPENED IN IRELAND
2010
2011



private equity partners, we acquired Watford Holdings Ltd. before rebranding the company as Somers Group Holdings Ltd. (Somers) in November. This marked a strategic repositioning for Somers, which facilitates a more traditional reinsurance business model while providing Arch Re with meaningful third-party capacity.

Additionally, in August, we completed the acquisition of Somerset Bridge Group Limited and Southern Rock Holdings Limited, which includes Somerset's motor managing general agent, distribution capabilities, insurer and fully integrated claims operation — expanding our UK motor insurance and reinsurance capabilities with a fully integrated platform.

Increased Focus on Third-Party Capital

Arch Re continued to expand its third-party capital capabilities in 2021 with double digit growth in assets under management from 2020, allowing us to enhance our client and broker relationships by providing broader solutions as we leverage our underwriting expertise and generate fee income. In addition to the Somers acquisition, we issued our first retrocession focused property catastrophe bond, Claveau Re Ltd., and continued to expand our presence at Lloyd's Syndicate 1955.

Investing in Our People

Despite another year of navigating the COVID-19 pandemic, our employees continue to adapt to the changing environment in order to meet the moment — finding balance between working in a mostly remote work environment and strategically engaging with clients around the globe.

Throughout 2021, we sought opportunities to increase our diversity and inclusion (D&I) efforts. All members of the Arch Re leadership team, along with more than 90 other leaders, participated in the Yale School of Management Fostering Inclusion and Diversity leadership program that is now offered regularly to any interested employee. Additionally, our Diversity and Inclusion Advisory Committee partnered with Howard University to provide internship opportunities for students in its insurance program, beginning in 2022.

In December, Arch Re was able to rely on its deep bench to make several promotions. Peder Moeller was promoted to CEO of Arch Reinsurance Company (U.S.) and Santiago Hernandez was promoted to CEO of Arch Re Facultative. These leaders, and their teams, will help ensure continuity and continued growth for our franchise.

ARIEL RE CREDIT AND SURETY ACQUISITION IN SWITZERLAND — 2012

CO-FOUNDED WATFORD RE — 2013

2014 2015 2016 2017 2018 2019

PRECISION MARKETING ASIA PACIFIC ACQUISITION — 2020

WATFORD, SOMERSET BRIDGE ACQUISITIONS — 2021

Arch | MI

Key Ratios	2021	2020
Loss Ratio	4.4%	37.8%
Underwriting Expense Ratio	22.7%	21.2%
Combined Ratio	27.1%	59.0%

A Global Leader in Residential Mortgage Credit Risk

Arch's Global Mortgage Group facilitates sustainable homeownership through the aggregation, management and syndication of mortgage credit risk worldwide. We believe our highly skilled workforce and commitment to technology and analytics make us the most effective and engaged mortgage credit risk manager in the industry. Through our insurance, reinsurance and capital markets operations in the United States, Australia, Bermuda and Europe, Arch stands alone as the only globally diversified insurer of mortgage credit risk.

Supporting Sustainable Homeownership

In the United States, our largest market, Arch MI U.S. provides banks, independent mortgage bankers, credit unions and Fannie Mae and Freddie Mac (the Government Sponsored Enterprises, or GSEs) with the financial security and credit insurance protection needed to support mortgage lending. By giving qualified borrowers access to mortgage insurance (MI), we help encourage sustainable homeownership among a diverse group of individuals and families. In 2021, we helped over 343,000 borrowers in the U.S. purchase or refinance a home.

In 2021, we produced $105.8 billion of new insurance written (NIW) at Arch MI U.S. Combined with the solid performance of insured loans originated in prior years and contributions from our Credit Risk Transfer and Services and International businesses, the Mortgage Group generated $953 million in underwriting income in the year, a 60% increase from 2020.

Expanding Our Diversified Platform

While the traditional U.S. MI market remains the most significant contributor to our bottom line, 2021 provided opportunities to further diversify our franchise for the long term.

In August, we completed the acquisition of Westpac Lenders Mortgage Insurance Limited (WLMI), an Australian Prudential Regulation Authority authorized captive lenders mortgage insurance (LMI) provider to the Westpac Group. As part of the agreement, WLMI, which has been rebranded as Arch Lenders Mortgage Indemnity Ltd., will remain Westpac's exclusive provider of LMI on new mortgage originations through 2031.

This transaction further establishes Arch as a market leader that provides innovative solutions and excellent service to clients across Australia.

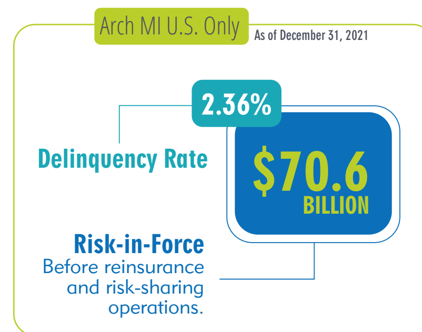
Overall, our International MI units grew total premiums written by over 51%. Australian premiums grew significantly due to higher origination volume and, to a lesser extent, the WLMI acquisition. Our Credit Risk Transfer and Services group underwrote approximately $1.7 billion of GSE Credit Risk Transfer limit — leading to the highest annual volume of GSE credit risk transfers booked since the unit's formation.

Arch also maintained its leadership position in the mortgage insurance-linked notes (MILN) market — one it established in 2015. In 2021, Arch MI completed three Bellemeade Re Insurance-Linked Note securitizations garnering $1.9 billion of indemnity reinsurance protection.

Innovation and Thought Leadership

Dating back to 2009, when Arch MI introduced the industry's first risk-based pricing engine, we have been regarded as the industry standard for thought leadership and innovation.

In 2021, we introduced the Arch Mortgage Guaranty Company (AMGC) EqualAccess Homeownership Program designed to help low- to moderate-income and minority borrowers attain homeownership. Qualifying borrowers have access to lower down payment options and additional considerations,



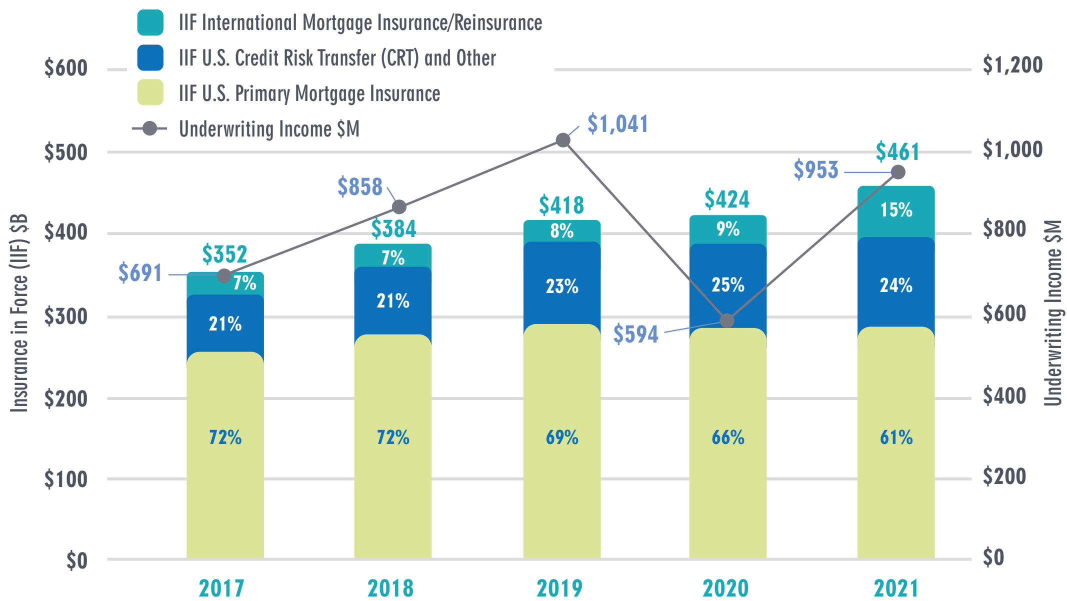
UNITED GUARANTY (LATER ARCH MI) INTRODUCED FIRST MI RISK-BASED PRICING

ARCH INSURANCE EUROPE ADDED MI TO ITS UNDERWRITING PLATFORM

2001 2002 2003 2004 2005 2006 2007 2008 **2009** **2010** 2011

Global Mortgage Group Insurance in Force (IIF) and Underwriting Income

As of December 31, 2021



This chart contains certain non-GAAP financial measures. For 2020 and 2021, references to the comparable GAAP measures and the reconciliation of such non-GAAP financial measures to the relevant GAAP financial measures are found on page 1 of this letter. For 2017-2019, the comparable GAAP measures and reconciliation of such non-GAAP financial measures to the relevant GAAP financial measures are found on pages 102-109 in note 4, "Segment Information," to our consolidated financial statements in Item 8 of the Company's Annual Report on Form 10-K, filed with the SEC on February 28, 2020.

including allowances for nontraditional credit and nonoccupant borrowers, to help make homeownership attainable to a wider array of creditworthy borrowers. Now, even more people will have an opportunity to build wealth and long-term security through homeownership. The EqualAccess Homeownership Program is just another example of Arch's outside-the-box thinking and commitment to enabling the possibility of homeownership.

We also maintained our commitment to thought leadership by continuing to deliver the Arch MI *PolicyCast*, a biweekly video podcast that touches on key issues facing the housing finance industry, including housing policy and affordable housing. Additionally, loyal followers were able to read Arch MI's *Housing and Mortgage Market Review (HaMMR)*, which provides housing sector forecasts and information on long-term trends, for the 19th consecutive year. Offerings like the *HaMMR* and *PolicyCast* are just two reasons the industry looks up to Arch MI.

A Committed and Engaged Culture

A commitment to culture and an engaged workforce continue to play crucial roles in Arch's differentiation and success. Employees in our Greensboro, North Carolina, headquarters voted Arch MI one of the "Best Places to Work" for the third consecutive year in the annual survey conducted by the *Triad Business Journal*.

Creating a work environment where everyone can bring their authentic selves to work is a critical component of an inclusive workplace with a free exchange of ideas. In 2021, Arch MI introduced D&I Champions and Advocates, volunteer positions that support D&I efforts to promote diversity, equity, inclusion and belonging for all employees. This group works behind the scenes to support existing D&I groups, which are focused on communications, measurement, people and culture. Arch MI's efforts around D&I are being noticed. In May, the Global Mortgage Group was recognized by the *Triad Business Journal* as a Leader in Diversity — a company that demonstrates respect for the inclusive treatment of others and advocacy for underrepresented groups.

Arch also welcomed its second Arch MI Scholar, part of a partnership that began in 2020 with North Carolina Agricultural and Technical State University — the nation's largest historically Black college, which is located in Greensboro. The scholarship program is designed to provide financial support and real-world experiences for high-achieving students.

Expanding Environmental, Social and Governance

Our focus on Environmental, Social and Governance (ESG) factors pushes us to not only assess and address risk, but also seize opportunities across our business, through our investments and in the communities where we live and work. In 2021, we prioritized companywide ESG integration by focusing on the ESG topics most relevant to our industry and Company, publishing our second Sustainability Report and Sustainable Accounting Standards Board (SASB) Report. Recognizing the need for effective disclosures regarding climate-related risks and opportunities, we published our first Task Force on Climate-related Financial Disclosures (TCFD) Report. The latest about our sustainability practices, including reports and disclosures, is available at **archgroup.com/esg.** We are committed to sharing our ongoing integration of ESG topics within five key areas: business, operations, investments, people and communities.

all areas of our operations puts us in a strong position to protect our people and the customers who entrust us with their personal information and business.

We believe the integration of ESG factors into investment analysis contributes to improved returns and reduced risk over the long term, and aligns with our policyholders', shareholders' and other stakeholders' best interests. When it comes to our investments, we consider ESG factors for assets managed both internally and those managed by third parties. We opportunistically seek ESG-positive "impact" investments and aim to create positive and measurable effects on society while delivering competitive financial market returns. We adopted a Responsible Investment Policy in 2022 that reflects our approach to sustainable value creation by specifying governance, engagement and employee training as well as

Across our business, we strive to manage ESG risks in the interest of our insureds. As a global (re)insurer, we provide services and insurance coverages that allow our clients to rebuild after major losses and improve their resilience in a changing world. Understanding environmental and social issues means we can reduce risks and take advantage of opportunities in our underwriting for the benefit of our shareholders, customers and other stakeholders. Our risk management process monitors and manages risk, including climate risk and other risk tied to catastrophic events worldwide. We incorporate complex, dynamic factors like increased population density with elements such as our views on increased frequency and severity of natural catastrophes. Our integrated approach aligns with our corporate values and supports our core business strategy.

We incorporate sustainability and responsible, ethical practices within our operations to support our employees and stakeholders. Actively managing ESG risks and embedding compliance, transparency, data protection and resilience across

a thoughtful approach to considering ESG factors in our investment process for all assets under our management.

Investing in the success of our people as individuals and professionals is central to creating long-term sustainable growth as an organization. Our holistic approach to human capital management provides an unparalleled employee experience. This enables us to attract and retain a diverse, talented and innovative workforce and grow an inclusive culture where employees are engaged, developed, rewarded and fulfilled.

One of Arch's core values is striving to make a difference by investing in our communities. While the COVID-19 pandemic continues to cause hardship across the globe, it underscores our commitment to building stronger, more resilient communities. We demonstrate our ongoing commitment to community development by supporting high-impact volunteer work and charitable giving within our focus areas of health, housing and education, and the environment.

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

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

OR

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

For the Fiscal Year Ended December 31, 2021 **Commission File No. 001-16209**

ARCH CAPITAL GROUP LTD.

(Exact name of registrant as specified in its charter)

Bermuda **98-0374481**
(State or other jurisdiction of incorporation or organization) (I.R.S. Employer Identification No.)

Waterloo House, Ground Floor
100 Pitts Bay Road, Pembroke HM 08, Bermuda **(441) 278-9250**
(Address of principal executive offices) (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
Depositary shares, each representing a 1/1,000th interest in a 5.45% Series F preferred share	ACGLO	NASDAQ Stock Market
Depositary shares, each representing a 1/1,000th interest in a 4.55% Series G preferred share	ACGLN	NASDAQ Stock Market

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

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☑ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Exchange Act. Yes ☐ No ☑

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Exchange Act 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 has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☑

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

The aggregate market value of the voting and non-voting common equity held by non-affiliates, computed by reference to the closing price as reported by the NASDAQ Stock Market as of the last business day of the Registrant's most recently completed second fiscal quarter, was approximately $14.3 billion.

As of February 21, 2022, there were 379,042,099 of the registrant's common shares outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of Part III and Part IV incorporate by reference our definitive proxy statement for the 2022 annual meeting of shareholders to be filed with the Securities and Exchange Commission pursuant to Regulation 14A within 120 days after December 31, 2021.

ARCH CAPITAL GROUP LTD.

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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 and reinsurance 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;
- changes in the method for determining the London Inter-bank Offered Rate ("LIBOR") and the replacement of LIBOR with alternative benchmark rates;
- 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 new guidance implementing the Tax Cuts and Jobs Act of 2017 and the possible 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 this Annual Report on Form 10-K, as well as the other factors set forth in Arch Capital Group Ltd.'s 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.

PART I

ITEM 1. BUSINESS

As used in this report, references to "we," "us," "our," "Arch" or the "Company" refer to the consolidated operations of Arch Capital Group Ltd. ("Arch Capital") and its subsidiaries. Tabular amounts are in U.S. Dollars in thousands, except share amounts, unless otherwise noted. We refer you to Item 1A "Risk Factors" for a discussion of risk factors relating to our business.

OUR COMPANY

General

Arch Capital, a publicly listed Bermuda exempted company with $16.3 billion in capital at December 31, 2021, provides insurance, reinsurance and mortgage insurance on a worldwide basis through its wholly owned subsidiaries. While we are positioned to provide a full range of property, casualty and mortgage insurance and reinsurance lines, we focus on writing specialty lines of insurance and reinsurance. For 2021, we wrote $9.0 billion of net premiums and reported net income available to Arch common shareholders of $2.1 billion. Book value per share was $33.56 at December 31, 2021, compared to $30.31 per share at December 31, 2020.

Arch Capital's registered office is located at Clarendon House, 2 Church Street, Hamilton HM 11, Bermuda (telephone number: (441) 295-1422), and its principal executive offices are located at Waterloo House, Ground Floor, 100 Pitts Bay Road, Pembroke HM 08, Bermuda (telephone number: (441) 278-9250). Arch Capital makes available free of charge through its website, located at www.archgroup.com, its annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and all amendments to those reports as soon as reasonably practicable after such material is electronically filed with, or furnished to, the U.S. Securities and Exchange Commission ("SEC"). The SEC maintains an Internet site that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC (such as Arch Capital) and the address of that site is www.sec.gov.

Our History

Arch Capital was formed in September 2000 and became the sole shareholder of Arch Capital Group (U.S.) Inc. ("Arch-U.S.") pursuant to an internal reorganization transaction completed in November 2000. In October 2001, Arch Capital launched an underwriting initiative to meet current and future demand in the global insurance and reinsurance markets that included the recruitment of new management teams and an equity capital infusion of $763.2 million, which created a strong capital base that was unencumbered by significant pre-2002 risks. Since then, we have attracted a proven management team with extensive industry experience and continued to build our global underwriting platform for our insurance, reinsurance and mortgage insurance businesses.

Our insurance underwriting platform initially consisted of our Bermuda and U.S. operations, followed by the establishment of our United Kingdom-based carrier, Arch Insurance (U.K.) Limited ("Arch Insurance (U.K.)") in 2004 and Canadian operations in 2005. In 2009, we established a managing agency and syndicate at Lloyd's of London ("Lloyd's") and significantly expanded our U.K. presence in 2019 through the acquisition of Barbican Group Holdings Limited ("Barbican Holdings") and its subsidiaries (collectively, "Barbican"). Our U.S. platform has grown with the 2018 acquisition of McNeil & Company, Inc. ("McNeil"), a U.S. nationwide leader in specialized risk management and program administration. See "Operations—Insurance Operations" for further details on our insurance operations.

Our reinsurance underwriting platform initially consisted of Arch Reinsurance Ltd. in Bermuda ("Arch Re Bermuda") and Arch Reinsurance Company ("Arch Re U.S."), our U.S.-licensed reinsurer. Our reinsurance operations in Europe began in 2006 in offices in Zurich, Switzerland and the formation of a Danish underwriting agency in 2007. In addition to the U.S. reinsurance treaty activities of Arch Re U.S., we launched our property facultative reinsurance underwriting operations in 2007, which underwrite in the U.S., Canada and Europe. In 2008, we formed Arch Reinsurance Europe Designated Activity Company ("Arch Re Europe"), our Ireland-based reinsurance company headquartered in Ireland with offices in Switzerland and the U.K. The acquisition of Barbican in 2019 also contributed to our reinsurance operations. On August 6, 2021, Arch Re Bermuda completed the acquisition of Somerset Bridge Group Limited, Southern Rock Holdings Limited and affiliates ("Somerset Group"). The acquisition includes Somerset's motor insurance managing general agent, distribution capabilities through direct and aggregator channels, affiliated insurer and fully integrated claims operation. See "Operations—Reinsurance Operations" for further details on our reinsurance operations.

Our mortgage operations include U.S. and international mortgage insurance and reinsurance operations, as well as participation in government sponsored enterprise ("GSE") credit risk-sharing transactions.

The U.S. mortgage platform was established in 2014 and expanded greatly in 2016 through the acquisition of United Guaranty Corporation ("UGC"). Our U.S. primary mortgage operations provide mortgage insurance products and services to the U.S. market. These operations include providers that are also approved as eligible mortgage insurers by Federal National Mortgage Association ("Fannie Mae") and Federal Home Loan Mortgage Corporation ("Freddie Mac"), each a GSE. The mortgage operations also include participation in GSE credit risk-sharing transactions and direct mortgage insurance to U.S. mortgage lenders with respect to mortgages that lenders intend to retain in portfolio or include in non-agency securitizations along with mortgage insurance and reinsurance on a global basis. Our European business is written through our Ireland-based carrier, Arch Insurance (EU) Designated Activity Company ("Arch Insurance (EU)"), which was authorized in 2011 to provide mortgage insurance products and services to the European and U.K. markets. In 2019, Arch LMI Pty Ltd. ("Arch LMI") was authorized by the Australian Prudential Regulation Authority ("APRA") to write lenders' mortgage insurance on a direct basis in Australia. We expanded our presence in Australia in August 2021 by acquiring Westpac Lenders Mortgage Insurance Limited, another APRA-approved writer of lenders' mortgage insurance, which has since been renamed Arch Lenders Mortgage Indemnity Ltd. ("Arch Indemnity"). See "Operations—Mortgage Operations" for further details on our mortgage operations.

It is our belief that our underwriting platform, our experienced management team and our strong capital base have enabled us to establish a strong presence in the markets we participate in.

In 2014, we acquired approximately 11% of Somers Holdings Ltd. (formerly Watford Holdings Ltd.). Somers Holdings Ltd. is the parent of Somers Re Ltd. (formerly Watford Re Ltd.), a multi-line Bermuda reinsurance company (together with Somers Holdings Ltd., "Somers"). In the 2020 fourth quarter, Arch Capital, Somers, and Greysbridge Ltd., a wholly-owned subsidiary of Arch Capital, entered into an Agreement and Plan of Merger (as amended, the "Merger Agreement"). Arch Capital assigned its rights under the Merger Agreement to Greysbridge Holdings Ltd. ("Greysbridge"). The merger and the related Greysbridge equity financing closed on July 1, 2021. Effective July 1, 2021, Somers is wholly owned by Greysbridge, and Greysbridge is owned 40% by Arch, 30% by certain funds managed by Kelso & Company ("Kelso") and 30% by certain funds managed by Warburg Pincus LLC ("Warburg"). In 2017, we acquired approximately 25% of Premia Holdings Ltd. Premia Holdings Ltd. is the parent of Premia Reinsurance Ltd., a multi-line Bermuda reinsurance company (together with Premia Holdings Ltd., "Premia"). In 2021, the Company completed the share purchase agreement with Natixis, a French financial services firm, to purchase 29.5% of the common equity of Coface SA ("Coface"), a France-based leader in the global trade credit insurance market. See "Operations—Other Operations" for further details on Somers, Premia and Coface.

The board of directors of Arch Capital (the "Board") has authorized the investment in Arch Capital's common shares through a share repurchase program. Repurchases under the share repurchase program may be effected from time to time in open market or privately negotiated transactions through December 31, 2022. Since the inception of the share repurchase program in February 2007 through December 31, 2021, Arch Capital has repurchased 420.7 million common shares for an aggregate purchase price of $5.3 billion. At December 31, 2021, the total remaining authorization under the share repurchase program was $1.2 billion. 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. Depending upon results of operations, market conditions and the development of the economy, as well as other factors, generally we will consider share repurchases on an opportunistic basis from time to time. During the 2021 fiscal year, we repurchased 31,486,830 shares for an aggregate amount of $1.23 billion under our share repurchase program.

OPERATIONS

We classify our businesses into three underwriting segments– insurance, reinsurance and mortgage and two operating segments– corporate and 'other.' For an analysis of our underwriting results by segment, see note 4, "Segment Information," to our consolidated financial statements in Item 8 and "Management's Discussion and Analysis of Financial Condition and Results of Operations—Results of Operations."

COVID-19 Pandemic

The global pandemic resulting from the coronavirus (including variants of the coronavirus such as Delta and Omicron, "COVID-19") has disrupted the global economy, causing a significant slowdown in economic activity around the world. Businesses around the world, including ours, have been impacted by the restrictions on travel, some business activities and non-essential services and the reverberations of severe curtailment of normal activities. We have taken proactive steps to ensure the health and safety of our employees with the majority of our 5,200 employees working from home to maintain business continuity. Where possible, we have encouraged employees to return to our offices,

taking into account their health and safety, as well as our changing business practices. Our employees and businesses have adapted to the changing needs of our clients, customers and business partners. We remain committed to continuing to carrying on our business activities without interruption during these challenging times.

Insurance Operations

Our insurance operations are conducted in Bermuda, the United States, the United Kingdom, Europe, Canada, and Australia. Our insurance operations in Bermuda are conducted through Arch Insurance (Bermuda), a division of Arch Re Bermuda, and Alternative Re Limited.

In the U.S., our insurance group's principal insurance subsidiaries are Arch Insurance Company ("Arch Insurance"), Arch Specialty Insurance Company ("Arch Specialty"), Arch Indemnity Insurance Company ("Arch Indemnity Insurance") and Arch Property & Casualty Insurance Company ("Arch P&C"). Arch Insurance is an admitted insurer in 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands and Guam. Arch Specialty is an approved excess and surplus lines insurer in 50 states, the District of Columbia, Puerto Rico and the U.S. Virgin Islands and an authorized insurer in one state. Arch Indemnity Insurance is an admitted insurer in 50 states and the District of Columbia. Arch P&C, which is not currently writing business, is an admitted insurer in 40 states and the District of Columbia and is filing applications for admission in all remaining states where it is not yet admitted. Our insurance group also operates McNeil, a specialized risk manager and a program administrator based in Cortland, New York. The headquarters for our insurance group's U.S. support operations (excluding underwriting units) are in Jersey City, New Jersey. The insurance group has offices throughout the U.S., including five regional offices located in Alpharetta, Georgia, Chicago, Illinois, New York, New York, San Francisco, California, Dallas, Texas and additional branch offices.

Our insurance operations in Canada are conducted through Arch Insurance Canada Ltd. ("Arch Insurance Canada"), a Canada domestic company which is authorized in all Canadian provinces and territories. Arch Insurance Canada is headquartered in Toronto, Ontario.

In 2019, Arch Insurance (EU), based in Dublin, Ireland, received authorization from the Central Bank of Ireland ("CBOI") to expand its classes of business as part of our plan to address the U.K.'s departure from the European Union ("Brexit"). As of January 2020, all of the insurance business in the European Union ("EU") previously written by Arch Insurance (U.K.) is now written through Arch Insurance (EU). Arch Insurance (EU) has branches in the EU in Denmark and Italy and outside the EU in the U.K. At the end of December 2020, Arch Insurance (U.K.) received court approval in the U.K. to transfer its legacy book of business written in the European Economic Area ("EEA") to Arch Insurance (EU) under Part VII of the U.K. Financial Services and Markets Act 2000.

We conduct insurance operations on several platforms in the U.K., including Arch Insurance (U.K.) and our Lloyd's syndicates: Arch Syndicate 2012 ("Arch Syndicate 2012") and Arch Syndicate 1955 ("Arch Syndicate 1955"). Arch Managing Agency Limited ("AMAL") is the managing agent of Arch Syndicate 2012 and Arch Syndicate 1955. Our Lloyd's syndicates provide us access to Lloyd's extensive distribution network and worldwide licenses. AMAL also acts as managing agent for third party members of Arch Syndicate 1955. Arch Underwriting at Lloyd's (Australia) Pty Ltd, based in Sydney, Australia, is a Lloyd's services company which underwrites exclusively for our Lloyd's syndicates. With the Barbican acquisition, we also acquired Castel Underwriting Agencies Limited ("Castel") in the U.K. and Castel Underwriting Europe BV in the Netherlands, giving us additional underwriting intermediary capabilities for our underwriting platforms. Collectively, the U.K. insurance operations are referred to as "Arch U.K.". Arch U.K. conducts its operations from London and other locations in the U.K.

Strategy. Our insurance group's strategy is to operate in lines of business in which underwriting expertise can make a meaningful difference in operating results. The insurance group focuses on talent-intensive rather than labor-intensive business and seeks to operate profitably (on both a gross and net basis) across all of its product lines. To achieve these objectives, our insurance group's operating principles are to:

- *Capitalize on profitable underwriting opportunities*. Our insurance group believes that its experienced management and underwriting teams are positioned to locate and identify business with attractive risk/reward characteristics. As profitable underwriting opportunities are identified, our insurance group will continue to seek to make additions to its product portfolio in order to take advantage of market trends. This includes adding underwriting and other professionals with specific expertise in specialty lines of insurance.

- *Centralize responsibility for underwriting*. Our insurance group consists of a range of product lines. The underwriting executive in charge of each product line oversees all aspects of the underwriting product development process within such product line. Our insurance group believes that centralizing the control of such product line with the respective underwriting executive allows for close management of underwriting and creates clear accountability for results. Our U.S.

insurance group has five regional offices, and the executive in charge of each region is primarily responsible for all aspects of the marketing and distribution of our insurance group's products, including the management of broker and other producer relationships in such executive's respective region. In our non-U.S. offices, a similar philosophy is observed, with responsibility for the management of each product line residing with the senior underwriting executive in charge of such product line.

- *Maintain a disciplined underwriting philosophy*. Our insurance group's underwriting philosophy is to generate an underwriting profit through prudent risk selection and proper pricing. Our insurance group believes that the key to this approach is adherence to uniform underwriting standards across all types of business. Our insurance group's senior management closely monitors the underwriting process.

- *Focus on providing superior claims management*. Our insurance group believes that claims handling is an integral component of credibility in the market for insurance products. Therefore, our insurance group believes that its ability to handle claims expeditiously and satisfactorily is a key to its success. Our insurance group employs experienced claims professionals and also utilizes experienced external claims managers (third party administrators) where appropriate.

- *Promote and utilize an efficient distribution system*. Our insurance group believes that promoting and utilizing a multi-channel distribution system, provides efficient access to its broad customer base. Our insurance group works with select international, national and regional retail and wholesale brokers and leading managing general agencies, including McNeil, to distribute our insurance products. The Arch U.K. Regional Division expanded our retail distribution network in the U.K.

- *Grow strategic partnerships in stable and niche areas.* Our insurance group aims to build more integrated long-term alignment with strategic partners offering superior access to niche opportunities, quality scalable businesses, or lines with reliable defensive qualities.

Our insurance group writes business in the U.S. on both a U.S. admitted and U.S. non-admitted basis. Our insurance group focuses on various specialty lines, as described in note 4, "Segment Information," to our consolidated financial statements in Item 8.

Underwriting Philosophy. Our insurance group's underwriting philosophy is to generate an underwriting profit (on both a gross and net basis) through prudent risk selection and proper pricing across all types of business. One key to this philosophy is the adherence to uniform underwriting standards across each product line that focuses on the following:

- risk selection;
- desired attachment point;
- limits and retention management;
- due diligence, including financial condition, claims history, management, and product, class and territorial exposure;
- underwriting authority and appropriate approvals; and
- collaborative decision making.

Marketing. Our insurance group's products are marketed principally through a group of licensed independent retail and wholesale brokers. Clients (insureds) are referred to our insurance group through a large number of international, national and regional brokers and captive managers who receive from the insured or insurer a set fee or brokerage commission usually equal to a percentage of gross premiums. In the past, our insurance group also entered into contingent commission arrangements with some brokers that provided for the payment of additional commissions based on volume or profitability of business. Currently, some of our contracts with brokers provide for additional commissions based on volume. We have also entered into service agreements with select international brokers that provide access to their proprietary industry analytics. In general, our insurance group has no implied or explicit commitments to accept business from any particular broker and neither brokers nor any other third parties have the authority to bind our insurance group, except in the case where underwriting authority may be delegated contractually to select program administrators. Such administrators are subject to a financial and operational due diligence review prior to any such delegation of authority and ongoing reviews and audits are carried out as deemed necessary by our insurance group to assure the continuing integrity of underwriting and related business operations. See "Risk Factors—Risks Relating to Our Industry, Business and Operations—We could be materially adversely affected to the extent that important third parties with whom we do business do not adequately or appropriately manage their risks, commit fraud or otherwise breach obligations owed to us." For information on major brokers, see note 18, "Commitments and Contingencies—Concentrations of Credit Risk," to our consolidated financial statements in Item 8.

Risk Management and Reinsurance. In the normal course of business, our insurance group may cede a portion of its premium on a quota share or excess of loss basis through treaty or facultative reinsurance agreements. Reinsurance arrangements do not relieve our insurance group from its primary obligations to insureds. Reinsurance recoverables are

recorded as assets, predicated on the reinsurers' ability to meet their obligations under the reinsurance agreements. If the reinsurers are unable to satisfy their obligations under the agreements, our insurance subsidiaries would be liable for such defaulted amounts. Our principal insurance subsidiaries, with oversight by a group-wide reinsurance steering committee ("RSC"), are selective with regard to reinsurers, seeking to place reinsurance with only those reinsurers which meet and maintain specific standards of established criteria for financial strength. The RSC evaluates the financial viability of its reinsurers through financial analysis, research and review of rating agencies' reports and also monitors reinsurance recoverables and collateral with unauthorized reinsurers. The financial analysis includes ongoing qualitative and quantitative assessments of reinsurers, including a review of the financial stability, appropriate licensing, reputation, claims paying ability and underwriting philosophy of each reinsurer. See note 8, "Reinsurance," to our consolidated financial statements in Item 8.

For catastrophe-exposed insurance business, our insurance group seeks to limit the amount of exposure to catastrophic losses it assumes through a combination of managing aggregate limits, underwriting guidelines and reinsurance. For a discussion of our risk management policies, see "Management's Discussion and Analysis of Financial Condition and Results of Operations—Summary of Critical Accounting Estimates—Ceded Reinsurance" and "Risk Factors—Risks Relating to Our Industry, Business and Operations—The failure of any of the loss limitation methods we employ could have a material adverse effect on our financial condition or results of operations."

Claims Management. Our insurance group's claims management function is performed by claims professionals, as well as experienced external claims managers (third party administrators), where appropriate. In addition to investigating, evaluating and resolving claims, members of our insurance group's claims departments work with underwriting professionals as functional teams in order to develop products and services desired by the group's clients.

Reinsurance Operations

Our reinsurance operations are conducted on a worldwide basis through our reinsurance subsidiaries, Arch Re Bermuda, Arch Re U.S., Arch Syndicate 2012, Arch Syndicate 1955 and Arch Re Europe. Arch Re Bermuda is a registered Class 4 general business insurer and Class C long-term insurer and is headquartered in Hamilton, Bermuda. Arch Re Bermuda has also been approved as a "certified reinsurer" in certain U.S. states that allow reduced collateral for reinsurance ceded to such reinsurers. Arch Re U.S. is licensed or is an accredited or otherwise approved reinsurer in 50 states, the District of Columbia and Puerto Rico, the provinces of Ontario and Quebec in Canada with its principal U.S. offices in Morristown, New Jersey. Treaty operations in Canada are conducted through the Canadian branch of Arch Re U.S. ("Arch Re Canada"). Arch Re U.S. is also an admitted insurer in Guam. Our property facultative reinsurance operations are conducted primarily through Arch Re U.S. The property facultative reinsurance operations have offices throughout the U.S., Canada, Europe and the U.K. Arch Re Europe, licensed and authorized as a non-life reinsurer and a life reinsurer, is headquartered in Dublin, Ireland with branch offices outside the EEA in Zurich and London. AMAL is the managing agent for the reinsurance operations of Arch Syndicate 2012 and Arch Syndicate 1955.

Strategy. Our reinsurance group's strategy is to capitalize on our financial capacity, experienced management and operational flexibility to offer multiple products through our operations. The reinsurance group's operating principles are to:

- *Actively select and manage risks*. Our reinsurance group only underwrites business that meets certain profitability criteria, and it emphasizes disciplined underwriting over premium growth. To this end, our reinsurance group maintains centralized control over reinsurance underwriting guidelines and authorities.

- *Maintain flexibility and respond to changing market conditions*. Our reinsurance group's organizational structure and philosophy allows it to take advantage of increases or changes in demand or favorable pricing trends. Our reinsurance group believes that its existing platforms in Bermuda, the U.S., U.K., Europe and Canada, broad underwriting expertise and substantial capital facilitate adjustments to its mix of business geographically and by line and type of coverage. Our reinsurance group believes that this flexibility allows it to participate in those market opportunities that provide the greatest potential for underwriting profitability.

- *Maintain a low cost structure*. Our reinsurance group believes that maintaining tight control over its staffing level and operating primarily as a broker market reinsurer permits it to maintain low operating costs relative to its capital and premiums.

Our reinsurance group writes business on both a proportional and non-proportional basis and writes both treaty and facultative business. In a proportional reinsurance arrangement (also known as pro rata reinsurance, quota share reinsurance or participating reinsurance), the reinsurer shares a proportional part of the original premiums and losses of the reinsured. The reinsurer pays the cedent a commission which is generally based on the cedent's cost of acquiring the business being reinsured (including commissions, premium taxes, assessments and miscellaneous administrative expenses) and may also include a profit factor. Non-

proportional (or excess of loss) reinsurance indemnifies the reinsured against all or a specified portion of losses on underlying insurance policies in excess of a specified amount, which is called a "retention." Non-proportional business is written in layers and a reinsurer or group of reinsurers accepts a band of coverage up to a specified amount. The total coverage purchased by the cedent is referred to as a "program." Any liability exceeding the upper limit of the program reverts to the cedent.

The reinsurance group's treaty operations generally seek to write significant lines on less commoditized classes of coverage, such as specialty property and casualty reinsurance treaties. However, with respect to other classes of coverage, such as property catastrophe and casualty clash, the reinsurance group's treaty operations participate in a relatively large number of treaties where they believe that they can underwrite and process the business efficiently. The reinsurance group's property facultative operations write reinsurance on a facultative basis whereby they assume part of the risk under primarily single insurance contracts. Facultative reinsurance is typically purchased by ceding companies for individual risks not covered by their reinsurance treaties, for unusual risks or for amounts in excess of the limits on their reinsurance treaties.

For additional information regarding the business written by the reinsurance group, please refer to note 4, "Segment Information," to our consolidated financial statements in Item 8.

Underwriting Philosophy. Our reinsurance group employs a disciplined, analytical approach to underwriting reinsurance risks that is designed to specify an adequate premium for a given exposure commensurate with the amount of capital it anticipates placing at risk. A number of our reinsurance group's underwriters are also actuaries. It is our reinsurance group's belief that employing actuaries on the front-end of the underwriting process gives it an advantage in evaluating risks and constructing a high quality book of business.

As part of the underwriting process, our reinsurance group typically assesses a variety of factors, including:

- adequacy of underlying rates for a specific class of business and territory;
- the reputation of the proposed cedent and the likelihood of establishing a long-term relationship with the cedent, the geographic area in which the cedent does business, together with its catastrophe exposures, and our aggregate exposures in that area;
- historical loss data for the cedent and, where available, for the industry as a whole in the relevant regions, in order to compare the cedent's historical loss experience to industry averages;
- projections of future loss frequency and severity; and
- the perceived financial strength of the cedent.

Marketing. Our reinsurance group generally markets its reinsurance products through brokers, except our property facultative reinsurance group, which generally deals directly with the ceding companies. Brokers do not have the authority to bind our reinsurance group with respect to reinsurance agreements, nor does our reinsurance group commit in advance to accept any portion of the business that brokers submit to them. Our reinsurance group generally pays brokerage fees to brokers based on negotiated percentages of the premiums written through such brokers. For information on major brokers, see note 18, "Commitments and Contingencies—Concentrations of Credit Risk," to our consolidated financial statements in Item 8.

Risk Management and Retrocession. Our reinsurance group currently purchases a combination of per event excess of loss, per risk excess of loss, proportional retrocessional agreements and other structures that are available in the market. Such arrangements reduce the effect of individual or aggregate losses on, and in certain cases may also increase the underwriting capacity of, our reinsurance group. Our reinsurance group will continue to evaluate its retrocessional requirements based on its net appetite for risk. See note 8, "Reinsurance," to our consolidated financial statements in Item 8.

For catastrophe exposed reinsurance business, our reinsurance group seeks to limit the amount of exposure it assumes from any one reinsured and the amount of the aggregate exposure to catastrophe losses from a single event in any one geographic zone. For a discussion of our risk management policies, see "Management's Discussion and Analysis of Financial Condition and Results of Operations—Summary of Critical Accounting Estimates—Ceded Reinsurance" and "Risk Factors—Risks Relating to Our Industry, Business and Operations—The failure of any of the loss limitation methods we employ could have a material adverse effect on our financial condition or results of operations."

Claims Management. Claims management includes the receipt of initial loss reports, creation of claim files, determination of whether further investigation is required, establishment and adjustment of case reserves and payment of claims. Additionally, audits are conducted for both specific claims and overall claims procedures at the offices of selected ceding companies. Our reinsurance group makes use of outside consultants for claims work from time to time.

Mortgage Operations

Our mortgage operations provide U.S. and international mortgage insurance and reinsurance operations as well as participation in GSE credit risk-sharing transactions. Our mortgage group includes direct mortgage insurance in the U.S. primarily through Arch Mortgage Insurance Company, United Guaranty Residential Insurance Company, and Arch Mortgage Guaranty Company (together, "Arch MI U.S."); mortgage reinsurance primarily through Arch Re Bermuda to mortgage insurers on both a proportional and non-proportional basis globally; direct mortgage insurance in the EEA and U.K. through Arch Insurance (EU), in Australia through Arch LMI and Arch Indemnity, and in Hong Kong through Arch MI Asia Limited ("Arch MI Asia"); and participation in various GSE credit risk-sharing products primarily through Arch Re Bermuda.

In 2014 we entered the U.S. mortgage insurance marketplace, underwriting on the Arch Mortgage Insurance Company platform. Arch Mortgage Insurance Company is licensed and operates in all 50 states, the District of Columbia and Puerto Rico. In December 2016, we completed the acquisition of UGC and its primary operating subsidiary, United Guaranty Residential Insurance Company, which is licensed and operates in all 50 states and the District of Columbia.

Arch Mortgage Insurance Company and United Guaranty Residential Insurance Company have each been approved as an eligible mortgage insurer by Fannie Mae and Freddie Mac, subject to maintaining certain ongoing requirements ("eligible mortgage insurer"). Arch Mortgage Guaranty Company offers direct mortgage insurance to U.S. mortgage lenders with respect to mortgages that lenders intend to retain in portfolio or include in non-agency securitizations. Arch Mortgage Guaranty Company, which is licensed in all 50 states and the District of Columbia, insures mortgages that are not intended to be sold to the GSEs, and it is therefore not approved by either GSE as an eligible mortgage insurer.

In 2019, Arch LMI was authorized by APRA to write lenders' mortgage insurance. In August 2021, we acquired Arch Indemnity, which is also authorized by APRA to write lenders' mortgage insurance. Arch LMI and Arch Indemnity are headquartered in Sydney, Australia and focus on providing direct lenders' mortgage insurance and reinsurance to the Australian market.

Strategy. The mortgage insurance market operates on a distinct underwriting cycle, with demand driven mainly by the housing market and general economic conditions. As a result, the creation of the mortgage group provides us with a more diverse revenue stream. Our mortgage group's strategy is to capitalize on its financial capacity, mortgage insurance technology platform, operational flexibility and experienced management to offer mortgage insurance, reinsurance and other risk-sharing products in the U.S. and around the world.

Our mortgage group's operating principles and goals are to:

- *Capitalize on profitable underwriting opportunities*. Our mortgage group believes that its experienced management, analytics and underwriting teams are positioned to identify and evaluate business with attractive risk/reward characteristics.

- *Maintain a disciplined credit risk philosophy*. Our mortgage group's credit risk philosophy is to generate underwriting profit through disciplined credit risk analysis and proper pricing. Our mortgage group believes that the key to this approach is maintaining discipline across all phases of the applicable housing and mortgage lending cycles.

- *Provide superior and innovative mortgage products and services*. Our mortgage group believes that it can leverage its financial capacity, experience across insurance product lines and the mortgage finance industry, and its analytics and technology to provide innovative products and superior service. The mortgage group believes that its delivery of tailored products that meet the specific, evolving needs of its customers will be a key to the group's success.

- *Maintain our position as a leading provider of U.S. mortgage insurance business*. With the acquisition of UGC in 2016, a leading provider of mortgage insurance products and services to national and regional banks and mortgage originators, we became a leading provider of U.S. mortgage insurance.

Our mortgage group focuses on the following areas:

- *Direct mortgage insurance in the United States*. Under their monoline insurance licenses, each of Arch's eligible mortgage insurers may only offer private mortgage insurance covering first lien, one-to-four family residential mortgages. Nearly all of our mortgage insurance written provides first loss protection on loans originated by mortgage lenders and sold to the GSEs. Each GSE's Congressional charter generally prohibits it from purchasing a mortgage where the principal balance of the mortgage is in excess of 80% of the value of the property securing the mortgage unless the excess portion of the mortgage is protected against default by lender recourse, participation or by a qualified insurer. As a result, such "high loan-to-value mortgages" purchased by Fannie Mae or Freddie Mac generally are insured with private mortgage insurance.

  Mortgage insurance protects the insured lender, investor or GSE against loss in the event of a borrower's default.

If a borrower defaults on mortgage payments, private mortgage insurance reduces, and may eliminate, losses to the insured. Private mortgage insurance may also facilitate the sale of mortgage loans in the secondary mortgage market because of the credit enhancement it provides. Our primary U.S. mortgage insurance policies predominantly cover individual loans and are effective at the time the loan is originated. We also may enter into insurance transactions with lenders and investors, under which we insure a portfolio of loans at or after origination. Although not currently a significant product, we may offer mortgage insurance on a "pool" basis in the future. Under pool insurance, the mortgage insurer provides coverage on a group of specified loans, typically for 100% of all contractual or policy-defined losses on every loan in the portfolio, subject to an agreed aggregate loss limit. Pool insurance may be in a first loss position with respect to loans that do not have primary mortgage insurance policies, or it may be in a second loss position, covering losses in excess of those covered by the primary mortgage insurance policy.

- *Direct mortgage insurance in Europe and other countries where we identify profitable underwriting opportunities*. Since 2011, Arch Insurance (EU) has offered mortgage insurance to European mortgage lenders. Arch Insurance (EU)'s mortgage insurance is primarily purchased by European mortgage lenders in order to reduce lenders' credit risk and regulatory capital requirements associated with the insured mortgages. In certain European countries, lenders purchase mortgage insurance to facilitate regulatory compliance with respect to high loan-to-value residential lending. Arch Insurance (EU) offers mortgage insurance on both a "flow" basis to cover new originations and through structured transactions to cover one or more portfolios of previously originated residential loans. In Australia, Arch LMI and Arch Indemnity provide lenders' mortgage insurance on a direct basis.

- *Reinsurance*. Arch Re Bermuda provides quota share reinsurance covering U.S. and international mortgages.

- *Other credit risk-sharing products*. In addition to providing traditional mortgage insurance and reinsurance, we offer various credit risk-sharing products to government agencies and mortgage lenders. The GSEs have reduced their exposure to mortgage risk by shifting a portion of it to the private sector, creating opportunities for insurers to assume additional mortgage risk. In 2013, Arch Re Bermuda became the first (re)insurance company to participate in Freddie Mac's program to transfer certain credit risk in its single-family portfolio to the private sector. Since that time, Arch Re Bermuda and its affiliates have regularly participated in both Fannie Mae and Freddie Mac single family and multifamily risk sharing programs.

In 2019 we established Arch Credit Risk Services (Bermuda) ("Arch CRS") Ltd. Arch CRS is licensed by the Bermuda Monetary Authority ("BMA") as an insurance agent in Bermuda. Arch CRS offers mortgage credit assessment and underwriting advisory services with respect to participation in GSE credit risk transfer transactions.

Underwriting Philosophy. Our mortgage group believes in a disciplined, analytical approach to underwriting mortgage risks by utilizing proprietary and third party models, including forecasting delinquency and future home price movements with the goal of ensuring that premiums are adequate for the risk being insured. Experienced actuaries and statistical modelers are engaged in analytics to inform the underwriting process. As part of the underwriting process, our mortgage group typically assesses a variety of factors, including the:

- ability and willingness of the mortgage borrower to pay its obligations under the mortgage loan being insured;
- characteristics of the mortgage loan being insured and the value of the collateral securing the mortgage loan;
- financial strength, quality of operations and reputation of the lender originating the mortgage loan;
- expected future home price movements which vary by geography;
- projections of future loss frequency and severity; and
- adequacy of premium rates.

Sales and Distribution. We employ a sales force located throughout the U.S. to directly sell mortgage insurance products and services to our customers, which include mortgage originators such as mortgage bankers, mortgage brokers, commercial banks, savings institutions, credit unions and community banks. Our largest single mortgage insurance customer (including branches and affiliates) accounted for 6.3% and 5.4% of our gross premiums written for the years ending December 31, 2021 and 2020, respectively. No other customer accounted for greater than 2.8% and 3.2% of the gross premiums written for the years ending December 31, 2021 and 2020, respectively. The percentage of gross premiums written on our top 10 customers was 22.7% and 22.0% as of December 31, 2021 and 2020, respectively. In Europe, Asia, Bermuda and Australia, our products and services are/or will be distributed on a direct basis and through brokers. Each country represents a unique set of opportunities and challenges that require knowledge of market conditions and client needs to develop effective solutions.

Risk Management. Exposure to mortgage risk is monitored globally and managed through underwriting guidelines, pricing, reinsurance, utilization of proprietary risk models, concentration limits and limits on net probable loss resulting from a severe economic downturn in the housing market. For a discussion of our risk management policies, see "Management's Discussion and Analysis of Financial Condition and Results of Operations—Summary of Critical Accounting Estimates—Ceded Reinsurance" and "Risk Factors—Risks Relating to Our Industry, Business and Operations—The failure of any of the loss limitation methods we employ could have a material adverse effect on our financial condition or results of operations."

Our mortgage group has ceded a portion of its premium on a quota share basis through certain reinsurance agreements and through aggregate excess of loss reinsurance agreements which provide reinsurance coverage for delinquencies on portfolios of in-force policies issued between certain periods. See note 8, "Reinsurance," to our consolidated financial statements in Item 8 for further details.

Reinsurance arrangements do not relieve our mortgage group from its primary obligations to insured parties. Reinsurance recoverables are recorded as assets, predicated on the reinsurers' ability to meet their obligations under the reinsurance agreements. If the reinsurers are unable to satisfy their obligations under the agreements, our mortgage subsidiaries would be liable for such defaulted amounts. For our U.S. mortgage insurance business, in addition to utilizing reinsurance, we have developed a proprietary risk model that simulates the maximum loss resulting from severe economic events impacting the housing market. See "Management's Discussion and Analysis of Financial Condition and Results of Operations—Catastrophic Events and Severe Economic Events."

Claims Management. With respect to our direct mortgage insurance business, the claims process generally begins with notification by the insured or servicer to us of a default on an insured loan. The insured is generally required to notify us of a default after the borrower misses two consecutive monthly payments. Borrowers default for a variety of reasons, including a reduction of income, unemployment, divorce, illness, inability to manage credit, rising interest rate levels and declining home prices. Upon notice of a default, in certain cases we may coordinate with loan servicers to facilitate and enhance retention workouts on insured loans. Retention workouts include payment forbearance, loan modifications and other loan repayment options, which may enable borrowers to cure mortgage defaults and retain ownership of their homes. If a retention workout is not viable for a borrower, our loss on a loan may be mitigated through a liquidation workout option, including a pre-foreclosure sale or a deed-in-lieu of foreclosure.

In the U.S., our master policies generally provide that within 60 days of the perfection of a primary insurance claim, we have the option of:

- paying the insurance coverage percentage specified in the certificate of insurance multiplied by the loss amount;
- in the event the property is sold pursuant to an approved prearranged sale, paying the lesser of (i) 100% of the loss amount less the proceeds of sale of the property, or (ii) the specified coverage percentage multiplied by the loss amount; or
- paying 100% of the loss amount in exchange for the insured's conveyance to us of good and marketable title to the property, with us then selling the property for our own account.

While we select the claim settlement option that best mitigates the amount of our claim payment, in the U.S. we generally pay the coverage percentage multiplied by the loss amount.

Other Operations

In 2014, we and HPS Investment Partners, LLC (formerly Highbridge Principal Strategies, LLC) ("HPS"), sponsored the formation of Somers. Arch Re Bermuda invested $100.0 million in Somers common equity. Somers' strategy is to combine a diversified reinsurance and insurance business with a disciplined investment strategy comprised primarily of non-investment grade credit assets. Somers' own management and board of directors are responsible for its results and profitability. Arch Re Bermuda has appointed three directors to serve on the seven person board of directors of Somers. In the 2020 fourth quarter, Arch Capital, Somers and Greysbridge, a wholly-owned subsidiary of Arch Capital, entered into a Merger Agreement pursuant to which, among other things, Arch Capital agreed to acquire all of the common shares of Somers not owned by Arch for a cash purchase price of $35.00 per common share. Arch Capital has assigned its rights under the Merger Agreement to Greysbridge. The merger and the related Greysbridge equity financing closed on July 1, 2021. Effective July 1, 2021, Somers is wholly owned by Greysbridge, and Greysbridge is owned 40% by Arch, 30% by certain investment funds managed by Kelso and 30% by certain investment funds managed by Warburg. See note 12, "Variable Interest Entity and Noncontrolling Interests," to our consolidated financial statements in Item 8 for further details.

In 2017 we and Kelso sponsored the formation of Premia. Premia's strategy is to reinsure or acquire companies or reserve portfolios in the non-life property and casualty insurance and reinsurance run-off market. Arch Re Bermuda

and certain Arch co-investors invested $100.0 million and acquired approximately 25% of Premia as well as warrants to purchase additional common equity. Arch Re Bermuda is providing a 25% quota share reinsurance treaty on certain business written by Premia, and subsidiaries of Arch Capital are providing certain administrative and support services to Premia, in each case pursuant to separate multi-year agreements. Arch Re Bermuda has appointed two directors to serve on the seven person board of directors of Premia. In the 2019 fourth quarter, Barbican entered into certain reinsurance and related transactions with Premia pursuant to which Premia assumed a transfer of liability for the 2018 and prior years of account of Barbican as of July 1, 2019. See note 16, "Transactions with Related Parties," to our consolidated financial statements in Item 8 for further details.

In 2021, the Company completed the share purchase agreement with Natixis to purchase 29.5% of the common equity of Coface. This is a long-term, strategic investment in Coface, and fits with Arch's efforts to develop uncorrelated sources of underwriting income. Our companies share a focus on specialty underwriting where knowledge and expertise create value for our clients, and trade credit contributes to Arch's specialty-driven business model. Arch has appointed four directors to serve on the ten person board of directors of Coface.

HUMAN CAPITAL

We are driven by our common purpose of "Enabling Possibility" for our customers, our communities and our employees. This purpose is supported by our collaborative, results-driven culture which relies on our dedicated, engaged and talented people. By offering a meaningful and inclusive employee experience, we not only help people perform at their best among colleagues who care, but also support our strategy of delivering specialty products and innovative solutions to our customers in each of our business segments. As of February 15, 2022, we had just over 5,200 employees globally, compared to around 4,500 last year, which directly speaks to our ability to grow and retain our talent despite the challenges we all faced with the global pandemic. We have approximately 3,100 employees in North America (U.S., Canada and Bermuda), 1,300 employees in Europe and the U.K. and 900 employees in the Philippines and the rest of the world.

Our People and Culture. In 2021, we conducted our bi-annual employee engagement survey. We believe the results demonstrated the success of programs, such as our employee networks, regular Company-wide "town hall" meetings and other efforts to communicate more frequently and transparently with our employees. Our employee overall engagement score was 87%, up from 84% and 10 points over the external norm. Our values of embracing teamwork, working hard and smart, continually pursuing innovation and improvement, striving to make a difference, and exhibiting honesty and integrity in all that we do were clearly reflected in the results.

Through the global pandemic, the spirit of agility that is part of our entrepreneurial roots allowed us to transition virtually overnight to a home-based employee population. Since the start of the pandemic we recognized and supported the wellness needs of our employees. We provided additional resources including webinars with a psychologist who specializes in building resilience and continued our ArchCares program to provide financial support to employees affected by COVID-19.

An important part of our culture is building an inclusive, diverse workforce. By better reflecting the demographics in the markets in which we operate while also actively instilling norms for inclusive behavior, we leverage all the best contributions and thinking across our Company. To that end, we are committed to further integrating diversity and inclusion principles in our operations. In 2021, our six employee networks provided a forum to share ideas, build community and belonging, and contribute meaningfully to business outcomes. Importantly, our networks include significant ally representation, which underscores the inclusive behavior of our people.

Talent Acquisition, Development, Rewards and Retention. Our employees are our greatest asset, and we maintain a sharp focus on improving the ways we attract, develop and retain our high-performing talent. Our goal is to cultivate a workplace culture where all our employees can thrive by building awareness of inclusive practices and incorporating them into our regular course of business. We provide unique career growth opportunities through a combination of on-the-job training, exposure to top-notch colleagues who coach and mentor, and education and training programs designed to accelerate learning and applying new skills and behaviors. We offer competitive compensation and comprehensive benefits packages, including an employee share purchase plan, parental leave, generous contributions to retirement savings plans and programs to support employee mental and physical well-being. We recognize the financial burden of educational loans in the United States and have supported our employees with a student debt assistance program. Since the inception of the program in 2018, Arch has contributed $3.2 million to this program, including $0.9 million in 2021. We also match eligible contributions to qualified charitable organizations and employees are eligible to receive time-off to volunteer with an eligible non-profit organization. Our Arch Achieve program has recognized over 400 employees for excellence since its inception in 2009, and each recipient is awarded shares of our common stock (or a cash bonus in certain cases), to recognize their accomplishments.

We also encourage employees to continue their educational and professional development through tuition reimbursement plans. To attract the best talent to our industry, we offer internship programs and an Early Career Program with an Underwriting Track which provides participants with a robust introduction and real technical skills to build a successful career at Arch. As part of our talent attraction, we have targeted programs aimed at diversifying our workforce. Experienced professionals at Arch may participate in manager and leadership development programs and, for our mortgage insurance segment employees, we offer the opportunity to seek a Mortgage Bankers Association Certified Banker designation.

RESERVES

Reserves for losses and loss adjustment expenses ("Loss Reserves") represent estimates of what the insurer or reinsurer ultimately expects to pay on claims at a given time, based on facts and circumstances then known, and it is probable that the ultimate liability may exceed or be less than such estimates. Even actuarially sound methods can lead to subsequent adjustments to reserves that are both significant and irregular due to the nature of the risks written. Loss Reserves are inherently subject to uncertainty.

For detail on our Loss Reserves by segment and potential variability in the reserving process, see the Loss Reserves section of "Summary of Critical Accounting Estimates" in Item 7. For an analysis of losses and loss adjustment expenses and a reconciliation of the beginning and ending Loss Reserves and information about prior year reserve development, see note 5, "Reserve for Losses and Loss Adjustment Expenses," to our consolidated financial statements in Item 8. For information on our reserving process, see note 6, "Short Duration Contracts," to our consolidated financial statements in Item 8.

Unpaid and paid losses and loss adjustment expenses recoverable were approximately $5.9 billion at December 31, 2021. For detail on our unpaid and paid losses and loss adjustment expenses, see the Reinsurance Recoverables section of "Financial Condition, Reinsurance Recoverables" in Item 7.

INVESTMENTS

At December 31, 2021, total investable assets held by Arch were $27.4 billion. Our current investment guidelines and approach stress preservation of capital, market liquidity and diversification of risk. Our investments are subject to market-wide risks and fluctuations, as well as to risks inherent in particular securities. While maintaining our emphasis on preservation of capital and liquidity, we expect our portfolio to become more diversified and, as a result, we may in the future expand into areas which are not part of our current investment strategy. For detail on our investments, see the Investable Assets Held by Arch section of "Financial Condition" in Item 7 and note 9, "Investment Information," to our consolidated financial statements in Item 8.

RATINGS

Our ability to underwrite business is affected by the quality of our claims paying ability and financial strength ratings as evaluated by independent agencies. Such ratings from third party internationally recognized statistical rating organizations or agencies are instrumental in establishing the financial security of companies in our industry. We believe that the primary users of such ratings include commercial and investment banks, policyholders, brokers, ceding companies and investors. Insurance ratings are also used by insurance and reinsurance intermediaries as an important means of assessing the financial strength and quality of insurers and reinsurers, and are often an important factor in the decision by an insured or intermediary of whether to place business with a particular insurance or reinsurance provider.

The financial strength ratings of our operating insurance and reinsurance subsidiaries are subject to periodic review as rating agencies evaluate us to confirm that we continue to meet their criteria for ratings they have assigned to us. Such ratings may be revised or revoked at the discretion of such ratings agencies in response to a variety of factors, including capital adequacy, management, earnings, forms of capitalization and risk profile. A.M. Best Company ("A.M. Best"), Fitch Ratings ("Fitch"), Moody's Investors Service ("Moody's") and Standard & Poor's ("S&P") are ratings agencies which have assigned financial strength and/or issuer ratings to Arch Capital and/or one or more of its subsidiaries.

The ratings issued on our companies by these agencies are announced publicly and are available directly from the agencies. Our website *www.archgroup.com (Investor Relations-Credit Ratings)* contains information about our ratings, but such information on our website is not incorporated by reference into this report.

COMPETITION

The worldwide insurance markets are highly competitive. We compete, and will continue to compete, with major U.S. and non-U.S. insurers and reinsurers, some of which have greater financial, marketing and management resources than we have and longer-term relationships with insureds and brokers than we have had. We compete primarily on the basis of overall financial strength, ratings assigned by independent rating agencies, geographic scope of business, strength of client

relationships, premiums charged, contract terms and conditions, products and services offered, speed of claims payment, reputation, employee experience, and qualifications and local presence. See “Risk Factors—Risks Relating to Our Industry, Business and Operations—“We operate in a highly competitive environment, and we may not be able to compete successfully in our industry.”

In our property casualty insurance and reinsurance businesses, we compete with insurers and reinsurers that provide specialty property and casualty lines of insurance, including Alleghany Corporation, Allianz, American Financial Group, Inc., American International Group, Inc., Aviva, AXA XL, AXIS Capital Holdings Limited, Berkshire Hathaway, Inc., Chubb Limited, CNA Financial Corp., Convex, Everest Re Group Ltd., Fairfax Financial Holdings Limited, Hannover Rück SE, The Hartford Financial Services Group, Inc., Liberty Mutual Group, Lloyd’s, Markel Corporation, Munich Re Group, PartnerRe Ltd., RenaissanceRe Holdings Ltd., RLI Corp., SCOR, Sompo International, Swiss Reinsurance Company, Tokio Marine, The Travelers Companies, Inc., W.R. Berkley Corp. and Zurich Insurance Group.

In our U.S. mortgage business, we compete with five active U.S. mortgage insurers, which include the mortgage insurance subsidiaries of Essent Group Ltd., Enact Holdings Inc., MGIC Investment Corporation, NMI Holdings Inc. and Radian Group Inc. The private mortgage insurance industry is highly competitive. Private mortgage insurers generally compete on the basis of underwriting guidelines, pricing, terms and conditions, financial strength, product and service offerings, customer relationships, reputation, the strength of management, technology, and innovation in the delivery and servicing of insurance products. Arch MI U.S. and other private mortgage insurers compete with federal and state government agencies that sponsor their own mortgage insurance programs. The private mortgage insurers’ principal government competitor is the Federal Housing Administration (“FHA”) and, to a lesser degree, the U.S. Department of Veterans Affairs (“VA”). Future changes to the FHA program, including any reduction to premiums charged may impact the demand for private mortgage insurance.

Arch MI U.S. and other private mortgage insurers increasingly compete with multi-line reinsurers and capital markets alternatives to private mortgage insurance. The GSEs continued their respective mortgage credit risk transfer (“CRT”) programs including the use of front and back-end transactions with multi-line reinsurers. These transactions continue to create opportunities for multi-line property casualty reinsurance groups and capital markets participants.

For other U.S. risk sharing products and non-U.S. mortgage insurance opportunities, we have also seen increased competition from well capitalized and highly rated multi-line reinsurers. It is our expectation that the depth and capacity of competitors from this segment will continue to increase over the next several years as more residential mortgage credit risk is borne by private capital.

ENTERPRISE RISK MANAGEMENT

General. Enterprise Risk Management (“ERM”) is a key element in our philosophy, strategy and culture. We employ an ERM framework that includes underwriting, reserving, investment, credit and operational risks. Risk appetite and exposure limits are set by our executive management team, reviewed with the Board and its committees and routinely discussed with business unit management. These limits are articulated in our risk appetite statement, which details risk appetite, tolerances and limits for each major risk category, and are integrated into our operating guidelines. Exposures are aggregated and monitored periodically by our corporate risk management team. The reporting, review and approval of risk management information is integrated into our annual planning process, capital modeling and allocation, reinsurance purchasing strategy and reviewed at insurance business reviews, reinsurance underwriting meetings and board level committees.

Risk Management Process and Procedures. The following narrative provides an overview of our risk management framework and our methodology for identifying, measuring, managing and reporting on the key risks affecting us. It outlines our approach to risk identification and assessment and provides an overview of our risk appetite and tolerance for each of the following major risks: underwriting (insurance) risk including pricing, reserving and catastrophe; investment including market and liquidity risks; strategic risk; group risk including governance and capital market risk; credit risk; and operational risk, including regulatory, investor relations (reputational risk), rating agency and outsourcing risks.

The framework includes details of our risk philosophy and policies to address the material risks confronting us and the, approach and procedures to control and or mitigate these risks. The actions and policies implemented to meet our business management and regulatory obligations form the core of this framework. We have adopted a holistic approach to risk management by analyzing risk from both a top-down and bottom-up perspective.

Risk Identification and Assessment. The Finance, Investment and Risk Committee (“FIR Committee”), Audit Committee and Underwriting Oversight Committee of the Board oversee the top-down and bottom-up review of our risks. Given the nature and scale of our operations, these committees consider all aforementioned risks within the scope of the assessment.

Arch Capital's Chief Risk Officer ("CRO") assists these committees in the identification and assessment of all key risks. The CRO is responsible for maintaining Arch Capital's risk register and continually reviewing and challenging risk assessments, including the impact of emerging risks and significant business developments. Board approval is required for any new high level risks or change in inherent or residual designations.

Risk Monitoring and Control. Arch Capital's risk management framework requires risk owners to monitor key risks on a continuous basis. The highest residual risks are actively managed by the FIR Committee. The remaining risks are managed and monitored at a process level by the risk owners and/or the CRO. Risk owners have ultimate responsibility for the day-to-day management of each designated risk, reporting to the CRO on the satisfactory management and control of the risk and timely escalation of significant issues that may arise in relation to that risk. The CRO is responsible for overseeing the monitoring of all risks across the business and for communicating to the relevant risk owners if she becomes aware of issues, or potential and actual breaches of risk appetite, relevant to the assigned risks. A key element of these monitoring activities is the periodic evaluation of our position relative to risk tolerances and limits approved by the Board.

Risk Reporting. Quarterly, the CRO compiles the results of the key risk review process into a report to the FIR Committee for review and discussion at their next meeting. The report includes an overview of selected key risks; a risk dashboard that depicts the status of risk limit and tolerance metrics; changes in the rating of high-level risks in the Arch Capital risk register; and summaries of our largest exposures and reinsurance recoverables. If necessary, risk management matters reviewed at the FIR Committee meeting are presented for discussion by the Board. The CRO is responsible for immediately escalating any significant risk matters to executive management, the FIR Committee and/or the Board for approval of the required remediation. As part of our corporate governance, the Board and certain of its committees hold regular executive sessions with members of our management team. These sessions are intended to ensure an open and frank dialogue exists about various forms of risk across the organization.

Implementation and Integration. We believe that an integrated approach to developing, measuring and reporting our Own Risk and Solvency Assessment ("ORSA") is an important part of the risk management framework. The ORSA process provides the link between Arch Capital's risk profile, its board-approved risk appetite including approved risk tolerances and limits, its business strategy and its overall solvency requirements. The ORSA is the entirety of the processes and procedures employed to identify, assess, monitor, manage, and report the short- and long-term risks we face or may face and to determine the capital necessary to ensure that our overall solvency needs are met at all times. The ORSA also makes the link between actual reported results and the capital assessment.

The ORSA is the basis for risk reporting to the Board and its committees and acts as a mechanism to embed the risk management framework within our decision making processes and operations. The Board has delegated responsibility for supervision and oversight of the ORSA to the FIR Committee. This oversight includes regular reviews of the ORSA process and output. An ORSA report is produced at least annually and the results of each assessment are reported to the Board. The Board actively participates in the ORSA process by steering how the assessment is performed and challenging its results. This assessment is also taken into account when formulating strategic decisions.

The ORSA process and reporting are also important parts of our business strategy, tailored specifically to fit into our organizational structure and risk management system with the appropriate techniques in place to assess our overall solvency needs, taking into consideration the nature, scale and complexity of the risks inherent in the business.

We also take the results of the ORSA into account within our system of governance, including long-term capital management, business planning and new product development. The results of the ORSA also contribute to various elements of our strategic decision-making including how best to optimize capital management, establishing the most appropriate premium levels and deciding whether to retain or transfer risks.

For further discussion of our risk management policies, see the Ceded Reinsurance section of "Summary of Critical Accounting Estimates" in Item 7.

REGULATION

General

Our insurance and reinsurance subsidiaries are subject to varying degrees of regulation and supervision in the various jurisdictions in which they operate. We are subject to extensive regulation under applicable statutes in these countries and any other jurisdictions in which we operate. The current material regulations under which we operate are described below. We may become subject in the future to regulation in new jurisdictions or to additional regulations in existing jurisdictions.

Bermuda

General. Our Bermuda insurance operating subsidiary, Arch Re Bermuda, is a Class 4 general business insurer and a Class

C long-term insurer, and is subject to the Insurance Act 1978 of Bermuda and related regulations, as amended ("Insurance Act"). Among other matters, the Insurance Act imposes certain solvency and liquidity standards, auditing and reporting requirements, the submission of certain period examinations of its financial conditions and grants the BMA powers to supervise, investigate, require information and demand the production of documents and intervene in the affairs of insurance companies. Significant requirements include the appointment of an independent auditor, the appointment of a loss reserve specialist, the appointment of a principal representative in Bermuda, the filing of annual Statutory Financial Returns, the filing of annual financial statements in accordance with U.S. generally accepted accounting principles ("GAAP"), the filing of an annual capital and solvency return, compliance with minimum and enhanced capital requirements, compliance with certain restrictions on reductions of capital and the payment of dividends and distributions, compliance with group solvency and supervision rules, if applicable, and compliance with the Insurance Code of Conduct (relating to corporate governance, risk management and internal controls).

Arch Re Bermuda must also comply with a minimum liquidity ratio and minimum solvency margin in respect of its general business. The minimum liquidity ratio requires that the value of relevant assets must not be less than 75% of the amount of relevant liabilities. The minimum solvency margin, which varies depending on the class of the insurer, is determined as a percentage of either net reserves for losses and loss adjustment expenses ("LAE") or premiums or pursuant to a risk-based capital measure. Arch Re Bermuda is also subject to an enhanced capital requirement ("ECR") which is established by reference to either the Bermuda Solvency Capital Requirement model ("BSCR") or an approved internal capital model. The BSCR model is a risk-based capital model which provides a method for determining an insurer's capital requirements (statutory capital and surplus) by taking into account the risk characteristics of different aspects of the insurer's business. The BMA has established a target capital level for each Class 4 insurer equal to 120% of its ECR. While a Class 4 insurer is not currently required to maintain its available statutory economic capital and surplus at this level, the target capital level serves as an early warning tool for the BMA, and failure to maintain statutory capital at least equal to the target capital level will likely result in increased regulatory oversight. As a Class C insurer, Arch Re Bermuda is also required to maintain available statutory economic capital and surplus in respect of its long-term business at a level equal to or in excess of its long-term enhanced capital requirement which is established by reference to either the Class C BSCR model or an approved internal capital model.

Arch Re Bermuda is prohibited from declaring or paying any dividends during any financial year if it is in breach of its general business or long-term business enhanced capital requirements, minimum solvency margins or its general business minimum liquidity ratio or if the declaration or payment of such dividends would cause such a breach. If it has failed to meet its minimum solvency margins or minimum liquidity ratio on the last day of any financial year, Arch Re Bermuda will be prohibited, without the approval of the BMA, from declaring or paying any dividends during the next financial year. In addition, Arch Re Bermuda is prohibited from declaring or paying in any financial year dividends of more than 25% of its total statutory capital and surplus (as shown on its previous financial year's statutory balance sheet) unless it files (at least seven days before payment of such dividends) with the BMA an affidavit stating that it will continue to meet the required margins. Without the approval of the BMA, Arch Re Bermuda is prohibited from reducing by 15% or more its total statutory capital as set out in its previous year's financial statements and any application for such approval must include an affidavit stating that it will continue to meet the required margins. Where such an affidavit is filed, it shall be available for public inspection at the offices of the BMA. Under the Bermuda Companies Act of 1981, as amended (the "Companies Act"), Arch Re Bermuda may declare or pay a dividend out of distributable reserves only if it has reasonable grounds for believing that it is, or would after the payment be, able to pay its liabilities as they become due and if the realizable value of its assets would thereby not be less than its liabilities.

Policyholder Priority. The Insurance Amendment (No. 2) Act 2018 amended the Insurance Act to provide for the prior payment of policyholders' liabilities ahead of general unsecured creditors in the event of the liquidation or winding up of an insurer. The amendments provide inter alia that, subject to certain statutorily preferred debts, the insurance debts of an insurer must be paid in priority to all other unsecured debts of the insurer. Insurance debt is defined as a debt to which an insurer is or may become liable pursuant to an insurance contract excluding debts owed to an insurer under an insurance contract where the insurer is the person insured.

Group Supervision. The BMA acts as group supervisor of our group of insurance and reinsurance companies ("Group") and has designated Arch Re Bermuda as the designated insurer ("Designated Insurer"). As our Group supervisor, the BMA performs a number of functions including: (i) coordinating the gathering and dissemination of relevant or essential information for going concerns and emergency situations, including the dissemination of information which is of importance for the supervisory task of other competent authorities; (ii) carrying out supervisory reviews and assessments of our Group; (iii) carrying out assessments of our Group's compliance with the rules on solvency, risk concentration, intra-group transactions and good governance

procedures; (iv) planning and coordinating through regular meetings held at least annually (or by other appropriate means) with other competent authorities, supervisory activities in respect of our Group; both as a going concern and in emergency situations (v) coordinating any enforcement action that may need to be taken against our Group or any Group members; and (vi) planning and coordinating meetings of colleges of supervisors in order to facilitate the carrying out of these functions. As Designated Insurer, Arch Re Bermuda is required to facilitate compliance by our Group with the group insurance solvency and supervision rules.

On an annual basis, the Group is required to file Group statutory financial statements, a Group statutory financial return, a Group capital and solvency return, audited Group financial statements, a Group Solvency Self-Assessment ("GSSA"), and a financial condition report with the BMA. The GSSA is designed to document our perspective on the capital resources necessary to achieve our business strategies and remain solvent, and to provide the BMA with insights on our risk management, governance procedures and documentation related to this process. In addition, the Designated Insurer is required to file quarterly group financial returns with the BMA. The Group is also required to maintain available Group statutory economic capital and surplus in an amount that is at least equal to the group enhanced capital requirement ("Group ECR") and the BMA has established a group target capital level equal to 120% of the Group ECR.

Fit and Proper Controllers. The BMA maintains supervision over the controllers of all Bermuda registered insurers, brokers, agents and insurance marketplace providers. For so long as the shares of Arch Capital are listed on the NASDAQ or another recognized stock exchange, any person who, directly or indirectly, becomes a holder of at least 10%, 20%, 33% or 50% of our common shares must notify the BMA in writing within 45 days of becoming such a holder (or ceasing to be such a holder). The BMA may object to such a person and require the holder to reduce its holding of common shares and direct, among other things, that voting rights attaching to the common shares shall not be exercisable.

Economic Substance Act. In December 2018, Bermuda enacted the Economic Substance Act 2018 (as amended) of Bermuda and its related regulations (together, the "ES Act"). The ES Act came into force on January 1, 2019, and provides that a registered entity other than an entity which is resident for tax purposes in certain jurisdictions outside Bermuda ("non-resident entity") that carries on as a business any one or more of the "relevant activities" referred to in the ES Act must comply with economic substance requirements. The list of "relevant activities" includes carrying on any one or more of the following activities: banking, insurance, fund management, financing, leasing, headquarters, shipping, distribution and service center, intellectual property and holding entities. Under the ES Act, if a company is engaged in one or more "relevant activities", it is required to maintain a substantial economic presence in Bermuda and to comply with the economic substance requirements set forth in the ES Act. A company will comply with those economic substance requirements if it: (a) is managed and directed in Bermuda; (b) undertakes "core income generating activities" (as may be prescribed under the ES Act) in Bermuda in respect of the relevant activity; (c) maintains adequate physical presence in Bermuda; (d) has adequate full time employees in Bermuda with suitable qualifications; and (e) incurs adequate operating expenditure in Bermuda in relation to the relevant activity undertaken by it.

Companies that are licensed under the Insurance Act and thereby carry on insurance as a relevant activity are generally considered to operate in Bermuda with adequate substance if they comply with the existing provisions of (a) the Companies Act relating to corporate governance; and (b) the Insurance Act, that are applicable to the economic substance requirements, and the Registrar will have regard to such companies' compliance in his assessment of compliance with the economic substance requirements. That being said, such companies are still required to complete and file a Declaration Form, with the Bermuda Registrar of Companies and the Registrar will also have regard to the information provided in that Declaration Form in making his assessment of compliance with the ES Act.

Insurance Sector Operational Cyber Risk Management Code of Conduct ("Cyber Risk Management Code of Conduct"). The Cyber Risk Management Code of Conduct was established in October 2020. All Bermuda insurers, insurance managers and intermediaries registered under the Insurance Act are required to company with the BMA's Cyber Risk Management Code of Conduct, which established duties, requirements and standards to be complied by each registrant in relation to operational cyber risk management.

United States

General. Our U.S. based insurance operating subsidiaries are subject to extensive governmental regulation and supervision by the states and jurisdictions in which they are domiciled, licensed and/or approved to conduct business. The insurance laws and regulations of the state of domicile have the most significant impact on operations. We currently have U.S. insurance and/or reinsurance subsidiaries domiciled in Delaware, North Carolina, Missouri, Wisconsin, Kansas and the District of Columbia and we may acquire insurers domiciled in other states in the future. State insurance regulation and supervision is designed to protect policyholders rather than investors. Generally, state regulatory authorities have broad regulatory powers over such matters as licenses, standards of solvency, premium

rates, policy forms, marketing practices, claims practices, investments, methods of accounting, form and content of financial statements, certain aspects of governance, ERM, amounts we are required to hold as reserves for future payments, minimum capital and surplus requirements, annual and other report filings and transactions among affiliates. Our U.S. based subsidiaries are required to file detailed quarterly and audited annual statutory financial statements with state insurance regulators. In addition, regulatory authorities conduct periodic financial, claims and market conduct examinations. Certain insurance regulatory requirements are highlighted below. In addition to regulation applicable generally to U.S. insurance and reinsurance companies, our U.S. mortgage insurance operations are affected by federal and state regulation relating to mortgage insurers, mortgage lenders, and the origination, purchase and sale of residential mortgages. Arch Insurance (U.K.) is also subject to certain governmental regulation and supervision in the states where it writes excess and surplus lines insurance.

Holding Company Regulation. All states have enacted legislation that regulates insurance holding company systems. These regulations generally provide that each insurance company in the system is required to register with the insurance department of its state of domicile and furnish information concerning the operations of companies within the holding company system which may materially affect the operations, management or financial condition of the insurers within the system. Notice to the state insurance departments is required prior to the consummation of certain material transactions between an insurer and any entity in its holding company system and certain transactions may not be consummated without the applicable insurance department's prior approval or non-disapproval after receiving notice. The holding company acts also prohibit any person from directly or indirectly acquiring control of a U.S. insurance or reinsurance company unless that person has filed an application with specified information with such company's domiciliary commissioner and has obtained the commissioner's prior approval. Under most states' statutes acquiring 10% or more of the voting securities of an insurance company or its parent company is presumptively considered an acquisition of control of the insurance company, although such presumption may be rebutted.

State holding company acts and regulations also impose extensive informational requirements on parents and other affiliates of licensed insurers or reinsurers with the purpose of protecting them from enterprise risk, including requiring an annual enterprise risk report by the ultimate controlling person identifying the material risks within the insurance holding company system that could pose enterprise risk to the licensed companies and requiring a person divesting its controlling interest to make a confidential advance notice filing.

The National Association of Insurance Commissioners ("NAIC") Insurance Holding Company System Model Act and Model Regulation includes provisions that, when adopted by states, will require the ultimate controlling person of an insurance holding company system to file an annual group capital calculation, unless the ultimate controlling person or its insurance holding company system is exempt from the filing requirement. The group capital calculation is designed to assist state insurance regulators in understanding the financial condition of non-insurance entities that are part of an insurance holding company system and the degree to which insurance companies are supporting those non-insurance entities.

Regulation of Dividends and Other Payments from Insurance Subsidiaries. The ability of an insurer to pay dividends or make other distributions is subject to insurance regulatory limitations of the insurer's state of domicile. Such laws generally limit the payment of dividends or other distributions above a specified level. Dividends or other distributions in excess of such thresholds are "extraordinary" and are subject to prior notice and approval, or non-disapproval after receiving notice.

Credit for Reinsurance. Arch Re U.S. is subject to insurance regulation and supervision that is similar to the regulation of licensed primary insurers. However, except for certain mandated provisions that must be included in order for a ceding company to obtain credit for reinsurance ceded, the terms and conditions of reinsurance agreements generally are not subject to regulation by any governmental authority.

A primary insurer ordinarily will enter into a reinsurance agreement to obtain credit for the reinsurance ceded on its U.S. statutory-basis financial statements. As a result of the requirements relating to the provision of credit for reinsurance, Arch Re U.S. and Arch Re Bermuda are indirectly subject to certain regulatory requirements imposed by jurisdictions in which ceding companies are domiciled.

In general, credit for reinsurance is allowed if the reinsurer is licensed or "accredited" in the state in which the primary insurer is domiciled; or if none of the above applies, to the extent that the reinsurance obligations of the reinsurer are collateralized appropriately, typically through the posting of a letter of credit for the benefit of the primary insurer or the deposit of assets into a trust fund established for the benefit of the primary insurer. All states have adopted provisions of the NAIC Credit for Reinsurance Model Law and Regulation that allow full credit to U.S. ceding insurers for reinsurance ceded to reinsurers that have been approved as "certified reinsurers" based upon less than 100% collateralization. As of January 20, 2022 Arch Re Bermuda is approved as a "certified reinsurer" in 36 states with applications pending in nine additional states.

In April 2018, the U.S. and the EU entered into the Bilateral Agreement between the United States of America and the European Union on Prudential Matters Regarding Insurance and Reinsurance (the "EU-U.S. Covered Agreement") that, among other things, would eliminate reinsurance collateral requirements for qualified U.S. reinsurers operating in the EU insurance market, and eliminate reinsurance collateral requirements under U.S. state insurance law for qualified reinsurers having their head office or domiciled in an EU member state. In December 2018, the U.S. Secretary of the Treasury and the U.S. Trade Representative announced that they had reached agreement with the U.K. on a covered agreement ("U.K. Covered Agreement") with terms nearly identical to the EU Covered Agreement for insurers and reinsurers operating in the U.K. In 2019, the NAIC adopted amendments to the Credit for Reinsurance Model Law and Regulation that would implement the EU-US Covered Agreement and the U.K. Covered Agreement and eliminate reinsurance collateral requirements for qualified reinsurers having their head office or domiciled in other jurisdictions deemed "Reciprocal Jurisdictions" by the NAIC (although individual states may reject a Reciprocal Jurisdiction designation). The NAIC list of Reciprocal Jurisdictions includes Bermuda, Japan and Switzerland. As of January 5, 2022, the NAIC reports that 46 U.S. states have adopted the 2019 amendments to the Credit for Reinsurance Model Law with an additional four considering amendments.

Risk Management and ORSA. The NAIC Risk Management and Own Risk Solvency Assessment Model Act ("ORSA Model Act") provides that domestic insurers, or their insurance group, must regularly conduct an ORSA consistent with a process comparable to the ORSA Guidance Manual process. The ORSA Model Act also provides that, no more than once a year, an insurer's domiciliary regulator may request that an insurer submit an ORSA summary report, or any combination of reports that together contain the information described in the ORSA Guidance Manual, with respect to the insurer and/or the insurance group of which it is a member. States may impose additional internal review and regulatory filing requirements on licensed insurers and their parent companies. All states have enacted the ORSA Model Act or substantially similar legislation.

Cybersecurity and Privacy. The NAIC has adopted an Insurance Data Security Model Law, which, when adopted by the states, will require insurers, insurance producers and other entities required to be licensed under state insurance laws to comply with certain requirements under state insurance laws, such as developing and maintaining a written information security program, conducting risk assessments and overseeing the data security practices of third-party vendors and meeting expanded breach notification requirements. A significant and growing number of states have adopted versions of this model law, with more expected to follow. In addition, certain state insurance regulators are developing or have developed regulations that may impose regulatory requirements relating to cybersecurity on insurance and reinsurance companies (potentially including insurance and reinsurance companies that are not domiciled, but are licensed, in the relevant state). Many regulators, including the Federal Trade Commission ("FTC"), the New York Department of Financial Services ("NYDFS"), and the US Department of the Treasury's Office of Foreign Assets Control ("OFAC"), have issued new guidance on managing cybersecurity risks which expand existing regulatory requirements. Additional guidance that is applicable to us is expected. Privacy legislation and regulation has also become an issue of increasing focus of the federal government and in many states. The California Consumer Privacy Act of 2018 ("CCPA"), which applies to us, came into effect on January 1, 2020, and grants California consumers certain rights to, among other things, access and delete data about them subject to certain exceptions, as well as a private right of action related to cybersecurity breaches with statutory penalties. Additionally, a California ballot initiative known as the California Privacy Rights Act of 2020 ("CPRA") passed as part of the November 2020 ballot and will become fully effective on January 1, 2023. The CPRA will apply to us and will substantially amend the CCPA, providing for additional consumer privacy rights, additional regulatory obligations, and creating a new privacy focused California regulatory agency with enforcement authority. The CPRA also charges this new privacy agency with issuing a wide array of new regulations, including relating to the use of automated decision-making.

A range of new cybersecurity and privacy laws are also under consideration in other states, as well as by the federal government. As part of this trend, Virginia and Colorado adopted new comprehensive data privacy legislation in 2021 that provide consumer privacy rights and protections like those in the CCPA and CPRA, but currently exempt entities subject to the Gramm-Leach-Bliley Act from their requirements.

Risk-Based Capital Requirements. Licensed U.S. property and casualty insurance and reinsurance companies are subject to risk-based capital requirements that are designed to assess capital adequacy and to raise the level of protection that statutory surplus provides for policyholder obligations. The risk-based capital model for property and casualty insurance companies measures three major areas of risk facing property and casualty insurers: underwriting, which encompasses the risk of adverse loss developments and inadequate pricing; declines in asset values arising from credit risk; and declines in asset values arising from investment risks. An insurer will be subject to varying degrees of regulatory action depending on how its statutory surplus compares to its risk-based capital calculation. Under the approved formula, an insurer's total adjusted capital is compared to its authorized control level risk-based capital. If this ratio is above a minimum threshold,

no company or regulatory action is necessary. Below this threshold are four distinct action levels at which an insurer's domiciliary state regulator can intervene with increasing degrees of authority over an insurer as the ratio of surplus to risk-based capital requirement decreases. The mildest regulatory action requires an insurer to submit a plan for corrective action; the most severe requires an insurer to be rehabilitated or liquidated.

Our mortgage insurance operations are not currently subject to state risk-based capital requirements, but rather are subject to state risk to capital or minimum policyholder position requirements. The NAIC has established a Mortgage Guaranty Insurance Working Group which is engaged in developing changes to the Mortgage Guaranty Insurers Model Act, including the development of supplemental disclosures schedules unique to mortgage guaranty insurers.

Guaranty Funds. Most states require all admitted insurance companies to participate in their respective guaranty funds which cover certain claims against insolvent insurers. Solvent insurers licensed in these states are required to cover the losses paid on behalf of insolvent insurers by the guaranty funds and are generally subject to annual assessments in the states by the guaranty funds to cover these losses. Mortgage guaranty insurance, among other lines of business, is typically exempt from participation in guaranty funds.

Climate Change and Financial Risks. U.S. state insurance regulators have increased their oversight of insurance company governance, reporting and disclosure relating to the potential risks presented by climate change and one or more states may adopt climate-change-related requirements that impact our insurance and reinsurance companies. In 2020, NYDFS issued a circular letter stating that NYDFS expects insurers authorized in New York to integrate the consideration of climate risks into their governance frameworks, risk management processes and business strategies, including the designation of a board committee or member and senior management function to be accountable for the company's assessment and management of the financial risks from climate change. In 2021, NYDFS issued additional Guidance for New York Domestic Insurers on Managing the Financial Risks from Climate Change that reiterates many of the principles outlined in the 2020 circular letter.

Federal Regulation. Although state regulation is the dominant form of regulation for insurance and reinsurance business, a number of federal laws affect and apply to the insurance industry. The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 ("Dodd-Frank") created the Federal Insurance Office ("FIO") within the Department of Treasury ("U.S. Treasury"), which is not a federal regulator or supervisor of insurance, but monitors the insurance industry for systemic risk, administers the Terrorism Risk Insurance Program ("TRIP"), consults with the states regarding insurance matters and develops federal policy on aspects of international insurance matters. See "Risk Factors—Risks Relating to Our Industry, Business and Operations—We could face unanticipated losses from war, terrorism, cyber-attacks, pandemics and political instability, and these or other unanticipated losses could have a material adverse effect on our financial condition and results of operations" for more information on TRIP. In addition, FIO is authorized to assist the U.S. Secretary of the Treasury in negotiating "covered agreements" between the U.S. and one or more foreign governments or regulatory authorities that address insurance prudential measures. In August 2021, the FIO announced that it was requesting information and soliciting public comment on the insurance sector and climate-related financial risks. Among its priorities were increasing the FIO's engagement on climate-related issues and leveraging the insurance sector's role in achieving climate change goals outlined in President Biden's May 2021 Executive Order entitled "Climate-Related Financial Risk".

Certain other federal laws also directly or indirectly impact mortgage insurers, including the Real Estate Settlement Procedures Act of 1974 ("RESPA"), the Homeowners Protection Act of 1998 ("HOPA"), the Equal Credit Opportunity Act, the Fair Housing Act, the Truth In Lending Act ("TILA"), the Fair Credit Reporting Act of 1970 ("FCRA"), and the Fair Debt Collection Practices Act. Among other things, these laws and their implementing regulations prohibit payments for referrals of settlement service business, require fairness and non-discrimination in granting or facilitating the granting of credit, govern the circumstances under which companies may obtain and use consumer credit information, define the manner in which companies may pursue collection activities, and require disclosures of the cost of credit and provide for other consumer protections.

GSE Eligible Mortgage Insurer Requirements. GSEs impose requirements on private mortgage insurers so that they may be eligible to insure loans sold to the GSEs, known as the Private Mortgae Insurer Eligibility Requirements ("PMIERs"). The PMIERs apply to our eligible mortgage insurers, but do not apply to Arch Mortgage Guaranty Company, which is not GSE-approved. The PMIERs impose limitations on the type of risk insured, the forms and insurance policies issued, standards for the geographic and customer diversification of risk, procedures for claims handling, acceptable underwriting practices, standards for certain reinsurance cessions and financial requirements, among other things. 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, original credit score of performing loans, and the delinquency status of non-performing loans).

Canada

Arch Insurance Canada and Arch Re Canada are subject to federal, as well as provincial and territorial, regulation in Canada in the provinces and territories in which they underwrite insurance/reinsurance. The Office of the Superintendent of Financial Institutions ("OSFI") is the federal regulatory body that, under the Insurance Companies Act (Canada), prudentially regulates federal Canadian and non-Canadian insurance and reinsurance companies operating in Canada. Arch Insurance Canada is licensed to carry on insurance business by OSFI and in each province and territory. Arch Re Canada is licensed to carry on reinsurance business by OSFI and in the provinces of Ontario and Quebec.

Under the Insurance Companies Act (Canada), Arch Insurance Canada is required to maintain an adequate amount of capital in Canada, calculated in accordance with a test promulgated by OSFI called the Minimum Capital Test, and Arch Re Canada is required to maintain an adequate margin of assets over liabilities in Canada, calculated in accordance with a test promulgated by OSFI called the Branch Adequacy of Assets Test. OSFI has implemented a risk-based methodology for assessing insurance/reinsurance companies operating in Canada known as its "Supervisory Framework." In applying the Supervisory Framework, OSFI considers the inherent risks of the business and the quality of risk management for each significant activity of each operating entity. Under the Insurance Companies Act (Canada), approval of the Minister of Finance (Canada) is required in connection with certain acquisitions of shares of, or control of, Canadian insurance companies such as Arch Insurance Canada, and notice to and/or approval of OSFI is required in connection with the payment of dividends by or redemption of shares by Canadian insurance companies such as Arch Insurance Canada.

United Kingdom

General. The Prudential Regulation Authority ("PRA") and the Financial Conduct Authority ("FCA") regulate insurance and reinsurance companies and the FCA regulates firms carrying on insurance mediation activities operating in the U.K. under the Financial Services and Markets Act 2000 (the "FSMA"). In May 2004, Arch Insurance (U.K.) was granted the relevant permissions for the classes of insurance business which it underwrites in the U.K. AMAL currently manages Arch Syndicate 2012 and Arch Syndicate 1955 pursuant to its authorizations by the U.K. regulator and Lloyd's. All U.K. companies are also subject to a range of statutory provisions, including the laws and regulations of the Companies Act 2006 (as amended) (the "U.K. Companies Act").

The objectives of the PRA are to promote the safety and soundness of all firms it supervises and to secure an appropriate degree of protection for policyholders. The objectives of the FCA are to ensure customers receive financial services and products that meet their needs, to promote sound financial systems and markets and to ensure that firms are stable and resilient with transparent pricing information and which compete effectively and have the interests of their customers and the integrity of the market at the heart of how they run their business. The PRA has responsibility for the prudential regulation of banks and insurers, while the FCA has responsibility for the conduct of business regulation in the wholesale and retail markets. The PRA and the FCA adopt separate methods of assessing regulated firms on a periodic basis. Arch Insurance (U.K.) and AMAL are subject to periodic assessment by the PRA along with all regulated firms. Arch Insurance (U.K.) and AMAL are subject to regulation by both the PRA and FCA. Castel is authorized and regulated by the FCA and is subject to periodic assessment and review by the FCA.

Lloyd's Supervision. The operations of AMAL (as managing agent of Arch Syndicate 2012 and Arch Syndicate 1955) and each syndicate's respective corporate members, are subject to the byelaws and regulations made by (or on behalf of) the Council of Lloyd's, and requirements made under those byelaws. The Council of Lloyd's, established in 1982 by Lloyd's Act 1982, has overall responsibility and control of Lloyd's. Those byelaws, regulations and requirements provide a framework for the regulation of the Lloyd's market, including specifying conditions in relation to underwriting and claims operations of Lloyd's participants. Lloyd's is also subject to the provisions of the FSMA. Lloyd's is authorized by the PRA and regulated by the PRA and FCA. Those entities acting within the Lloyd's market are required to comply with the requirements of the FSMA and provisions of the PRA's or FCA's rules, although the PRA has delegated certain of its powers, including some of those relating to prudential requirements, to Lloyd's. Each corporate member of Lloyd's is required to contribute a percentage of the member's premium income for each year of account to the Lloyd's central fund. The Lloyd's central fund is available if members of Lloyd's assets are not sufficient to meet claims for which the member is liable. Each corporate member of Lloyd's, may also be required to contribute to the central fund by way of a supplement to a callable layer of up to 3% of the corresponding member's premium income limit for the relevant year of account.

Financial Resources. The European solvency framework and prudential regime for insurers and reinsurers, the Solvency II Directive 2009/138/EC ("Solvency II"), took effect in full on January 1, 2016. See "European Union—Insurance and Reinsurance Regulatory Regime" below for additional details.

Arch Insurance (U.K.), and the corporate members of Arch Syndicate 2012 and Arch Syndicate 1955 are currently required to meet economic risk-based solvency requirements imposed under Solvency II. Solvency II, together with European Commission "delegated acts" and guidance issued by the European Insurance and Occupational Pensions Authority ("EIOPA") sets out classification and eligibility requirements, including the features which capital must display in order to qualify as regulatory capital.

On January 31, 2020, the U.K. withdrew from the EU with the terms of Brexit set forth in the Withdrawal Agreement agreed by the U.K. Parliament and the EU Parliament. At the expiration of the transition period from January 31, 2020 until December 31, 2020 (the "Transition Period"), during which time the U.K. remained in the EU customs union and single market, the European Union (Withdrawal) Act 2018, as amended, has transposed all applicable direct EU legislation into domestic U.K. law, thus ensuring the continuing application of Solvency II under the U.K.'s financial services regulatory regime.

The U.K. government commenced a post-Brexit review of Solvency II in June 2020. The response to the review, published in early July 2021, suggests that there will likely be changes in the U.K. Solvency II framework, including the removal of certain prescriptive requirements. In parallel, the PRA is also undertaking a review of Solvency II and, launched a quantitative impact study which contains both quantitative studies and qualitative questions intended to guide future reforms of Solvency II in the U.K. Additionally, the U.K. government has undertaken a Future Regulatory Framework Review to determine how the financial services regulatory framework should adapt to the U.K.'s new position outside of the EU.

In January 2022, the U.K. Parliament launched an inquiry into the U.K. insurance and reinsurance industry and, specifically, into the regulation of the London market, the U.K.'s market for commercial and wholesale specialty risks. The inquiry will review the extent to which regulatory policy is well-designed and proportionately applied, the possibilities for optimizing policy following Brexit, the roles of the current U.K. regulators, such as the FCA and the Bank of England, as well as the appropriateness of regulation. The result of these reviews by the U.K. government may have an impact on whether the U.K. is granted Solvency II equivalence status by the EU in any of the three areas to which equivalence applies.

Financial Services Compensation Scheme. The Financial Services Compensation Scheme ("FSCS") is a scheme established under FSMA to compensate eligible policyholders of insurance companies who may become insolvent. The FSCS is funded by the levies that it has the power to impose on all insurers. Arch Insurance (U.K.) could be required to pay levies to the FSCS.

Restrictions on Acquisition of Control. Under FSMA, the prior consent of the PRA or FCA, as applicable, is required, before any person can become a controller or increase its control over any regulated company, including Arch Insurance (U.K.), or over the parent undertaking of any regulated company. Therefore, the PRA's or FCA's prior consent, as applicable, is required before any person can become a controller of Arch Capital. Prior consent is also required from Lloyd's before any person can become a controller or increase its control over a corporate member or a managing agent or a parent undertaking of a corporate member or managing agent. A controller is defined for these purposes as a person who holds (either alone or in concert with others) 10% or more of the shares or voting power in the relevant company or its parent undertaking.

Restrictions on Payment of Dividends. Under English law, all companies are restricted from declaring a dividend to their shareholders unless they have "profits available for distribution." The calculation as to whether a company has sufficient profits is based on its accumulated realized profits minus its accumulated realized losses. U.K. insurance regulatory laws do not prohibit the payment of dividends, but the PRA or FCA, as applicable, requires that insurance companies, insurance intermediaries and other regulated entities maintain certain solvency margins and may restrict the payment of a dividend by Arch Insurance (U.K.), AMAL or Castel, for example.

European Union Considerations. During the Transition Period, there was no change in passporting rights for financial institutions in the U.K. Under our Brexit plan, since January 2020 nearly all of the EEA insurance business of Arch Insurance (U.K.) has been conducted by Arch Insurance (EU). As part of our Brexit planning, and in advance of the Transition Period expiring, a transfer of the EEA legacy business (excluding inwards reinsurance) from Arch Insurance (U.K.) to Arch Insurance (EU) was completed under Part VII of the U.K. Financial Services and Market Act 2000 at the end of December 2020 ("Part VII Transfer").

Despite the loss of passporting rights, AMAL, Syndicate 2012 and Syndicate 1955 are still able to write business in the EEA via the Lloyd's Insurance Company, S.A. ("Lloyd's Brussels"). However, Lloyd's is still in discussions with the Belgium Financial Services Markets Authority ("FSMA") and the National Bank of Belgium regarding the Lloyd's Brussels operating model. In January 2021, Lloyd's released a communication stating that its discussions with supervisors had focused on certain risk placement services for open market business which was being performed by managing agents on behalf of Lloyd's Brussels. Lloyd's Brussels is in an ongoing dialogue with the Belgium FSMA in its effort to

overhaul its initial underwriting structures and is deploying significant efforts and investment to adjust its operating model to satisfy the Belgian authority in the post-Brexit environment. This may have an impact on the way managing agents and syndicates access and operate on the Lloyd's platform. Lloyd's Brussels is seeking to ensure that the claims it pays and complaints it processes preserve the objectives of policyholder protection and market discipline under the Insurance Distribution Directive.

The U.K. government established a Temporary Permissions Regime ("TPR") which came into force with effect from January 1, 2021, which allows EEA firms such as Arch Re Europe and Arch Insurance (EU), covered by a passport prior to that date, who wish to continue carrying out business in the U.K. in the longer term, to operate in the U.K. for a limited period while they seek authorization or recognition from the U.K. regulators. However, no TPR-equivalent regime is in place for U.K. firms who wish to continue carrying out business in the EEA. In the absence of a TPR-equivalent regime for U.K. firms, the ability of U.K. firms (including, Arch Insurance (U.K.), AMAL and Castel) to continue doing business in the EEA depends on applicable EEA state local law and regulation. Similarly, there has been no decision yet made by the European Commission on whether or not the U.K.'s financial services regulatory regime will be granted third-country equivalence for the purposes of reinsurance, solvency calculation and/or group supervision under Solvency II. In the absence of such declarations, U.K. firms are subject to more stringent requirements in carrying out reinsurance business with EEA firms.

The long-term implications of Brexit on the Solvency II framework in the U.K. continues to remain uncertain in relation to the arrangements that will allow U.K. and EU-established firms to continue to effectively transact business with each other and how the future relationship between the two parties will adversely affected regulated entities. See "Risk Factors—Risks Relating to Our Industry, Business and Operations—The U.K.'s Withdrawal from the EU could adversely affect us."

On December 24, 2020, the EU and the U.K. agreed the EU-U.K. Trade Cooperation Agreement (the "TCA") which details the terms of the future cooperation between the U.K. and the EU. The TCA was signed by both the EU and U.K. on December 30, 2020 and entered into force on May 1, 2021. The TCA did not preserve the status of financial services and as a result, under the provisions of the TCA, EEA financial institutions (including our Irish operating subsidiaries) lost their passporting rights into the U.K. Absent any future agreement between the U.K. and the EU on the provision of financial services by U.K. financial institutions into the EU, the post-Brexit status and rules applicable to U.K. branches of EEA financial institutions will be primarily driven by U.K. law and regulation. See "Risk Factors—Risks Relating to Our Industry, Business and Operations—The U.K.'s Withdrawal from the EU could adversely affect us."

Environmental, Social and Governance ("ESG") Considerations. In 2019, the U.K. government published its Green Finance Strategy which announced the government's long-term ambition to "green" the financial system and align it with the U.K.'s 2050 "Net Zero" (i.e.,100% greenhouse gas emissions reduction) target under the Climate Change Act 2008. In November 2020, the U.K. government announced proposals to require mandatory climate risk disclosures (aligned with the Recommendations of the Taskforce on Climate-related Financial Disclosures ("TCFD")) across all sectors of the U.K. economy.

In 2021, the U.K. government published its Greening Finance Roadmap to Sustainable Investing (the "Roadmap"), which announced proposals to extend the scope of the U.K.'s sustainable finance framework beyond climate change, under a 3-phase approach. The Roadmap presented the government's strategy to deliver on the first phase by introducing economy-wide Sustainability Disclosure Requirements ("SDR"), which would require corporate disclosures, asset manager and asset owner disclosures, and investment product disclosures covering a broader range of sustainability topics. The FCA is reviewing how SDR should be implemented.

The Roadmap also confirms that the U.K. will adopt a "Green Taxonomy" based on the architecture of the EU Sustainable Finance Taxonomy Regulation ("EU Taxonomy"), which will set out the criteria that specific economic activities must meet in order to be considered to be environmentally sustainable and therefore 'Taxonomy-aligned'. Reporting on Taxonomy-alignment will form part of the disclosures made by corporates and asset managers and asset owners.

Ireland

General. The CBOI regulates insurance and reinsurance companies and intermediaries authorized in Ireland. Our three Irish operating subsidiaries are Arch Re Europe, Arch Insurance (EU) and Arch Underwriters Europe Limited ("Arch Underwriters Europe"). Arch Re Europe was licensed and authorized by the CBOI as a non-life reinsurer in October 2008 and as a life reinsurer in November 2009. Arch Insurance (EU) was licensed and authorized by the CBOI as a non-life insurer in December 2011. As part of our Brexit plan, Arch Insurance (EU) received approval from the CBOI to expand the nature of its business in 2019 commenced writing expanded insurance lines in the EEA in 2020, and the Part VII Transfer was completed at the end of December 2020. Arch Underwriters Europe was registered by the CBOI

as an insurance and reinsurance intermediary in July 2014. Arch Re Europe, Arch Insurance (EU) and Arch Underwriters Europe are subject to the supervision of the CBOI and must comply with Irish insurance acts and regulations as well as with directions and guidance issued by the CBOI.

Arch Re Europe and Arch Insurance (EU) are required to comply with Solvency II requirements. See "European Union—Insurance and Reinsurance Regulatory Regime" below for additional details. As an intermediary, Arch Underwriters Europe is subject to a different regulatory regime and is not subject to solvency capital rules, but must comply with requirements such as to maintain professional indemnity insurance and to have directors that are fit and proper. Our Irish subsidiaries are also subject to the general body of Irish company laws and regulations including the provisions of the Companies Act 2014.

Financial Resources. Arch Re Europe and Arch Insurance (EU) are required to meet economic risk-based solvency requirements imposed under Solvency II. Solvency II, together with European Commission "delegated acts" and guidance issued by EIOPA sets out classification and eligibility requirements, including the features which capital must display in order to qualify as regulatory capital.

Restrictions on Acquisitions. Under Irish law, the prior consent of the CBOI is required before any person can acquire or increase a qualifying holding in an Irish insurer or reinsurer, including Arch Insurance (EU) and Arch Re Europe, or their parent undertakings. A qualifying holding is defined for these purposes as a direct or indirect holding that represents 10% or more of the capital of, or voting rights, in the undertaking or makes it possible to exercise a significant influence over the management of the undertaking.

Restrictions on Payment of Dividends. Under Irish company law, Arch Re Europe, Arch Insurance (EU) and Arch Underwriters Europe are permitted to make distributions only out of profits available for distribution. A company's profits available for distribution are its accumulated, realized profits, so far as not previously utilized by distribution or capitalization, less its accumulated, realized losses, so far as not previously written off in a reduction or reorganization of capital duly made. Further, the CBOI has powers to intervene if a dividend payment were to lead to a breach of regulatory capital requirements.

In response to the COVID-19 pandemic, EIOPA issued a statement in April 2020 urging (re)insurers to temporarily suspend all discretionary dividend distributions and share buy backs aimed at remunerating shareholders, and recommended a similar prudent approach should be applied to variable remuneration policies.

On the basis of EIOPA's statement, the CBOI issued guidance in April 2020 that insurance firms postpone any payment of dividend distributions or similar transactions until they can forecast their costs and future revenues with a greater degree of certainty. However, following on from the European Systemic Risk Board's recommendation of December 15, 2020 to suspend restrictions on dividend distributions, share buy-backs and payment of variable remuneration from September 30, 2021, the CBOI modified its guidance, with effect from October, 1 2021, so that the general restrictions on the payment of dividend distributions or variable remuneration are no longer in place. The CBOI still requires (re)insurance firms to notify it in advance of any proposed distribution.

European Union Considerations. As Arch Re Europe, Arch Insurance (EU) and Arch Underwriters Europe are authorized by the CBOI in Ireland, a Member State of the EU, those authorizations are recognized throughout the EEA. Subject only to certain notification and application requirements, Arch Re Europe, Arch Insurance (EU) and Arch Underwriters Europe can provide services, or establish a branch, in any other Member State of the EEA. Although, in doing so, they may be subject to the laws of such Member States with respect to the conduct of business in such Member State, company law registrations and other matters, they will remain subject to financial and operational supervision by the CBOI only. Arch Insurance (EU) has branches in Italy, Denmark and in the U.K. Arch Re Underwriting ApS in Denmark ("Arch Re Denmark") is an underwriting agency underwriting accident and health and other reinsurance business for Arch Re Europe. Arch Re Europe also has branches in the U.K. and Switzerland ("Arch Re Europe Swiss Branch").

From January 1, 2021, under the provisions of the TCA our Irish regulated entities have lost their passporting rights into the U.K. See "Risk Factors—Risks Relating to Our Industry, Business and Operations—The U.K.'s Withdrawal from the EU could adversely affect us."

ESG Considerations. ESG matters have been on the CBOI's agenda for a number of years. In November 2021, the CBOI issued its expectations in respect of climate and broader ESG issues for all regulated firms in Ireland (including (re)insurers). The CBOI's expectations focus on five key areas: governance, risk management, scenario analysis (including, but not limited to, stress testing for the purposes of the ORSA), disclosures and strategy and business model risk. The CBOI has indicated that its expectations will be applied in a proportionate manner. It is anticipated that the CBOI will issue more detailed guidance on its expectations in the future. It is expected that over time, disclosures in respect to ESG matters may be captured in the Solvency and Financial Condition Reports of Arch's Irish entities. See also "European Union – ESG Considerations".

European Union

Insurance and Reinsurance Regulatory Regime. Solvency II took effect in full on January 1, 2016. Solvency II imposes economic risk-based solvency requirements across all EU Member States and consists of three pillars: Pillar I-quantitative capital requirements, based on a valuation of the entire balance sheet; Pillar II-qualitative regulatory review, which includes governance, internal controls, enterprise risk management and supervisory review process; and Pillar III-market discipline, which is accomplished through reporting of the insurer's financial condition to regulators and the public. Solvency II is supplemented by European Commission Delegated Regulation (EU) 2015/35 (the "Delegated Regulation"), other European Commission "delegated acts" and binding technical standards, and guidelines issued by EIOPA. The Delegated Regulation sets out more detailed requirements for individual insurance and reinsurance undertakings, as well as for groups, based on the overarching provisions of Solvency II, which together make up the core of the single prudential rulebook for insurance and reinsurance undertakings in the EU.

In December 2020, EIOPA provided an opinion to the European Commission in relation to the review of the Solvency II regime. This review was initiated by the European Commission to determine if the Solvency II regime remains fit for purpose. In its opinion, EIOPA confirms that the overall Solvency II framework is working well from a prudential perspective, suggesting that there are no fundamental changes needed but that a number of amendments are required to ensure the regime continues as a well-functioning risk-based regime.In September 2021, the European Commission published legislative proposals for amendments to the Solvency II Directive arising out of EIOPA's review of the Solvency II regime. The proposed amendments cover a number of areas including proportionality, quality of supervision, sustainability risks and group and cross-border supervision. The European Parliament and the Council will consider the proposed amendments and it is anticipated that the amendments will be approved and in force by 2023 or 2024.

Following entry into the TCA by the U.K. and the EU, and the U.K.'s withdrawal from the EU under the provisions of the TCA, U.K. financial institutions have lost their passporting rights into the EU. It was originally envisaged that there would be a level of cooperation in relation to financial services, to be reflected in a Memorandum of Understanding between the U.K. and the EU However, while the text of the Memorandum of Undertaking has been agreed in principle, a formal version has not yet been published. See "Risk Factors—Risks Relating to Our Industry, Business and Operations—The U.K.'s Withdrawal from the EU could adversely affect us."

Arch Re Europe and Arch Insurance (EU), being established in Ireland and authorized by the CBOI, are able to establish branches and provide reinsurance services, subject to similar regulatory notifications and there being no objection from the CBOI and the Member States concerned and, in respect of Arch Insurance (EU), insurance services in all EEA states.

Solvency II does not prohibit EEA insurers from obtaining reinsurance from reinsurers licensed outside the EEA, such as Arch Re Bermuda. As such, and subject to the specific rules in each Member State, Arch Re Bermuda may do business from Bermuda with insurers in EEA Member States, but it may not directly operate its reinsurance business within the EEA. Article 172 of Solvency II provides that reinsurance contracts concluded by insurance undertakings in the EEA with reinsurers having their head office in a country whose solvency regime has been determined to be equivalent to Solvency II shall be treated in the same manner as reinsurance contracts with undertakings in the EEA authorized under Solvency II. From January 1, 2016, Bermuda was deemed by the European Commission to be equivalent for Solvency II purposes. Solvency II also includes specific measures providing for the supervision of insurance and reinsurance groups. However, as a consequence of the above determination of equivalence, pursuant to Article 260 of Solvency II, regulators within the EEA are required to rely on the worldwide group supervision exercised by the BMA. EIOPA has also indicated that, on a case by case basis, groups subject to this worldwide supervision may be exempted from any EEA sub-group supervision, where this results in more efficient supervision of the group and does not impair EEA supervisors in respect of their individual responsibilities.

The Insurance Distribution Directive ("IDD") was published in February 2016. EEA Member States were required to transpose the IDD by October 1, 2018. It replaces the existing Insurance Mediation Directive. The IDD applies to all distributors of insurance and reinsurance products (including insurers and reinsurers selling directly to customers) and strengthens the regulatory regime applicable to distribution activities through increased transparency, information and conduct requirements. The principal impact of the IDD is on the insurance market, however, requirements that apply across insurance and reinsurance include more specific conditions regarding knowledge and continuing professional development requirements for those involved in distribution of (re)insurance products. The IDD continues the existing ability for intermediaries established in a Member State of the EU to establish branches and provide services to all EEA states. Arch Underwriters Europe, being established in Ireland and authorized by the CBOI, is able, subject to regulatory notifications and there being no objection from the CBOI, to establish branches and provide services in all EEA states.

Privacy. The European General Data Protection Regulation (the "GDPR") came into effect on May 25, 2018. The GDPR aims to introduce consistent data protection rules across the EU and EEA, and its scope extends to certain entities not established in the EEA if they process personal data or offer goods or services to, or monitor the behavior of, EEA data subjects. The GDPR contains a number of requirements regarding the processing of personal data about individuals, including mandatory security breach reporting, new and strengthened individual rights, evidenced data controller accountability for compliance with the GDPR principles (including fairness and transparency), maintenance of data processing activity records and the implementation of "privacy by design," including through the completion of mandatory Data Protection Impact Assessments in connection with higher risk data processing activities. Following the end of the Transition Period on December 31, 2020, GDPR was entered into force in the U.K. (the "U.K. GDPR"). The requirements of the U.K. GDPR are virtually identical to those of the EU GDPR. After the expiration of the Transition Period, transfers of personal data from the U.K. to the EEA are unrestricted and do not require additional safeguards. On June 30, 2021 the EU Commission formally adopted an adequacy decision for the U.K., meaning data can flow freely from the EU to the U.K. This adequacy decision will remain in place for four years (until June 27, 2025) after which the adequacy decision may be renewed if the U.K. continues to ensure an adequate level of data protection. Additionally, the EU Commission will monitor developments in the U.K., with the EU Commission having the power to suspend, repeal or amend the adequacy decision if the U.K. deviates from the level of protection currently in place.

ESG Considerations. A comprehensive package of measures to facilitate the progression towards sustainable economic activities was approved in principle by the European Commission in April 2021. In August 2021, two delegated regulations (the "EC Regulations") amending sectoral legislation, including the Solvency II Directive and the Insurance Distribution Directive, were published. The EC Regulations focus on the integration of sustainability into key activities including product oversight and governance, risk management and suitability assessment procedures. The EC Regulations are expected to apply from August 2022.

The European Commission has also published its proposal for a Corporate Sustainability Reporting Directive ("CSRD"), which is intended to replace the current Non-Financial Reporting Directive ("NFRD"**)**. The CSRD will expand the scope of sustainability reporting obligations to any European listed company or any company (including (re)insurers) meeting certain criteria. A draft of the CSRD is expected to be published in early 2022 and come into effect in December 2022, with in-scope companies expected to start reporting relevant information for financial years starting on or after January 1, 2023. Certain of our European subsidiaries may meet these criteria and become subject to these sustainability reporting obligations. In addition, the reporting standards under the CSRD, which will provide in-scope companies with the technical detail on the information that will need to be disclosed and reported, are currently anticipated to be adopted by the European Commission by October 31, 2022.

An additional ESG framework, the EU Taxonomy, came into force in July 2020, with in-scope companies required to comply with certain reporting obligations from January 1, 2022. The EU Taxonomy (which is a classification standard for reporting) sets out six environmental objectives with which companies' economic activities must comply if they are to be described as environmentally sustainable. These six environmental objectives are: (1) climate change mitigation, (2) climate change adaptation, (3) sustainable use and protection of water and marine resources, (4) transition to a circular economy, (5) pollution prevention and control and (6) the protection and restoration of biodiversity and ecosystems. In addition, reporting obligations apply to in-scope companies regarding (1) the financial products they provide and (2) the environmental sustainability of an in-scope company's activities, which is to be disclosed in non-financial statements that are currently required under the NFRD (and subsequently under the CSRD once it is implemented). Currently, these reporting obligations would not apply to Arch's European entities (on the basis that (1) they do not provide financial products within the meaning of the EU Taxonomy (in particular, financial products for insurance entities means insurance based investment products) and (2) as detailed above, they do not fall within scope of the sustainability reporting obligations of the NFRD). However as indicated above, if the CSRD is implemented in the currently proposed form, certain of our European entities will fall within the scope of certain reporting obligations.

In tandem with all of the above, EIOPA continues to publish detailed guidelines, recommendations and expectations relating to ESG matters and how these should be managed and considered by the (re)insurance sector.

Switzerland

In December 2008, Arch Re Europe opened Arch Re Europe Swiss Branch as a branch office. As Arch Re Europe is domiciled outside of Switzerland and its activities are limited to reinsurance, the Arch Re Europe Swiss Branch in Switzerland is not required to be licensed by the Swiss insurance regulatory authorities.

In August 2014, Arch Underwriters Europe opened a branch office in Zurich ("Arch Underwriters Europe Swiss Branch") to render reinsurance advisory services to certain group

companies. Arch Underwriters Europe Swiss Branch is registered with the commercial register of the Canton of Zurich. Since its activities are limited to advisory services for reinsurance matters, the Arch Underwriters Europe Swiss Branch is not required to be licensed by the Swiss insurance regulatory authorities.

Australia

APRA is an independent statutory authority responsible for prudential supervision of institutions across banking, insurance and superannuation and promotes financial stability in Australia. Arch Indemnity has been authorized to conduct monoline lenders' mortgage insurance business in Australia since June 2002 and was acquired by Arch Capital on August 30, 2021. Arch LMI was authorized by APRA in January 2019 to conduct monoline lenders' mortgage insurance business in Australia. Major regulatory requirements that are applicable to Arch LMI and Arch Indemnity as general as an insurance providers in Australia include requirements on minimum capital levels and compliance with corporate governance standards, including the risk management strategy for our Australian mortgage insurance business.

Our group also conducts property and casualty insurance business in Australia through Lloyd's. This insurance business is managed by and distributed through local coverholders and is subject to Lloyd's Supervision. In addition, the business is subject to local Australian prudential regulatory oversight by APRA, and additional separate financial services market conduct regulation by the Australian Securities and Investments Commission.

Hong Kong

The insurance industry is regulated by Hong Kong Insurance Authority ("HKIA"), whose principal function is to regulate and supervise the insurance industry for the promotion of the general stability of the insurance industry and for the protection of existing and potential policyholders. Arch MI Asia is authorized to carry on general business Class 14 (Credit) and Class 16 (Miscellaneous Financial Loss), in or from Hong Kong.

Major regulatory requirements that are applicable to Arch MI Asia as a general business insurer include requirements on minimum paid-up capital, minimum solvency margin and maintenance of assets in Hong Kong.

TAX MATTERS

The following summary of the taxation of Arch Capital and the taxation of our shareholders is based upon current law and is for general information only. Legislative, judicial or administrative changes may be forthcoming that could affect this summary.

The following legal discussion (including and subject to the matters and qualifications set forth in such summary) of certain tax considerations (a) under "—Taxation of Arch Capital—Bermuda" and "—Taxation of Shareholders—Bermuda" is based upon the advice of Conyers Dill & Pearman Limited, Hamilton, Bermuda and (b) under "—Taxation of Arch Capital-United States," "—Taxation of Shareholders-United States Taxation," "—Taxation of Our U.S. Shareholders" and "—United States Taxation of Non-U.S. Shareholders" is based upon the advice of Cahill Gordon & Reindel LLP, New York, New York (the advice of such firms does not include accounting matters, determinations or conclusions relating to the business or activities of Arch Capital). The summary is based upon current law and is for general information only. The tax treatment of a holder of our common or preferred shares, or of a person treated as a holder of our shares for U.S. federal income, state, local or non-U.S. tax purposes, may vary depending on the holder's particular tax situation. Legislative, judicial or administrative changes or interpretations may be forthcoming that could be retroactive and could affect the tax consequences to us or to holders of our shares.

Taxation of Arch Capital

Bermuda. Under current Bermuda law, Arch Capital is not subject to tax on income or profits, withholding, capital gains or capital transfers. Arch Capital has obtained from the Minister of Finance under the Exempted Undertakings Tax Protection Act 1966 of Bermuda an assurance that, in the event that Bermuda enacts legislation imposing tax computed on profits, income, any capital asset, gain or appreciation, or any tax in the nature of estate duty or inheritance, the imposition of any such tax shall not be applicable to Arch Capital or to any of our operations or our shares, debentures or other obligations until March 31, 2035. We could be subject to taxes in Bermuda after that date. This assurance will be subject to the proviso that it is not to be construed so as to prevent the application of any tax or duty to such persons as are ordinarily resident in Bermuda (we are not so currently affected) or to prevent the application of any tax payable in accordance with the provisions of the Land Tax Act 1967 of Bermuda or otherwise payable in relation to any property leased to us or our insurance subsidiary. We pay annual Bermuda government fees, and our Bermuda insurance and reinsurance subsidiary pays annual insurance

license fees. In addition, all entities employing individuals in Bermuda are required to pay a payroll tax and other sundry taxes payable, directly or indirectly, to the Bermuda government.

United States. Arch Capital and its non-U.S. subsidiaries believe they have conducted their operations and currently intend to conduct their operations going forward in a manner that has not caused them and will not cause them to be treated as engaged in a trade or business in the U.S. and, therefore, has not been and will not be required to pay U.S. federal income taxes (other than U.S. excise taxes on insurance and reinsurance premiums and withholding taxes on dividends and certain other U.S. source investment income). However, because definitive identification of activities which constitute being engaged in a trade or business in the U.S. is not provided by the Internal Revenue Code of 1986, as amended (the "Code"), U.S. Treasury regulations ("Treasury Regulations") or court decisions, there can be no assurance that our position on being engaged in a trade or business in the U.S. is correct. A foreign corporation deemed to be so engaged would be subject to U.S. federal income tax, as well as the branch profits tax, on its income, which is treated as effectively connected with the conduct of that trade or business unless the corporation is entitled to relief under the permanent establishment provisions of a tax treaty. Such income tax, if imposed, would be based on effectively connected income computed in a manner generally analogous to that applied to the income of a domestic corporation, except that deductions and credits generally are not permitted unless the foreign corporation has timely filed a U.S. federal income tax return in accordance with applicable Treasury Regulations. Penalties may be assessed for failure to file tax returns. In addition, in such case, a 30% branch profits tax would be imposed on net income after subtracting the regular corporate tax and making certain other adjustments.

Under the income tax treaty between Bermuda and the U.S. (the "Treaty"), Arch Capital's Bermuda insurance subsidiaries will be subject to U.S. income tax on any insurance premium income that is effectively connected with a U.S. trade or business only if that trade or business is conducted through a permanent establishment in the U.S. No Treasury Regulations interpreting the Treaty have been issued. While there can be no assurances, Arch Capital does not believe that any of its Bermuda insurance subsidiaries has a permanent establishment in the U.S. Such subsidiaries would not be entitled to the benefits of the Treaty if (i) 50% or less of Arch Capital's shares were beneficially owned, directly or indirectly, by Bermuda residents or U.S. citizens or residents, or (ii) any such subsidiary's income were used in substantial part to make disproportionate distributions to, or to meet certain liabilities to, persons who are not Bermuda residents or U.S. citizens or residents. While Arch Capital believes that its Bermuda insurance subsidiaries have been eligible for Treaty benefits to date, there can be no assurance that this is the case or that the Bermuda insurance subsidiaries will continue to be eligible for Treaty benefits.

The Treaty clearly applies to premium income, but may be construed as not protecting investment income. If Arch Capital's Bermuda insurance subsidiaries were considered to be engaged in a U.S. trade or business and were entitled to the benefits of the Treaty in general, but the Treaty were not found to protect investment income, a portion of such subsidiaries' investment income could be subject to U.S. federal income tax.

Non-U.S. insurance companies carrying on an insurance business within the U.S. have a certain minimum amount of effectively connected net investment income, determined in accordance with a formula that depends, in part, on the amount of U.S. risk insured or reinsured by such companies. If any of Arch Capital's non-U.S. insurance subsidiaries is considered to be engaged in the conduct of an insurance business in the U.S., a significant portion of such company's investment income could be subject to U.S. federal income tax.

Non-U.S. corporations not engaged in a trade or business in the U.S. are nonetheless subject to U.S. income tax on certain "fixed or determinable annual or periodic gains, profits and income" derived from sources within the U.S. as enumerated in Section 881(a) of the Code (such as dividends and certain interest on investments), subject to exemption under the Code or reduction by an applicable treaty.

The U.S. also imposes an excise tax on insurance and reinsurance premiums paid to non-U.S. insurers or reinsurers with respect to risks located in the U.S. The rates of tax, unless reduced by an applicable U.S. tax treaty, are 4% for non-life insurance premiums and 1% for life insurance and all reinsurance premiums.

The Tax Cuts and Jobs Act of 2017 (the "Tax Cuts Act") was signed into law by the President of the United States in 2017. For taxable years beginning after 2017, the Tax Cuts Act imposes a 10% minimum base erosion and anti-abuse tax (increased to 12.5% for taxable years after 2025) on the "modified taxable income" of a U.S. corporation (or a non-U.S. corporation engaged in a U.S. trade or business) over such corporation's regular U.S. federal income tax, reduced by certain tax credits. The "modified taxable income" of a corporation is determined without deduction for certain payments by such corporation to its non-U.S. affiliates (including reinsurance premiums). Final Treasury Regulations interpreting the base erosion and anti-abuse tax were issued in December 2019.

United Kingdom. Our U.K. subsidiaries are companies incorporated and have their central management and control in the U.K., and are therefore resident in the U.K. for

corporation tax purposes. As a result, they will be subject to U.K. corporation tax on their respective profits. The U.K. branches of Arch Re Europe and Arch Insurance (EU) will be subject to U.K. corporation tax on the profits (both income profits and chargeable gains) attributable to each branch. The rate of U.K. corporation tax for the financial year is 19% on profits (increasing to 25% with effect from April 1, 2023).

Canada. Arch Insurance Canada is taxed on its worldwide income. Arch Re U.S. is taxed on its net business income earned in Canada. The general federal corporate income tax rate in Canada is currently 15%. Provincial and territorial corporate income tax rates are added to the general federal corporate income tax rate and generally vary between 8% and 16%.

Ireland. Each of Arch Re Europe, Arch Insurance (EU) and Arch Underwriters Europe is incorporated and resident in Ireland for corporation tax purposes and will be subject to Irish corporate tax on its worldwide profits, including the profits of the branches of Arch Re Europe, Arch Insurance (EU) and Arch Underwriters Europe. Any foreign branch corporate tax payable will be creditable against Arch Re Europe's Irish corporate tax liability on the results of Arch Re Europe's branches with the same principle applied to Arch Insurance (EU)'s branches and Arch Underwriters Europe's branches. The current rate of Irish corporation tax applicable to such trading profits is 12.5%.

Switzerland. Arch Re Europe Swiss Branch and Arch Underwriters Europe Swiss Branch are subject to Swiss corporation tax on the profit which is allocated to each branch. The effective tax rate is approximately 21.15% for Swiss federal, cantonal and communal corporation taxes on the profit. The effective tax rate of the annual cantonal and communal capital taxes on the equity which is allocated to Arch Re Europe Swiss Branch and Arch Underwriters Europe Swiss Branch is approximately 0.17%.

Denmark. Arch Re Denmark, established as a subsidiary of Arch Re Bermuda, is subject to Danish corporation taxes on its profits at a rate of 22%.

Hong Kong. Arch MI Asia is subject to Hong Kong corporate tax on its assessable profits at a rate of 16.5%. Assessable profits are the net profits for the basis period, arising in or derived from Hong Kong.

Australia. Arch LMI and Arch Indemnity, Australian incorporated and tax resident companies, are subject to Australian corporate tax on its worldwide profits. The current rate of Australian corporation tax applicable to such profits is 30%.

Taxation of Shareholders

Bermuda. Currently, there is no Bermuda withholding tax on dividends paid by us.

United States—General. The following summary sets forth certain U.S. federal income tax considerations related to the purchase, ownership and disposition of our common shares and our non-cumulative preferred shares ("preferred shares"). Unless otherwise stated, this summary deals only with shareholders ("U.S. holders") that are U.S. Persons (as defined below) and to common shares and preferred shares beneficially owned by such holder and held as capital assets. The following discussion is only a general summary of the U.S. federal income tax matters described herein and does not purport to address all of the U.S. federal income tax consequences that may be relevant to a particular shareholder in light of such shareholder's specific circumstances. In addition, the following summary does not describe the U.S. federal income tax consequences that may be relevant to certain types of shareholders, such as banks, insurance companies, regulated investment companies, real estate investment trusts, financial asset securitization investment trusts, dealers in securities or traders that adopt a mark-to-market method of tax accounting, tax exempt entities, expatriates, U.S. holders that hold our common shares or preferred shares through a non-U.S. broker or other non-U.S. intermediary, persons who hold the common shares or preferred shares as part of a hedging or conversion transaction or as part of a straddle, who may be subject to special rules or treatment under the Code or persons required for U.S. federal income tax purposed to recognize income no later than such income is reported on such persons' applicable financial statements. This discussion is based upon the Code, the Treasury Regulations promulgated there under and any relevant administrative rulings or pronouncements or judicial decisions, all as in effect on the date of this annual report and as currently interpreted, and does not take into account possible changes in such tax laws or interpretations thereof, which may apply retroactively. This discussion does not include any description of the tax laws of any state or local governments within the U.S., or of any foreign government, that may be applicable to our common shares or preferred shares or the shareholders. Persons holding or considering an investment in the common shares or preferred shares should consult their own tax advisors concerning the application of the U.S. federal tax laws to their particular situations as well as any tax consequences arising under the laws of any state, local or foreign taxing jurisdiction prior to making such investment.

If an entity that is treated as a partnership holds our common shares or preferred shares, the tax treatment of a partner will generally depend upon the status of the partner and the activities of the partnership. If you are a partner of a partnership holding or considering an investment in our

common shares or preferred shares, you should consult your tax advisor.

For purposes of this discussion, the term "U.S. Person" means a person that is, for U.S. federal income tax purposes:

- an individual who is a citizen or resident of the U.S.;
- a corporation created or organized under the laws of the U.S., any state thereof or the District of Columbia;
- an estate, the income of which is subject to U.S. federal income taxation regardless of its source; or
- a trust, if either (i) a court within the U.S. is able to exercise primary supervision over the administration of such trust and one or more U.S. persons have the authority to control all substantial decisions of such trust or (ii) the trust has a valid election in effect to be treated as a U.S. person for U.S. federal income tax purposes.

United States—Taxation of Dividends. The preferred shares should be properly classified as equity rather than debt for U.S. federal income tax purposes. Subject to the discussions below relating to the potential application of the controlled foreign corporation ("CFC"), "related person insurance income" ("RPII") and passive foreign investment companies ("PFIC") rules, as defined below, cash distributions, if any, made with respect to our common shares or preferred shares will constitute dividends for U.S. federal income tax purposes to the extent paid out of our current or accumulated earnings and profits (as computed using U.S. tax principles). If a U.S. holder of our common shares or our preferred shares is an individual or other non-corporate holder, dividends paid, if any, to that holder that constitute qualified dividend income generally will be taxable at the rate applicable for long-term capital gains (generally up to 20%), provided that such person meets a holding period requirement. Generally, in order to meet the holding period requirement, the U.S. holder must hold the common shares for more than 60 days during the 121-day period beginning 60 days before the ex-dividend date and must hold preferred shares for more than 90 days during the 181-day period beginning 90 days before the ex-dividend date. Dividends paid, if any, with respect to common shares or preferred shares generally will be qualified dividend income, provided the common shares or preferred shares are readily tradable on an established securities market in the U.S. in the year in which the shareholder receives the dividend (which should be the case for shares that are listed on the NASDAQ Stock Market or the New York Stock Exchange) and Arch Capital is not considered to be a passive foreign investment company in either the year of the distribution or the preceding taxable year. No assurance can be given that the preferred shares will be considered readily tradable on an established securities market in the U.S. See "—Taxation of Our U.S. Shareholders" below.

A U.S. holder that is an individual, estate or a trust that does not fall into a special class of trusts that is exempt from such tax, will be subject to a 3.8% tax on the lesser of (1) the U.S. holder's "net investment income" for the relevant taxable year and (2) the excess of the U.S. holder's modified adjusted gross income for the taxable year over a certain threshold (which in the case of individual will be between $125,000 and $250,000, depending on the individual's circumstances). A U.S. holder's net investment income generally will include its dividend income and its net gains from the disposition of our common shares and preferred shares, unless such dividend income or net gains are derived in the ordinary course of the conduct of a trade or business (other than a trade or business that consists of certain passive or trading activities).

Distributions with respect to the common shares and the preferred shares will not be eligible for the dividends received deduction allowed to U.S. corporations under the Code. To the extent distributions on our common shares and preferred shares exceed our earnings and profits, they will be treated first as a return of the U.S. holder's basis in our common shares and our preferred shares to the extent thereof, and then as gain from the sale of a capital asset.

United States—Sale, Exchange or Other Disposition. Subject to the discussions below relating to the potential application of the CFC, RPII and PFIC rules, holders of common shares and preferred shares generally will recognize capital gain or loss for U.S. federal income tax purposes on the sale, exchange or other taxable disposition of common shares or preferred shares, as applicable.

United States—Redemption of Preferred Shares. A redemption of the preferred shares will be treated under Section 302 of the Code as a dividend to the extent we have earnings and profits allocable to such shares, unless the redemption satisfies one of the tests set forth in Section 302(b) of the Code enabling the redemption to be treated as a sale or exchange, subject to the discussion herein relating to the potential application of the CFC, RPII and PFIC rules. Under the relevant Code Section 302(b) tests, the redemption should be treated as a sale or exchange only if it (1) is substantially disproportionate, (2) constitutes a complete termination of the holder's stock interest in us or (3) is "not essentially equivalent to a dividend." In determining whether any of these tests are met, shares considered to be owned by the holder by reason of certain constructive ownership rules set forth in the Code, as well as shares actually owned, must generally be taken into account. It may be more difficult for a U.S. holder who owns, actually or constructively by operation of the attribution rules, any of our other shares to satisfy any of the above requirements. The determination as to whether any of the alternative tests of Section 302(b) of the Code is satisfied with respect to a particular holder of the preferred shares depends on the facts and circumstances as of the time the determination is made.

Taxation of Our U.S. Shareholders

Controlled Foreign Corporation Rules. We or any of our non-U.S. subsidiaries generally will be treated as a CFC with respect to any taxable year if at any time during such taxable year, one or more "10% U.S. Shareholders" (as defined below) collectively own more than 50% of us or such non-U.S. subsidiary (as applicable) by vote or value (taking into account shares actually owned by such U.S. holder as well as shares attributed to such U.S. holder under the Code or the Treasury Regulations thereunder). Moreover, with respect to insurance income (including reinsurance income), the "more than 50%" requirement described in the preceding sentence is replaced with a more expansive "more than 25%" requirement. For taxable years beginning on or before December 31, 2017, a 10% Shareholder means any U.S. Person who was considered to own, actually or constructively, 10% or more of the total combined voting power of our shares or those of our non-U.S. subsidiaries (as applicable). Under the Tax Cuts Act, for taxable years beginning after December 31, 2017, a 10% Shareholder also includes any U.S. Person who is considered to own, actually or constructively, 10% or more of the value of our shares or those of our non-U.S. subsidiaries (as applicable). As a result, for taxable years beginning after December 31, 2017, the voting cut-back limitation contained in our bye-laws that limits the votes conferred by the Controlled Shares (as defined in our bye-laws) of any U.S. Person to 9.9% of the total voting power of all our shares entitled to vote will not prevent any U.S. holder from being treated as a 10% U.S. Shareholder. Due to the repeal of Section 958(b)(4) of the Code under the Tax Cuts Act, all non-U.S. subsidiaries directly or indirectly owned by Arch Capital are treated as constructively owned by its U.S. subsidiaries, and therefore are treated as CFCs.

Status as a CFC would not cause us or any of our non-U.S. subsidiaries to be subject to U.S. federal income tax. Such status also would have no adverse U.S. federal income tax consequences for any U.S. holder that is not a 10% U.S. Shareholder with respect to us or any such non-U.S. subsidiary (as applicable). If we or any of our non-U.S. subsidiaries are or were a CFC with respect to any taxable year, a U.S. holder that is considered a 10% U.S. Shareholder would be subject to current U.S. federal income taxation (at ordinary income tax rates) to the extent of all or a portion of the undistributed earnings and profits of Arch Capital and our subsidiaries attributable to "subpart F income" (including certain insurance premium income and investment income) or global intangible low-taxed income and may be taxable at ordinary income tax rates on any gain recognized on a sale or other disposition (including by way of repurchase or liquidation) of our common shares or preferred shares to the extent of the current and accumulated earnings and profits attributable to such common shares or preferred shares. For taxable years beginning after December 31, 2017, a helpful limitation, which provides that a U.S. shareholder would not be subject to the current inclusion rules of Subpart F for a taxable year unless the non-U.S. corporation was a CFC for an uninterrupted period of 30 days or more during such taxable year, will no longer apply.

Related Person Insurance Income Rules. In general, with respect to RPII (a limited category of insurance income, as defined below), the CFC rules are expanded in two significant respects. First, in determining CFC status, as well as determining which U.S. shareholders are subject to current taxation with respect to a CFC's RPII (whether or not currently distributed), all U.S. shareholders (as opposed to only 10% U.S. Shareholders) are taken into account. Second, the amount of stock in a foreign corporation that all U.S. shareholders, in the aggregate, must own for such corporation to be treated as a CFC is reduced from more than 50% (by vote or value), and more than 25% (by vote or value) with respect to insurance income generally, to 25% or more (by vote or value). Generally, RPII is insurance income (including reinsurance income) of a foreign corporation with respect to which the insured is a United States shareholder of the foreign corporation or a related person to such a shareholder.

Under one exception to the foregoing RPII rules, U.S. shareholders are not required to include a CFC's RPII currently in income if the CFC's gross RPII is less than 20% of its total gross insurance income for the taxable year in question (the "RPII 20% gross income exception").

Under current law, we currently expect each of our non-U.S. subsidiaries to satisfy the RPII 20% gross income exception, and therefore we currently do not expect any U.S. shareholder to be required to include RPII in income currently (although there can be no assurance that this is or will continue be the case). However, recently proposed Treasury Regulations (issued on January 24, 2022), if finalized in their current form, would for the first time (on a prospective basis) expand the definition of RPII to include certain intercompany insurance income (including reinsurance income) in a manner that could cause certain of our foreign subsidiaries not to satisfy the RPII 20% gross income exception. In such event, (1) as noted above, all U.S. shareholders (not just 10% U.S. Shareholders) would be required to include RPII in income currently, whether or not distributed, and (2) as noted below, U.S. shareholders that are tax exempt entities would be required to treat such RPII inclusions as unrelated business taxable income. Current and prospective U.S. holders should consult their own tax advisors as to the potential impact of these recently proposed Treasury Regulations.

Section 953(c)(7) of the Code generally provides that Section 1248 of the Code (which generally would require a U.S.

holder to treat certain gains attributable to the sale, exchange or disposition of common shares or preferred shares as a dividend) will apply to the sale or exchange by a U.S. shareholder of shares in a foreign corporation that is characterized as a CFC under the RPII rules if the foreign corporation would be taxed as an insurance company if it were a U.S. corporation, regardless of whether the U.S. shareholder is a 10% U.S. Shareholder or whether the corporation qualifies for the RPII 20% gross income exception. Although existing Treasury Regulations do not address the question, proposed Treasury Regulations issued in April 1991 create some ambiguity as to whether Section 1248 and the requirement to file Form 5471 would apply when the non-U.S. corporation has a foreign insurance subsidiary that is a CFC for RPII purposes and that would be taxed as an insurance company if it were a domestic corporation. We believe that Section 1248 and the requirement to file Form 5471 will not apply to a less than 10% U.S. Shareholder because Arch Capital is not directly engaged in the insurance business. There can be no assurance, however, that the IRS will interpret the proposed Treasury Regulations in this manner or that the Treasury will not take the position that Section 1248 and the requirement to file Form 5471 will apply to dispositions of our common shares or our preferred shares.

If the IRS or U.S. Treasury were to make Section 1248 of the Code and the Form 5471 filing requirement applicable to the sale of our shares, we would notify shareholders that Section 1248 of the Code and the requirement to file Form 5471 will apply to dispositions of our shares. Thereafter, we would send a notice after the end of each calendar year to all persons who were shareholders during the year notifying them that Section 1248 of the Code and the requirement to file Form 5471 apply to dispositions of our shares by U.S. holders. We would attach to this notice a copy of Form 5471 completed with all our information and instructions for completing the shareholder information.

Tax-Exempt Shareholders. Tax-exempt entities may be required to treat certain Subpart F insurance income, including RPII, that is includible in income by the tax-exempt entity as unrelated business taxable income. Current and prospective U.S. holders that are tax exempt entities should consult their own tax advisors as to the potential impact of the unrelated business taxable income provisions of the Code.

Passive Foreign Investment Companies. Sections 1291 through 1298 of the Code contain special rules applicable with respect to foreign corporations that are PFICs. In general, a foreign corporation will be a PFIC if 75% or more of its income constitutes “passive income” or 50% or more of its assets produce passive income. If we were to be characterized as a PFIC, U.S. holders would be subject to a penalty tax at the time of their sale of (or receipt of an “excess distribution” with respect to) their common shares or preferred shares. In general, a shareholder receives an “excess distribution” if the amount of the distribution is more than 125% of the average distribution with respect to the shares during the three preceding taxable years (or shorter period during which the taxpayer held the stock). In general, the penalty tax is equivalent to an interest charge on taxes that are deemed due during the period the shareholder owned the shares, computed by assuming that the excess distribution or gain (in the case of a sale) with respect to the shares was taxable in equal portions throughout the holder’s period of ownership. The interest charge is equal to the applicable rate imposed on underpayments of U.S. federal income tax for such period. A U.S. shareholder may avoid some of the adverse tax consequences of owning shares in a PFIC by making a qualified electing fund (“QEF”) election. A QEF election is revocable only with the consent of the IRS and has the following consequences to a shareholder:

- For any year in which Arch Capital is not a PFIC, no income tax consequences would result.
- For any year in which Arch Capital is a PFIC, the shareholder would include in its taxable income a proportionate share of the net ordinary income and net capital gains of Arch Capital and certain of its non-U.S. subsidiaries.

For taxable years beginning on or before December 31, 2017, the determination of whether the active insurance company exception applies to an insurance company was made on a case-by-case basis and the analysis was inherently subjective. Under the Tax Cuts Act, for taxable years beginning after December 31, 2017, the active insurance company exception applies only if (i) the company would be taxed as an insurance company were it a U.S. corporation and (ii) either (A) loss and loss adjustment expense and certain reserves constitute more than 25% of the company’s gross assets for the relevant year or (B) loss and loss adjustment expenses and certain reserves constitute more than 10% of the company’s gross assets for the relevant year and, based on the applicable facts and circumstances, the company is predominantly engaged in an insurance business and the failure of the company to satisfy the preceding 25% test is due solely to run-off related or other specified circumstances involving the insurance business. The PFIC statutory provisions contain a look-through rule that states that, for purposes of determining whether a foreign corporation is a PFIC, such foreign corporation shall be treated as if it “received directly its proportionate share of the income” and as if it “held its proportionate share of the assets” of any other corporation in which it owns at least 25% of the stock. We believe that we were not a PFIC for any taxable year ended on or before December 31, 2021 and we currently are not expecting to become a PFIC for any subsequent taxable year. However, due to the complexity and uncertainty of the PFIC rules and the limited guidance interpreting them, there can be

no assurance that we have not been a PFIC to date or that we will not become a PFIC at some time in the future.

On December 4, 2020, the IRS issued certain final Treasury Regulations (the "2020 final PFIC insurance regulations") and revised proposed Treasury Regulations (the "2020 proposed PFIC insurance regulations") regarding the application of the insurance company exception. While we believe that the 2020 final PFIC insurance regulations and the 2020 proposed PFIC insurance regulations should not adversely impact the our ability to satisfy the insurance company exception and avoid being treated as a PFIC, there can be no assurance that such exception will in fact apply and/or will continue to apply at all times in the future. Each U.S. holder should consult its own tax advisor as to the effects of these rules.

United States Taxation of Non-U.S. Shareholders

Taxation of Dividends. Cash distributions, if any, made with respect to common shares or preferred shares held by a holder that is, for U.S. federal income tax purposes, an individual, corporation, estate or trust that is not a U.S. holder (a "Non-U.S. holder") generally will not be subject to U.S. withholding tax.

Sale, Exchange or Other Disposition. Non-U.S. holders of common shares or preferred shares generally will not be subject to U.S. federal income tax with respect to gain realized upon the sale, exchange or other disposition of such shares unless such gain is effectively connected with a U.S. trade or business of the Non-U.S. holder or such person is present in the U.S. for 183 days or more in the taxable year the gain is recognized and certain other requirements are satisfied.

Information Reporting and Backup Withholding. Non-U.S. holders of common shares or preferred shares will not be subject to U.S. information reporting or backup withholding with respect to dispositions of common shares effected through a non-U.S. office of a broker, unless the broker has certain connections to the U.S. or is a U.S. person. No U.S. backup withholding will apply to payments of dividends, if any, on our common shares or our preferred shares.

FATCA Withholding. Sections 1471 through 1474 to the Code, known as the Foreign Account Tax Compliance Act ("FATCA"), impose a withholding tax of 30% on U.S.-source interest, dividends and certain other types of income, which is received by a foreign financial institution ("FFI"), unless such FFI enters into an agreement with the IRS to obtain certain information as to the identity of the direct and indirect owners of accounts in such institution. In addition, a 30% withholding tax may be imposed on the above payments to certain non-financial foreign entities which do not (i) certify to each respective withholding agent that they have no "substantial U.S. owners" (*i.e.*, a U.S. 10% direct or indirect shareholder), or (ii) provide such withholding agent with the certain information as to the identity of such substantial U.S. owners. The U.S. has entered into intergovernmental agreements to implement FATCA ("IGAs") with a number of jurisdictions. Bermuda has signed an IGA with the U.S. Different rules than those described above may apply under such an IGA.

Although dividends with respect to our common shares or preferred shares generally will be treated as foreign source for U.S. federal withholding tax purposes, it is unclear whether, for FATCA purposes, some or all of our dividends may be recharacterized as U.S. source dividends. Treasury Regulations addressing this topic have not yet been issued.

Current and prospective investors should consult their own tax advisors as to the filing and information requirements that may be imposed on them in respect of their ownership of our common share or preferred shares.

Other Tax Laws. Shareholders should consult their own tax advisors with respect to the applicability to them of the tax laws of other jurisdictions.

ITEM 1A. RISK FACTORS

Set forth below are risk factors relating to our business. These risks and uncertainties are not the only ones we face. There may be additional risks that we currently consider not to be material or of which we are not currently aware, and any of these risks could cause our actual results to differ materially from historical or anticipated results. You should carefully consider these risks along with the other information provided in this report, including our "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our accompanying consolidated financial statements, as well as the information under the heading "Cautionary Note Regarding Forward-Looking Statements" before investing in any of our securities. We may amend, supplement or add to the risk factors described below from time to time in future reports filed with the SEC.

RISK FACTORS SUMMARY

The following is a summary description of the material risks and uncertainties to which we may be exposed. Each of these risks could adversely affect our business, financial condition and results of operations, and any such effects may be material. These and other risks are more fully described after this summary description.

Risks Relating to Our Industry, Business and Operations

- We operate in a highly competitive environment.
- The insurance and reinsurance industry is highly cyclical, and we may at times experience periods characterized by excess underwriting capacity and unfavorable premium rates.
- Claims for natural and man-made catastrophic events could cause large losses and substantial volatility in our results of operations and could have a material adverse effect on our financial position and results of operations.
- The impacts of the COVID-19 pandemic, the shift to a COVID-19 endemic approach and related risks could materially affect our results of operations, financial position and/or liquidity.
- The impact of climate change will affect our loss limitation methods, such as the purchase of third party reinsurance and catastrophe risk modeling and risk selection in ways which may adversely impact our business, financial condition and results of operations.
- Our insurance and reinsurance subsidiaries are subject to supervision and regulation. Changes to existing regulation and supervisory standards, or failure to comply with applicable requirements, could adversely affect our business and results of operations.
- We are subject to ongoing legal and policy actions around climate change which may result in additional requirements which may prompt us to shift our risk selection and business strategy away in ways which may adversely impact our results of operations.
- Our customers and policyholders may also be impacted by regulatory, technological, market or other risks relating to climate change in ways which we cannot predict with certainty and adversely impact our results of operations.
- As we continue to incorporate climate change in our business strategy, we cannot be certain that shareholders, investors and other influential environmental groups will agree with our approach, which may adversely impact our ability to raise funds in the capital markets, our share price and our results of operations.
- Governmental, regulatory and rating actions in response to the COVID-19 pandemic may adversely affect our financial performance and our ability to conduct our businesses as we have in the past.
- We could face unanticipated losses from war, terrorism, cyber-attacks, pandemics and political instability, and these or other unanticipated losses could have a material adverse effect on our financial condition and results of operations.
- Underwriting risks and reserving for losses are based on probabilities and related modeling, which are subject to inherent uncertainties.
- The failure of any of the loss limitation methods we employ could have a material adverse effect on our financial condition or results of operations.
- The availability of reinsurance, retrocessional coverage and capital market transactions to limit our exposure to risks may be limited, and counterparty credit and other risks associated with our reinsurance arrangements may result in losses which could adversely affect our financial condition and results of operations.
- We could be materially adversely affected to the extent that important third parties with whom we do business do not adequately or appropriately manage their risks, commit fraud or otherwise breach obligations owed to us.
- Emerging claim and coverage issues, including issues relating to the COVID-19 pandemic, may adversely affect our business.
- Acquisitions, the addition of new lines of insurance or reinsurance business, expansion into new geographic regions and/or entering into joint ventures or partnerships expose us to risks.
- Our information technology systems may be unable to meet the demands of customers and our workforce.
- Technology failures and cyber attacks, including, but not limited to, ransomware, exploitation in software or code with malicious intent, state-sponsored cyber attacks, may impact us or our business partners and service providers, causing a disruption in service and operations which would negatively impact our business and/or expose us to litigation.
- Cyber incidents or data breaches caused by bad actors or unintentional human error impacting data, including personal data, we maintain or use during our business operations may result in regulatory fines or action, reputation damage and a disruption in our business operations.
- A downgrade in our ratings or our inability to obtain a rating for our operating insurance and reinsurance subsidiaries may adversely affect our relationships with clients and brokers and negatively impact sales of our products.
- Our ability to execute successfully our business strategy, continue to grow and innovate and offer our employees a dynamic and supportive workplace depends on the recruitment, retention and promotion of talented, agile, diverse and resilient employees at all levels of our organization.
- Our success will depend on our ability to maintain and enhance effective operating procedures and internal controls and our ERM program.
- Exposure to credit risk inherent in certain of our business operations.

- Applicable laws and regulations relating to economic trade sanctions and foreign bribery laws.
- The U.K.'s withdrawal from the EU and the impact thereof.

Risks Relating to Financial Markets and Investments

- Adverse developments in the financial markets (including as a result of the COVID-19 pandemic) and their potential to limit our access to capital or adversely affect our policyholders, reinsurers and retrocessionaires.
- Disruption to the financial markets and the general economic downturn resulting from COVID-19 may adversely and materially impact our investments, financial condition and results of operation.
- Foreign currency exchange rate fluctuation, as well as uncertainty relating to the determination of LIBOR and the replacement thereof with alternative benchmark rates.
- Uncertainty relating to the determination of LIBOR and the phasing out and replacement of LIBOR after 2021 may adversely affect the value of our investment portfolio, our cost of capital, net investment income and mortgage reinsurance costs.
- The determination of the amount of current expected credit losses ("CECL") allowances taken on our investments is highly subjective and could materially impact our results of operations or financial position.
- Inability of our reinsurance subsidiaries to provide required collateral.

Risks Relating to Our Mortgage Operations

- The ultimate performance of the Arch MI U.S. mortgage insurance portfolio remains uncertain.
- The amount of mortgage insurance we write in the U.S. could decline, which would reduce our revenues.
- Changes to the role of the GSEs in the U.S. housing market or to GSE eligibility requirements for mortgage insurers could negatively impact our results of operations and financial condition, or reduce our operating flexibility.
- The implementation of the Basel III Capital Accord and FHFA's Enterprise Capital Rule may adversely affect the use of mortgage insurance and CRT opportunities.

Risk Relating to Our Company

- Some of the provisions of our bye-laws and our shareholders agreement may have the effect of hindering, delaying or preventing third party takeovers or changes in management initiated by shareholders. These provisions may also prevent our shareholders from receiving premium prices for their shares in an unsolicited takeover.
- There are regulatory limitations on the ownership and transfer of our common shares.
- Arch Capital is a holding company and is dependent on dividends and other distributions from its operating subsidiaries.
- General market conditions and unpredictable factors could adversely affect market prices for our outstanding preferred shares.
- Dividends on our preferred shares are non-cumulative.
- Our preferred shares are equity and are subordinate to our existing and future indebtedness.
- The voting rights of holders of our preferred shares are limited.

Risks Relating to Taxation

- We and our non-U.S. subsidiaries may become subject to U.S. federal income taxation and/or the U.S. federal income tax liabilities of our U.S. subsidiaries may increase, including as a result of changes in tax law.
- The impact of the enactment and continuing implementation of the Tax Cuts Act.
- Recently proposed Treasury Regulations, if finalized in their current form, could (on prospective basis) cause our U.S. shareholders (including tax-exempt U.S. shareholders)to be subject to current U.S. federal income tax on the portion of our earnings attributable to certain intercompany reinsurance income (whether or not distributed).
- We may become subject to taxes in Bermuda after March 31, 2035.
- The impact of Bermuda's letter of commitment to the OECD to eliminate harmful tax practices is uncertain and could adversely affect our tax status in Bermuda.
- Legislation enacted in Bermuda as to Economic Substance may affect our operations.
- We may become subject to increased taxation in Bermuda and other countries as a result of the OECD's plan on "Base erosion and profit shifting."
- Application of the EU Anti-Tax Avoidance Directives.

Risks Relating to Our Industry, Business and Operations

We operate in a highly competitive environment, and we may not be able to compete successfully in our industry.

The insurance and reinsurance industry is highly competitive. We compete on an international and regional basis with major U.S. and non-U.S. insurers and reinsurers, many of which have greater financial, marketing and management resources than we do. See "Competition" in Item 1 for details on our competitors in each of the major segments we operate in. There has been significant consolidation in the insurance and reinsurance sector in recent years and we may experience increased competition as a result of that consolidation, with consolidated entities having enhanced market power. These

consolidated entities may use their enhanced market power and broader capital base to negotiate price reductions for products and services that compete with ours, and we may experience rate declines and possibly write less business. Any failure by us to effectively compete could adversely affect our financial condition and results of operations.

The insurance and reinsurance industry is highly cyclical, and we may at times experience periods characterized by excess underwriting capacity and unfavorable premium rates.

Historically, insurers and reinsurers have experienced significant fluctuations in operating results due to competition, frequency of occurrence or severity of catastrophic events, levels of capacity, general economic conditions, changes in equity, debt and other investment markets, changes in legislation, case law and prevailing concepts of liability and other factors. Demand for reinsurance is influenced significantly by the underwriting results of primary insurers and prevailing general economic conditions. The supply of insurance and reinsurance is related to prevailing prices and levels of surplus capacity that, in turn, may fluctuate in response to changes in rates of return being realized in the insurance and reinsurance industry on both underwriting and investment sides. As a result, the insurance and reinsurance business historically has been a cyclical industry characterized by periods of intense price competition due to excessive underwriting capacity as well as periods when shortages of capacity permitted favorable premium levels and changes in terms and conditions. Until recently, the supply of insurance and reinsurance had increased over the past several years, and may again in the future, either as a result of capital provided by new entrants or by the commitment of additional capital by existing insurers or reinsurers. Continued increases in the supply of insurance and reinsurance may have consequences for us, including fewer contracts written, lower premium rates, increased expenses for customer acquisition and retention, and less favorable policy terms and conditions.

Claims for natural and man-made catastrophic events could cause large losses and substantial volatility in our results of operations and could have a material adverse effect on our financial position and results of operations.

We have large aggregate exposures to natural and man-made catastrophic events. Natural catastrophes can be caused by various events, including hurricanes, floods, wildfires, tsunamis, windstorms, earthquakes, hailstorms, tornadoes, explosions, severe winter weather, fires, droughts and other natural disasters. The frequency and severity of natural catastrophe activity has also been greater in recent years. Due to climate change caused in part by human actions and other related factors. Catastrophic events caused by humans may include acts of war, acts of terrorism and political instability. Catastrophes can cause losses in non-property business such as workers' compensation or general liability. In addition to the nature of the 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. Actual losses from future catastrophic events may vary materially from estimates due to the inherent uncertainties in making such determinations resulting from several factors, including the potential inaccuracies and inadequacies in the data provided by clients, brokers and ceding companies, the modeling techniques and the application of such techniques, the contingent nature of business interruption exposures, the effects of any resultant demand surge on claims activity and attendant coverage issues. In estimating our losses from catastrophic events our considerations can include factors such as overall market losses, additional claims information from our clients, multiple model views and proprietary scenario testing.

The impact of the COVID-19 pandemic, the shift to a COVID-19 endemic approach and related risks could materially affect our results of operations, financial position and/or liquidity.

The COVID-19 pandemic has resulted in a global slowdown of economic activity, and the magnitude of the impact of the pandemic and the duration of the disruption and resulting decline in business activity is still highly uncertain. The emergence of variants of the original coronavirus, such as Delta or Omicron, create a high level of unpredictability for our business and the global economy. A further prolonged COVID-19 pandemic, or a shift to a COVID-19 endemic approach, may result in fundamental shifts in the global economy which could materially and adversely impact our own employees and operations, as well as the business operations of third parties with whom we interact. The COVID-19 pandemic has impacted our results of operations and could have a significant effect on our future business, results of operations and financial performance. We may experience higher levels of loss and claims activity in certain lines of business, and our premiums written and earned could also be adversely affected by a suppression of global commercial activity that results in a reduction in insurable assets and other exposure. The pandemic initially resulted in a sharp contraction in the global economy, tightening liquidity and increasing volatility and uncertainty in the capital markets. Coincident global mitigation responses stabilized markets and stimulated economic recovery. During the second quarter of 2020, pandemic-driven dislocations had a negative effect on the performance of our investment portfolio, after which valuations recovered. Continued maintenance of the low interest rates to combat the economic headwinds of the pandemic could negatively impact the net investment income in our fixed maturity portfolio. Conversely, the tightening of financial conditions as the

pandemic threat to the economy eases may drive rising interest rates and increase the potential for realized and unrealized losses in the fixed income portion of the portfolio. Certain lines of our business may require additional forms of collateral in the event of a decline in the fair value of securities and benchmarks to which those repayment mechanisms are linked. The impact of an ongoing pandemic on the financial markets may also adversely affect our ability to fund through public or private equity offerings, debt financings, and through other means at acceptable terms.

Claims for natural and man-made catastrophic events could cause large losses and substantial volatility in our results of operations and could have a material adverse effect on our financial position and results of operations.

We have large aggregate exposures to natural and man-made catastrophic events. Natural catastrophes can be caused by various events, including hurricanes, floods, wildfires, tsunamis, windstorms, earthquakes, hailstorms, tornadoes, explosions, severe winter weather, fires, droughts and other natural disasters. The frequency and severity of natural catastrophe activity has also been greater in recent years due to climate change caused in part by human actions and other related factors. Catastrophic events caused by humans may include acts of war, acts of terrorism and political instability. Catastrophes can cause losses in non-property business such as workers' compensation or general liability. In addition to the nature of the 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. Actual losses from future catastrophic events may vary materially from estimates due to the inherent uncertainties in making such determinations resulting from several factors, including the potential inaccuracies and inadequacies in the data provided by clients, brokers and ceding companies, the modeling techniques and the application of such techniques, the contingent nature of business interruption exposures, the effects of any resultant demand surge on claims activity and attendant coverage issues. In estimating our losses from catastrophic events our considerations can include factors such as overall market losses, additional claims information from our clients, multiple model views and proprietary scenario testing.

The impact of climate change will affect our loss limitation methods, such as the purchase of third party reinsurance and catastrophe risk modeling and risk selection in ways which may adversely impact our business, financial condition and results of operations.

Changing weather patterns and climatic conditions, such as global warming, have added to the unpredictability, severity and frequency of natural disasters. Uncertainty about complexities of climate change affects our ability to assess with certainty the full impact of climate change and creates uncertainty about future trends and exposures. Although the loss experience of catastrophe insurers and reinsurers has historically been characterized as low frequency, climate change has impacted the frequency and severity of extreme weather events and natural catastrophes such as hurricanes, tornado activity, other windstorms, floods and wildfires in recent years and may continue to increase in the future.

Claims for catastrophic events, or an unusual frequency of smaller losses in a particular period, could expose us to large losses, cause substantial volatility in our results of operations and could have a material adverse effect on our ability to write new business if we are not able to adequately assess and reserve for the increased frequency and severity of catastrophes resulting from these environmental factors. Climate change may make modeled outcomes less certain or produce new, non-modeled risks. Additionally, catastrophic events could result in increased credit exposure to reinsurers and other counterparties we transact business with, declines in the value of investments we hold and significant disruptions to our physical infrastructure, systems and operations. Climate change-related risks may also specifically adversely impact the value of the securities that we hold. The effects of climate change could also lead to increased credit risk of other counterparties we transact business with, including reinsurers.

Changes in security asset prices may impact the value of our fixed income, real estate and commercial mortgage investments, resulting in realized or unrealized losses on our invested assets. These risks are not limited to, but can include: (i) changes in supply/demand characteristics for fossil fuels (*e.g.*, coal, oil, natural gas); (ii) advances in low-carbon technology and renewable energy development; and (iii) effects of extreme weather events on the physical and operational exposure of industries and issuers, and the transition that these companies make towards addressing climate risk in their own businesses.

We attempt to manage our exposure to these risks relating to climate change through the use of underwriting controls, risk models, and the purchase of third-party reinsurance. Underwriting controls can include more restrictive underwriting criteria such as higher premiums and deductibles, or losses retained, and more specifically excluded policy risks. Our deductible in connection with a catastrophic event is determined by market capacity, pricing conditions, regulatory capital requirements and surplus preservation. There can be no assurance that our reinsurance coverage and other measures taken will be sufficient to mitigate losses resulting from one or more catastrophic events. As a result, the occurrence of one or more catastrophic events and the continuation and worsening of recent trends could have an adverse effect on our results of operations and financial condition.

Our insurance and reinsurance subsidiaries are subject to supervision and regulation. Changes to existing regulation and supervisory standards, or failure to comply with applicable requirements, could adversely affect our business and results of operation.

Our insurance and reinsurance subsidiaries conduct business globally and are subject to varying degrees of regulation in the various jurisdictions in which they conduct business, including by state, federal and national insurance regulators. The purpose of insurance laws and regulations generally is to protect policyholders and ceding insurance companies, not our shareholders. See "Regulation" in Item 1.

We may not be able to comply fully with, or obtain appropriate exemptions from, these statutes and regulations, which could result in restrictions on our ability to do business or undertake activities that are regulated in one or more of the jurisdictions in which we conduct business and could subject us to fines and other sanctions. Regulatory authorities also may seek to exercise their supervisory or enforcement authority in new or more extensive ways, such as imposing increased capital requirements. These actions, if they occur, could affect the competitive market and the way we conduct our business and manage our capital and could result in lower revenues and higher costs. As a result, such actions could have a material effect on our results of operations and financial condition.

We are subject to ongoing legal and policy actions around climate change which may result in additional requirements which may prompt us to shift our risk selection and business strategy away in ways which may adversely impact our results of operations.

Governments, regulators, legislators and influential non-governmental organizations continue to focus on enacting laws, regulations and other requirements relating to climate change. We are subject to some of these changing laws, regulations and public policy debates, which are difficult to predict and quantify and may have an adverse impact on our business. Legislative and regulatory initiatives and court decisions following major catastrophes could force expansion of certain insurance coverages for catastrophe claims or otherwise adversely impact our business. Additionally, changes in regulations relating to climate change or our own leadership decisions implemented as a result of assessing the impact of climate change on our business may result in an increase in the cost of doing business, or a decrease in premiums in certain lines of business.

Our efforts to address these exposures are based in part on the outcomes of our loss mitigation measures and risk modeling, our financial results of operations and our communications with our customers and shareholders. We also continue to monitor changes across our industry and geographies and the Board considers these exposures regularly. We may make strategic business decisions to address or respond to some of the legal and policy changes relating to climate change, but there is no assurance that these decisions will adequately address these exposures.

Our customers and policyholders may also be impacted by regulatory, technological, market or other risks relating to climate change in ways which we cannot predict with certainty and adversely impact our results of operations.

Our policyholders and customers are located primarily in countries and regions, such as the U.S., U.K. and EU, where there are regulatory, policy, legal and technological changes resulting from actions relating to climate change. In some cases, those policyholders and customers may not be able to shift their business strategies or adjust adequately to these changes, and their businesses may be negatively impacted or, in some cases, cease to exist. As a result, our results of operations may be impacted by the loss of those customers or a shift in their patterns or levels of insurance coverage in ways we cannot predict.

As we continue to incorporate climate change in our business strategy, we cannot be certain that shareholders, investors and other influential environmental groups will agree with our approach, which may adversely impact our ability to raise funds in the capital markets, our share price and our results of operations.

Shareholders and investors have placed increased importance on how we are addressing ESG issues. ESG encompass a wide range of issues, including climate change and other environmental risks. Our leadership and Board are actively engaged in understanding the ever-changing ESG landscape and assessing our business operations to ensure that our business strategy reflects our values that our success depends on our commitment to a diverse workforce, an informed and active dialogue about ESG issues with our customers and shareholders and the strength of our ERM framework. We cannot predict whether our business decisions, business strategy and disclosures relating to climate change and other ESG issues will meet the expectations or particular requirements of certain key institutional shareholders in particular. We may be adversely impacted if key institution shareholders do not agree with, or are not satisfied with, our business strategy and approach to climate change and decide to sell or not purchase our equity or debt instruments.

Governmental, regulatory and rating actions in response to the COVID-19 pandemic may adversely affect our financial performance and our ability to conduct our businesses as we have in the past.

Actions of the federal, state and local government in the U.S. and other countries where we do business, to address and

mitigate the impact of COVID-19, may adversely affect us. For example, we are potentially subject to legislative and/or regulatory action that seeks to retroactively mandate coverage for losses which our insurance policies were not designed or priced to cover. There is proposed legislation in some states to require insurers to cover business interruption claims retroactively irrespective of terms, exclusions or other conditions included in the policies that would otherwise preclude coverage. Some proposed bills would require policies providing business interruption coverage to cover losses prospectively for pandemic-related losses. Insurance regulators in some states will not approve policy exclusions for losses from COVID-19, viruses or pandemics. In addition, a number of states have instituted, and other states are considering instituting, changes designed to effectively expand workers' compensation coverage by creating presumptions of compensability of claims for certain types of workers. Regulatory restrictions or requirements could also impact pricing, risk selection and our rights and obligations with respect to our policies and insureds, including our ability to cancel policies, our ability to increase rates or our right to collect premiums. Some state regulators have issued orders to review insurers’ rates to determine whether premium refunds are required, and regulators in other states could take similar actions. Many insurers, including us, have also voluntarily provided, and may further provide, premium refunds to their customers. It is also possible that changes in economic conditions and steps taken by federal, state and local governments in response to COVID-19 could require an increase in taxes at the federal, state and local levels, which would adversely impact our results of operations.

We expect that certain mortgage loans may default or enter forbearance programs that allow borrowers to defer mortgage payments as borrowers face challenges related to COVID-19. Defaults related to the pandemic, if not cured, could remain in our defaulted loan inventory for a protracted period of time including due to foreclosure moratoria, potentially resulting in higher frequency (claim rate) and severity (amount of the claim) for those loans that ultimately result in a claim. Accordingly, extended or extensive forbearance programs, foreclosure moratoria and other changes in regulations or laws may adversely impact our mortgage insurance operations.

Under the GSEs’ PMIERs financial requirements, eligible insurers are required to hold additional risk-based required assets for delinquent mortgages. However, this amount is reduced for mortgages backed by a property located in a FEMA Declared Major Disaster Area, among other requirements. On June 30, 2020, as amended on September 29, 2020, December 4, 2020 and June 30, 2021, the GSEs published guidance clarifying the applicability of the reduced delinquent loan charges on loans (1) with their first missed payments occurring between March 1, 2020 and March 31, 2021, or (2) subject to a forbearance plan in response to a hardship related to COVID-19. Additionally, through December 31, 2021, the GSEs temporarily required eligible insurers to obtain prior approval of dividends or entering into any new arrangements or altering any existing arrangements under tax sharing and intercompany expense-sharing agreements. In addition, the rating agencies continually review the financial strength ratings assigned to the Company and its subsidiaries, and the ratings are subject to change. The COVID-19 pandemic and its impact on financial results and condition, could cause one or more of the rating agencies to downgrade the ratings assigned to the Company and its subsidiaries. The pandemic has resulted, and may continue to result in a material increase in new defaults as borrowers fail to make timely payments on their mortgages, including as a result of increases in unemployment and entering mortgage forbearance programs that allow borrowers to defer mortgage payments, which may have an adverse impact on our results or operations.

We could face unanticipated losses from war, terrorism, cyber-attacks, pandemics and political instability, and these or other unanticipated losses could have a material adverse effect on our financial condition and results of operations.

We have substantial exposure to unexpected, large losses resulting from future man-made catastrophic events, such as acts of war, acts of terrorism, pandemics similar to the COVID-19 pandemic and political instability. These risks are inherently unpredictable. It is difficult to predict the timing of such events with statistical certainty or estimate the amount of loss any given occurrence will generate. In certain instances, we specifically insure and reinsure risks resulting from acts of terrorism. We may also insure against risk related to cybersecurity and cyber-attacks. In addition, our exposure to cyber-attacks includes exposure to ‘silent cyber’ risks, meaning risks and potential losses associated with policies where cyber risk is not specifically included nor excluded in the policies. Even in cases where we attempt to exclude losses from terrorism, cybersecurity and certain other similar risks from some coverages written by us, we may not be successful in doing so. Moreover, irrespective of the clarity and inclusiveness of policy language, there can be no assurance that a court or arbitration panel will not limit enforceability of policy language or otherwise issue a ruling adverse to us. Accordingly, while we believe our reinsurance programs, together with the coverage provided under the Terrorism Risk Insurance Act of 2002, as amended (“TRIP”) are sufficient to reasonably limit our net losses relating to potential future terrorist attacks, we can offer no assurance that our available capital will be adequate to cover losses when they materialize. To the extent that an act of terrorism is certified by the Secretary of the Treasury and aggregate industry insured losses resulting from the act of terrorism exceeds the prescribed program trigger, our U.S. insurance operations may be covered under TRIP for up to 80% subject

to (i) a mandatory deductible of 20% of our prior year's direct earned premium for covered property and liability coverages, and (ii) an industry aggregate retention of $37.5 billion. The program trigger for calendar year 2022 and any program year thereafter through 2027 is $200 million. If an act (or acts) of terrorism result in covered losses exceeding the $100 billion annual limit, insurers with losses exceeding their deductibles will not be responsible for additional losses. It is not possible to completely eliminate our exposure to unforecasted or unpredictable events, and to the extent that losses from such risks occur, our financial condition and results of operations could be materially adversely affected.

Underwriting risks and reserving for losses are based on probabilities and related modeling, which are subject to inherent uncertainties.

Our success is dependent upon our ability to assess accurately the risks associated with the businesses that we insure and reinsure. We establish reserves for losses and loss adjustment expenses which represent estimates based on actuarial and statistical projections, at a given point in time, of our expectations of the ultimate future settlement and administration costs of losses incurred. 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. Most or all of these factors are not directly quantifiable, particularly on a prospective basis, and the effects of these and unforeseen factors could negatively impact our ability to accurately assess the risks of the policies that we write. Changes in the assumptions used by these models or by management could lead to an increase in our estimate of ultimate losses in the future. In addition, there may be significant reporting lags between the occurrence of the insured event and the time it is reported to the insurer and additional lags between the time of reporting and final settlement of claims. In addition, the estimation of loss reserves is more difficult during times of adverse economic and market conditions due to unexpected changes in behavior of claimants and policyholders, including an increase in fraudulent reporting of exposures and/or losses, reduced maintenance of insured properties or increased frequency of small claims. Changes in the level of inflation also result in an increased level of uncertainty in our estimation of loss reserves. As a result, actual losses and loss adjustment expenses paid can deviate, perhaps substantially, from the reserve estimates reflected in our financial statements.

If our loss reserves are determined to be inadequate, we will be required to increase loss reserves at the time of such determination with a corresponding reduction in our net income in the period when the deficiency becomes known. It is possible that claims in respect of events that have occurred could exceed our claim reserves and have a material adverse effect on our results of operations, in a particular period, or our financial condition in general. As a compounding factor, although most insurance contracts have policy limits, the nature of property and casualty insurance and reinsurance is such that losses and the associated expenses can exceed policy limits for a variety of reasons and could significantly exceed the premiums received on the underlying policies, thereby further adversely affecting our financial condition.

As of December 31, 2021, our consolidated reserves for unpaid losses and loss adjustment expenses, net of unpaid losses and loss adjustment expenses recoverable, were approximately $12.2 billion. Such reserves were established in accordance with applicable insurance laws and GAAP. Loss reserves are inherently subject to uncertainty. In establishing the reserves for losses and loss adjustment expenses, we have made various assumptions relating to the pricing of our reinsurance contracts and insurance policies and have also considered available historical industry experience and current industry conditions. Any estimates and assumptions made as part of the reserving process could prove to be inaccurate due to several factors, including the fact that for certain lines of business relatively limited historical information has been reported to us through December 31, 2021.

The failure of any of the loss limitation methods we employ could have a material adverse effect on our financial condition or results of operations.

We seek to limit our loss exposure by writing a number of our reinsurance contracts on an excess of loss basis, adhering to maximum limitations on reinsurance written in defined geographical zones, limiting program size for each client and prudent underwriting of each program written. In the case of proportional treaties, we may seek per occurrence limitations or loss ratio caps to limit the impact of losses from any one or series of events. In our insurance operations, we seek to limit our exposure through the purchase of reinsurance. For our U.S. mortgage insurance business, in addition to utilizing reinsurance, we have developed a proprietary risk model that simulates the maximum probable loss resulting from a severe economic event impacting the housing market. We also seek to limit our loss exposure by geographic diversification, including by pricing adjustments in our U.S. mortgage insurance business. Geographic pricing decisions and zone limitations involve significant underwriting judgments, including the determination of the area of the zones and the inclusion of a particular policy within a particular zone's limits. Various provisions of our policies, negotiated to limit our risk, such as limitations or exclusions from coverage or choice of forum, may not be enforceable in the manner we intend, as it is possible that a court or regulatory authority could nullify or void an exclusion or limitation, or legislation could be enacted modifying or barring the use of these exclusions and limitations. Disputes relating to coverage and choice of legal forum may also arise. Underwriting is

inherently a matter of judgment, involving important assumptions about matters that are inherently unpredictable and beyond our control, and for which historical experience and probability analysis may not provide sufficient guidance. One or more catastrophic events or severe economic events could result in claims that substantially exceed our expectations, or the protections set forth in our policies could be voided, which, in either case, could have a material adverse effect on our financial condition or our results of operations, possibly to the extent of eliminating our shareholders' equity. In addition, factors such as global climate change limit the value of historical experience and therefore further limit the effectiveness of our loss limitation methods. See "Catastrophic Events and Severe Economic Events" in Item 7 for further details. Depending on business opportunities and the mix of business that may comprise our insurance, reinsurance and mortgage insurance portfolio, we may seek to adjust our self-imposed limitations on probable maximum pre-tax loss for catastrophe exposed business and mortgage default exposed business.

The availability of reinsurance, retrocessional coverage and capital market transactions to limit our exposure to risks may be limited, and counterparty credit and other risks associated with our reinsurance arrangements may result in losses which could adversely affect our financial condition and results of operations.

We manage risk using reinsurance, retrocessional coverage and capital markets transactions. Our insurance subsidiaries typically cede a portion of their premiums through pro rata, excess of loss and facultative reinsurance agreements. Our reinsurance subsidiaries purchase a limited amount of retrocessional coverage as part of their aggregate risk management program. In addition, our reinsurance subsidiaries participate in "common account" retrocessional arrangements for certain pro rata treaties. Such arrangements reduce the effect of individual or aggregate losses to all companies participating on such treaties, including the reinsurers, such as our reinsurance subsidiaries, and the ceding company. Economic conditions or the impact of climate change could also have a material impact on our ability to manage our risk aggregations through reinsurance or capital markets transactions. The availability and cost of reinsurance and retrocessional protection is subject to market conditions. As a result of these factors, we may not be able to successfully mitigate risk through reinsurance and retrocessional arrangements.

Further, we are subject to credit risk with respect to our reinsurance and retrocessions because the ceding of risk to reinsurers and retrocessionaires does not relieve us of our liability to the clients or companies we insure or reinsure. We monitor the financial condition of our reinsurers and attempt to place coverages only with carriers we view as substantial and financially sound. An inability of our reinsurers or retrocessionaires to meet their obligations to us could have a material adverse effect on our financial condition and results of operations. Our losses for a given event or occurrence may increase if our reinsurers or retrocessionaires dispute or fail to meet their obligations to us or the reinsurance or retrocessional protections purchased by us are exhausted or are otherwise unavailable for any reason. In certain instances, we also require collateral to mitigate our credit risk to our reinsurers or retrocessionaires. We are at risk that losses could exceed the collateral we have obtained. Our failure to establish adequate reinsurance or retrocessional arrangements or the failure of our existing reinsurance or retrocessional arrangements to protect us from overly concentrated risk exposure could adversely affect our financial condition and results of operations.

We could be materially adversely affected to the extent that important third parties with whom we do business do not adequately or appropriately manage their risks, commit fraud or otherwise breach obligations owed to us.

For certain lines of our insurance business, we authorize managing general agents, general agents and other producers to write business on our behalf within underwriting authorities prescribed by us. In addition, our mortgage group delegates the underwriting of a significant percentage of its primary new insurance written to certain mortgage lenders. Under this delegated underwriting program, the approved customer may determine whether mortgage loans meet our mortgage insurance program guidelines and commit us to issue mortgage insurance. We rely on the underwriting controls of these agents to write business within the underwriting authorities provided by us. Although we have contractual protections in some instances and we monitor such business on an ongoing basis, our monitoring efforts may not be adequate or our agents may exceed their underwriting authorities or otherwise breach obligations owed to us. In addition, our agents, our insureds or other third parties may commit fraud or otherwise breach their obligations to us. Our financial condition and results of operations could be materially adversely affected by any one of these issues.

While we conduct underwriting, financial, claims and information technology due diligence reviews and apply rigorous standards in the selection of these counterparties, there is no assurance they have provided us accurate or complete information to assess their risk or that they can manage effectively their own risks. The counterparties are also subject to the same global increase in cyber incidents, including ransomware, and we cannot offer assurances that these counterparties have sufficient technical and organizational controls to mitigate these risks. Consequently, we assume a degree of credit and operational risk of those parties, and a material failure to manage their risks may result in material losses or damage to us.

Emerging claim and coverage issues, including issues relating to the COVID-19 pandemic, may adversely affect our business.

As industry practices and legal, social and other environmental conditions change, unexpected and unintended issues related to claims and coverage may emerge, including new or expanded theories of liability. These or other changes could impose new financial obligations on us by extending coverage beyond our underwriting intent or otherwise require us to make unplanned modifications to the products and services that we provide, or cause the delay or cancellation of products and services that we provide. In some instances, these changes may not become apparent until sometime after we have issued insurance or reinsurance contracts that are affected by the changes. As a result, the full extent of liability under our insurance or reinsurance contracts may not be known for many years after a contract is issued. The effects of unforeseen developments or substantial government intervention could adversely impact us.

We have exposure to a number of lines of business, such as trade credit, travel, workers compensation and property that do not contain a specific pandemic exclusion and/or explicitly afford business interruption coverage under a pandemic such as COVID-19. In May 2020, FCA commenced court proceedings against a number of insurance companies, including Arch Insurance (U.K.), to test how certain business interruption insurance policies respond to claims arising from COVID-19. The High Court in September 2020 handed down its judgment which, found in favor of policyholders on the majority of the key coverage issues in the representative sample of policies submitted by the defendants. Appeals were filed by six insurers, including Arch Insurance (U.K.), and in January 2021, the Supreme Court in the U.K. broadly confirmed the High Court's rulings on the business wordings. The impact of this case on Arch Insurance (U.K.)'s results of operations has been modest, but the larger impact of this "test case" and other litigation which may flow from it in the U.K. or other jurisdictions where we offer business interruption coverage, cannot be quantified or predicted with certainty at this time. A prolonged COVID-19 pandemic could trigger further litigation on coverage and claims issues and potentially result in material and adverse outcomes and impact our business results. See "Risks Relating to Our Mortgage Operations" for further details on our mortgage operations.

Acquisitions, the addition of new lines of insurance or reinsurance business, expansion into new geographic regions and/or entering into joint ventures or partnerships expose us to risks.

We may seek, from time to time, to acquire other companies, acquire selected blocks of business, expand our business lines, expand into new geographic regions and/or enter into joint ventures or partnerships. Such activities expose us to challenges and risks, including: integrating financial and operational reporting systems; establishing satisfactory budgetary and other financial controls; funding increased capital needs, overhead expenses or cash flow shortages that may occur if anticipated sales and revenues are not realized or are delayed, whether by general economic or market conditions or unforeseen internal difficulties; obtaining management personnel required for expanded operations; obtaining necessary regulatory permissions; and establishing adequate reserves for any acquired book of business. In addition, the value of assets acquired may be lower than expected or may diminish due to credit defaults or changes in interest rates; the liabilities assumed may be greater than expected; and assets and liabilities acquired may be subject to foreign currency exchange rate fluctuation. We may also be subject to financial exposures in the event that the sellers of the entities or business we acquire are unable or unwilling to meet their indemnification, reinsurance and other contractual obligations to us. Our failure to manage successfully any of the foregoing challenges and risks may adversely impact our results of operations.

Our information technology systems may be unable to meet the demands of customers and our workforce.

Our information technology systems service our insurance portfolios. Accordingly, we are highly dependent on the effective operation of these systems. While we believe that the systems are adequate to service our insurance portfolios, there can be no assurance that they will operate in all manners in which we intend or possess all of the functionality required by customers currently or in the future.

Our customers, especially our mortgage insurance customers, require that we conduct our business in a secure manner, electronically via the Internet or via electronic data transmission. We must continually invest significant resources in establishing and maintaining electronic connectivity with customers. In order to integrate electronically with customers in the mortgage insurance industry, we require electronic connections between our systems and those of the industry's largest mortgage servicing systems and leading pricing and loan origination systems. Our mortgage group currently possesses connectivity with certain of these external systems, but there is no assurance that such connectivity is sufficient and we are continually undertaking new electronic integration efforts with third-party loan servicing, pricing and origination systems. We also rely on electronic integrations in our insurance operations with third parties and customers. Our business, financial condition and operating results may be adversely affected if we do not possess or timely acquire the requisite set of electronic integrations necessary to keep pace with the technological demands of customers.

The COVID-19 pandemic has placed increased and unanticipated demands on our IT systems in use by our customers and our workforce as much of the general workforce continues to work remotely. Remote working may increase the risk of cyber security attacks or other data security incidents. There is no assurance that we will be able to respond effectively to all of the increased and varied demands on our IT systems during a prolonged pandemic.

Technology failures and cyber attacks, including, but not limited to, ransomware, exploitation in software or code with malicious intent, state-sponsored cyber attacks, may impact us or our business partners and service providers, causing a disruption in service and operations which would negatively impact our business and/or expose us to litigation.

We rely on information technology systems to process, transmit, store and protect the electronic information, financial data and proprietary models that are critical to our business. Furthermore, a significant portion of the communications between our employees and our business partners and service providers depends on information technology and electronic information exchange. Like all companies, our information technology systems are vulnerable to data breaches, interruptions or failures due to events that may be beyond our control, including, but not limited to, natural disasters, power outages, theft, terrorist attacks, computer viruses, malicious actors, errors in usage or through social engineering or phishing and general technology failures. Security breaches by third parties could expose us to the loss or misuse of our information, litigation, financial losses and potential liability. In addition, cyber incidents that impact the availability, reliability, speed, accuracy or other proper functioning of these systems could have a significant negative impact on our operations and possibly our results.

We are dependent on certain third party technology service providers and other service providers to operate our business, notably major cloud providers, Software-as-a-Service (or SaaS) solutions, and on-premise software, including proprietary and open source solutions. We also outsource certain business process functions to third parties and may continue do so in the future. This practice exposes us to increased risks related to data security, service disruptions or the effectiveness of our control system, which could result in our ability to conduct business operations, monetary and reputational damage or harm to our competitive position.

Cyber incidents or data breaches caused by bad actors or unintentional human error impacting data, including personal data, we maintain or use during our business operations may result in regulatory fines or action, reputation damage and a disruption in our business operations.

We use data, including the personal data of our employees, customers and policyholders, as part of our business operations. While we believe we have effective technical and organizational measures in place to prevent, detect, manage and mitigate the impact of data breaches caused by malicious actors, systemic failures or human error, we cannot offer complete assurances that significant data breaches will not occur. A cyber incident could also result in a violation of applicable privacy, data protection or other laws, damage our reputation, cause a loss of customers, adversely affect our stock price, cause us to incur remediation costs, increased insurance premiums, and/or give rise to monetary fines and penalties, any of which could adversely affect our business.

A downgrade in our ratings or our inability to obtain a rating for our operating insurance and reinsurance subsidiaries may adversely affect our relationships with clients and brokers and negatively impact sales of our products.

Similar to our competitors, a ratings downgrade or the potential for such a downgrade, or failure to obtain a necessary rating, could adversely affect our relationships with agents, brokers, wholesalers, intermediaries, clients and other distributors of our existing and new products and services. Some of the reinsurance agreements assumed by our reinsurance operations include provisions that a ratings downgrade or other specified triggering event with respect to our reinsurance operations, such as a reduction in surplus by specified amounts during specified periods, provide our ceding company clients certain rights, including, the right to terminate the subject reinsurance agreement and/or to require us to post additional collateral. Any ratings downgrade or failure to obtain a necessary rating could adversely affect our ability to compete in our markets, could cause our premiums and earnings to decrease and could have a material adverse impact on our financial condition and results of operations. In some cases, a downgrade in ratings of certain of our operating subsidiaries may constitute an event of default under our credit facilities.

We can offer no assurances that our ratings will remain at their current levels or that any of our ratings which are under review or watch by ratings agencies will remain unchanged. It is possible that rating agencies may modify their evaluation criteria, heighten the level of scrutiny they apply when analyzing companies in our industry, adjust upward the capital and other requirements employed in their models and/or discontinue credit and debt instruments or other structures

deployed for maintenance of certain rating levels. We may need to raise additional funds through equity or debt financings. Any equity or debt financing, if available at all, may be on terms that are unfavorable to us. Equity financings could be dilutive to our existing shareholders and could result in the issuance of securities that have rights, preferences and privileges that are senior to those of our outstanding securities. If we are not able to obtain adequate capital, our business, results of operations and financial condition could be adversely affected. See “Capital Resources” in Item 7 for further details.

For further information on our financial strength and/or issuer ratings, see “Ratings” in Item 1. For further information on our letter of credit facilities, see the Letter of Credit and Revolving Credit Facilities section of “Contractual Obligations and Commercial Commitments” in Item 7.

Our ability to execute successfully our business strategy, continue to grow and innovate and offer our employees a dynamic and supportive workplace depends on the recruitment, retention and promotion of talented, agile, diverse and resilient employees at all levels of our organization.

The COVID-19 pandemic has triggered a major shift to employees working remotely, with many employees opting to continue to work remotely or in a hybrid work model. Employers are confronting unprecedented, complex and constantly changing regulations and court rulings relating to employee vaccination mandates and other safety precautions. Since the COVID-19 pandemic, the number of employees who have chosen to leave their employment positions has risen across many industries, including financial services and insurance. We provide a work environment and culture which reflects our goal to “Enable Possibility”. We offer flexible work arrangements, when possible, for our employees globally, as well as competitive compensation packages which include participation in our Employee Stock Purchase Plan and the possibility of equity awards at certain job levels. Over the past few years, we have also implemented and expanded our learning programs, career leveling and employee networks, all of which we believe will help us retain talent. Our leadership and Board promote the goals of building a diverse employee population and fostering an environment that allows us to fully leverage and engage that diversity as a competitive edge which benefits both our employees and our business. While our efforts to attract, develop and retain talented employees continues to be a top priority, current job market conditions present challenges for us and may adversely impact our ability to fully realize our business strategy.

Our success will depend on our ability to maintain and enhance effective operating procedures and internal controls and our ERM program.

We operate within an ERM framework designed to identify, assess and monitor our risks. We consider underwriting, reserving, investment, credit and operational risk in our ERM framework. Losses, reputational damage, regulatory fines and litigation are among the adverse impacts which can arise if we fail to operate an effective ERM framework. Operational risk and losses can result from, among other things, fraud, errors, failure to document transactions properly or to obtain proper internal authorization, failure to comply with regulatory requirements, information technology or information security failures and failure to train employees appropriately or adequately. We continuously enhance our operating procedures and internal controls to effectively support our business and our regulatory and reporting requirements. 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 or circumvention of controls. There can be no assurance that our control system will succeed in achieving its stated goals under all potential future conditions. Any ineffectiveness in our controls or procedures could have a material adverse effect on our business. For further information on our ERM framework, see “Enterprise Risk Management” in Item 1.

We are exposed to credit risk in certain of our business operations.

In addition to exposure to credit risk related to our investment portfolio, reinsurance recoverables and reliance on brokers and other agents, we are exposed to credit risk in other areas of our business related to policyholders. We are exposed to credit risk in our insurance group’s surety unit where we guarantee to a third party that our policyholder will satisfy certain performance or financial obligations. If our policyholder defaults, we may suffer losses and be unable to be reimbursed by our policyholder. We are also exposed to credit risk from policyholders on smaller deductibles in other insurance group lines, such as healthcare and excess and surplus casualty. Although we have not experienced any material credit losses to date, an increased inability of our policyholders to meet their obligations to us could have a material adverse effect on our financial condition and results of operations. See note 3, “Significant Accounting Policy.”

Our business is subject to applicable laws and regulations relating to economic trade sanctions and foreign bribery laws, the violation of which could adversely affect our operations.

We must comply with all applicable economic sanctions and anti-bribery laws and regulations of the U.S. and other foreign jurisdictions where we operate. U.S. laws and regulations applicable to us and others who provide insurance and reinsurance include the economic trade sanctions laws and regulations administered by the Treasury's Office of Foreign Assets Control as well as certain laws administered by the U.S. Department of State. New sanction regimes may be initiated, or existing sanctions expanded, at any time, which can immediately impact our business activities. We are also subject to the U.S. Foreign Corrupt Practices Act and other anti-bribery laws such as the U.K. Bribery Act that generally bar corrupt payments or unreasonable gifts to foreign governments or officials. Although we have policies and controls in place designed to ensure compliance with these laws and regulations, it is possible that an employee or intermediary could fail to comply with applicable laws and regulations. In such event, we could be exposed to fines, criminal penalties and other sanctions. Such violations could limit our ability to conduct business and/or damage our reputation, resulting in a material adverse effect on our financial condition and results of operations.

The U.K.'s Withdrawal from the EU could adversely affect us.

The U.K. ceased to be a member state of the European Union in January 2020. Although the EU and U.K. reached a limited agreement in relation to certain matters, U.K. insurers and reinsurers no longer have automatic access to EU markets and vice versa. Our U.K. domiciled entities and our Lloyd's syndicates, may no longer "passport" within the EU and. are now part of the U.K. temporary permissions regime which allows firms to operate in the U.K. for a limited period while they seek authorization from the U.K. regulators. While we have implemented changes in our operations to accommodate Brexit, the full extent to which our business, operations and financial condition could be adversely affected by Brexit is uncertain.

Risks Relating to Financial Markets and Investments

Adverse developments in the financial markets could have a material adverse effect on our results of operations, financial position and our businesses, and may also limit our access to capital; our policyholders, reinsurers and retrocessionaires may also be affected by such developments, which could adversely affect their ability to meet their obligations to us.

Adverse developments in the financial markets, including the increasing uncertainty level of disruptions, and heightened volatility in the capital and credit markets, may result in realized and unrealized capital losses that could have a material adverse effect on our results of operations, financial position and our businesses, and may also limit our access to capital required to operate our business. Depending on market conditions, we could incur additional realized and unrealized losses on our investment portfolio in future periods, which could have a material adverse effect on our results of operations, financial condition and business. Economic conditions could also have a material impact on the frequency and severity of claims and therefore could negatively impact our underwriting returns. In addition, our policyholders, reinsurers and retrocessionaires may be affected by developments in the financial markets, which could adversely affect their ability to meet their obligations to us. The volatility in the financial markets could continue to significantly affect our investment returns, reported results and shareholders' equity.

The capital requirements of our businesses depend on many factors, including regulatory and rating agency requirements, the performance of our investment portfolio, our ability to write new business successfully, the frequency and severity of catastrophe events and our ability to establish premium rates and reserves at levels sufficient to cover losses.

Disruption to the financial markets and the general economic downturn resulting from COVID-19 may adversely and materially impact our investments, financial condition and results of operation.

Disruption in the financial markets and the downturn in global economic activity resulting from the COVID-19 pandemic adversely affect the performance of our investment portfolio and the significant, continued volatility in financial markets, changes in interest rates, increases in credit spreads, a lack of pricing transparency, decreased market liquidity, declines in equity prices and the strengthening or weakening of foreign currencies against the U.S. Dollar, individually or in tandem, could continue to have a material adverse effect on our results through realized losses, impairments and changes in unrealized positions in our investment portfolio. Furthermore, issuers of the investments we hold under the equity method of accounting report their financial information to us one month to three months following the

end of the reporting period. Accordingly, the adverse impact of any disruptions in global financial markets on equity method income from these investments would likely not be reflected in our current quarter results and would instead be reported in the subsequent quarter.

Our operating results depend in part on the performance of our investment portfolio. A significant portion of cash and invested assets held by Arch consists of fixed maturities (67.1% as of December 31, 2021). Although our current investment guidelines and approach stress preservation of capital, market liquidity and diversification of risk, our investments are subject to market-wide risks and fluctuations. In addition, we are subject to risks inherent in particular securities or types of securities, as well as sector concentrations. We may not be able to realize our investment objectives, which could have a material adverse effect on our financial results. In the event that we are unsuccessful in correlating our investment portfolio with our expected insurance and reinsurance liabilities, we may be forced to liquidate our investments at times and prices that are not optimal, which could have a material adverse effect on our financial results and ability to conduct our business.

Foreign currency exchange rate fluctuation may adversely affect our financial results.

We write business on a worldwide basis, and our results of operations may be affected by fluctuations in the value of currencies other than the U.S. Dollar. The primary foreign currencies in which we operate are the Euro, the British Pound Sterling, the Australian Dollar and the Canadian Dollar. In order to minimize the possibility of losses we may suffer as a result of our exposure to foreign currency fluctuations in our net insurance liabilities, we invest in securities denominated in currencies other than the U.S. Dollar. In addition, we may replicate investment positions in foreign currencies using derivative financial instruments. Changes in the value of investments due to foreign currency rate movements are reflected as a direct increase or decrease to shareholders' equity and are not included in the statement of income.

Uncertainty relating to the determination of LIBOR and the phasing out and replacement of LIBOR after 2021 may adversely affect the value of our investment portfolio, our cost of capital, net investment income and mortgage reinsurance costs.

On July 27, 2017, the U.K. Financial Conduct Authority announced that it intends to end the use of LIBOR after 2021 as the benchmark rate that many banks and issuers use to set interest rates for loans, securities, derivative contracts and other financial instruments. Recognizing the need to replace LIBOR, authorities in the United States convened the Alternative Reference Rates Committee (“ARRC”) in 2014 to identify a replacement for LIBOR with respect to indebtedness denominated in U.S. Dollars. In 2017, the ARRC identified the Secured Overnight Financing Rate (“SOFR”), and in April 2018, the Federal Reserve Bank of New York began publishing the 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. Although the U.S. Treasury-backed overnight repo market is highly liquid, there is currently no robust market for determining forward-looking, SOFR term rates. Because SOFR is an overnight risk-free rate, whereas LIBOR has various terms and an embedded credit charge, the transition from LIBOR to SOFR will require adjustments, which may continue to vary for certain forms of indebtedness and financial instruments as the relevant markets adapt to SOFR’s implementation. Similar alternative benchmark replacements will be required to be implemented in respect of indebtedness and other financial instruments that are currently based on LIBOR quotes for currencies other than the U.S. Dollar. Uncertainty as to the nature of such potential changes, alternative reference rates and other related adjustments and reforms may adversely affect the value of and trading market for LIBOR-based securities, including those held in our investment portfolio or used in the valuation of certain embedded derivatives. Moreover, the transition from LIBOR to SOFR and other alternative reference rates may adversely affect the performance of our investment portfolio, our cost of capital and our cost of issuing Bellemeade mortgage risk transfer securities, and could require changes to our current asset liability strategies.

In order to mitigate the potential adverse effects on our cost of capital caused by the uncertainty of the timing and impact of the phase-out of LIBOR, we entered into certain amendments to our credit facilities in 2021 in order to replace the LIBOR-based benchmarks for borrowings and letters of credit denominated in British Pounds Sterling and Euros with the Sterling Overnight Index Average (“SONIA”) and the Euro Inter-bank Offered Rate (“EURIBOR”), respectively, as SONIA and EURIBOR have emerged as preferred alternative benchmarks with respect to certain indebtedness and other financial instruments denominated in these currencies. Similarly, for indebtedness denominated in U.S. Dollars, our credit facilities contain mechanics that provide for a transition from a LIBOR benchmark to a benchmark based on SOFR or a similar replacement benchmark, which transition may be effected, in specified circumstances, even before LIBOR is formally phased out for the applicable tenors. However, there can be no assurance that these mitigation efforts will adequately protect against increases or volatility in our cost of capital.

While we have also reviewed our products, investment portfolio and other contractual obligations for LIBOR exposure and believe we have either appropriate fallback language or have moved to other benchmark rates, we do not believe that it is possible to predict how markets will respond to the transition to SOFR, or any other reference rate, on new or existing financial instruments or quantify the potential effect of any such event on us at this time.

The determination of the amount of current expected credit losses ("CECL") allowances taken on our investments is highly subjective and could materially impact our results of operations or financial position.

On a quarterly basis, we review our investments by applying an approach based on the CECL and whether declines in fair value below the cost basis requires an estimate of the expected credit loss. There can be no assurance that our management has accurately assessed the level of the credit loss allowance taken reflected in our financial statements. Furthermore, additional allowance may need to be taken or allowances provided for in the future. Further, rapidly changing and unpredictable credit and equity market conditions could materially affect the valuation of securities carried at fair value as reported within our consolidated financial statements and the period-to-period changes in value could vary significantly.

Our reinsurance subsidiaries may be required to provide collateral to ceding companies, by applicable regulators, their contracts or other commercial considerations. Their ability to conduct business could be significantly and negatively affected if they are unable to do so.

Arch Re Bermuda is a registered Bermuda insurance company and is not licensed or admitted as an insurer in any jurisdiction in the U.S., although Arch Re Bermuda has been approved as a "certified reinsurer" in certain U.S. states that allow reduced collateral for reinsurance ceded to such reinsurers. Arch Re Bermuda's contracts generally require it to post a letter of credit or provide other security, even in U.S. states where it has been approved for reduced collateral. State credit for reinsurance rules also generally provide that certified reinsurers such as Arch Re Bermuda must provide 100% collateral in the event their certified status is "terminated" or upon the entry of an order of rehabilitation, liquidation or conservation against a ceding insurer.

Although, to date, Arch Re Bermuda has not experienced any difficulties in providing collateral when required, if we are unable to post security in the form of letters of credit or trust funds when required, the operations of Arch Re Bermuda could be significantly and negatively affected.

Risks Relating to Our Mortgage Operations

The ultimate performance of the Arch MI U.S. mortgage insurance portfolio remains uncertain.

The mix of business in our insured loan portfolio may affect losses. The presence of multiple higher-risk characteristics in a loan materially increases the likelihood of a claim on such a loan unless there are other characteristics to mitigate the risk. The geographic mix of Arch MI U.S.'s business could increase losses and harm our financial performance.

Generally, we cannot cancel mortgage insurance coverage or adjust renewal premiums during the life of a mortgage insurance policy. As a result, higher than anticipated claims generally cannot be offset by premium increases on policies in force or mitigated by our non-renewal or cancellation of insurance coverage. The premiums charged, and the associated investment income, may not be adequate to compensate us for the risks and costs associated with the insurance coverage provided to customers. An increase in the number or size of claims, compared to what we anticipate, could adversely affect Arch MI U.S.'s results of operations and financial condition.

The frequency and severity of claims we incur is uncertain and will depend largely on general economic factors outside of our control, including, among others, changes in unemployment, home prices and interest rates in the U.S. Inflated home prices followed by a decline in home values could significantly decrease a borrower's equity in their home, which would limit their ability to sell the property without incurring a loss, and could increase the frequency and severity of claims. Deteriorating economic conditions in the U.S., potentially due to prolonged recessionary conditions related to COVID-19, could adversely affect the performance of our U.S. mortgage insurance portfolio and could adversely affect our results of operations and financial condition.

If the volume of low down payment mortgage originations declines, or if other government housing policies, practices or regulations change, the amount of mortgage insurance we write in the U.S. could decline, which would reduce our mortgage insurance revenues.

The size of the U.S. mortgage insurance market depends in large part upon the volume of low down payment home mortgage originations. Factors affecting the volume of low down payment mortgage originations include, among others: restrictions on mortgage credit due to stringent underwriting standards and liquidity issues affecting lenders; changes in mortgage interest rates and home prices, and other economic conditions in the U.S. and regional economies; population trends, including the rate of household formation; and U.S. government housing policy.

The private mortgage insurers' principal government competitor is the Federal Housing Administration ("FHA"). Future changes to the FHA program, including any reduction to mortgage insurance premiums charged may negatively impact the amount of mortgage insurance we write in the U.S.

On January 14, 2021, the Federal Housing Finance Agency ("FHFA") as conservator of the GSEs and the Department of Treasury entered into a letter agreement that further amended the senior preferred stock purchase arrangement ("PSPA"). This letter agreement, among other provisions, imposed restrictions on the amount of high risk loans that can be purchased by the GSEs. In September 2021, the FHFA and the Treasury Department agreed to suspend certain portions of the PSPAs for one year to review the extent to which these requirements are redundant or inconsistent with existing FHFA standards, policies, and directives that mandate sustainable lending standards. In addition, on January 5, 2022, FHFA announced that beginning on April 1, 2022, Fannie Mae and Freddie Mac will increase upfront fees for "high-balance loans" (mortgages in excess of $647,000) and mortgages on second homes. These actions could cause a decline in the volume of low-down payment home mortgage purchases by the GSEs and could decrease demand for mortgage insurance, decrease our U.S. new insurance written and reduce mortgage insurance revenues.

Finally, FHFA directed the GSEs to submit Equitable Housing Plans by the end of 2021 to identify and address barriers to sustainable housing opportunities, including the GSEs' goals and action plans to advance equity in housing finance for the next three years; directed the GSEs to expand their streamlined refinance programs; and directed the GSEs to make permanent desktop appraisals by incorporating the practice into their Selling Guides, which originally was a temporary practice implemented in light of Covid-19. These changes, along with any new practices or programs implemented under the GSEs' Equitable Housing Plans, may impact the underwriting and servicing standards on mortgages purchased by the GSEs and could increase the presence of multiple higher-risk characteristics in our insured loan portfolio.

Changes to the role of the GSEs in the U.S. housing market or to GSE eligibility requirements for mortgage insurers could negatively impact our results of operations and financial condition, or reduce our operating flexibility.

Substantially all of Arch MI U.S.'s insurance written has been for loans sold to the GSEs. The charters of the GSEs require credit enhancement for low down payment mortgages in order for such loans to be eligible for purchase or guarantee by the GSEs. If the charters of the GSEs were amended to change or eliminate the acceptability of private mortgage insurance, our mortgage insurance business could decline significantly.

The PMIERs apply to Arch Mortgage Insurance Company and United Guaranty Residential Insurance Company, which are GSE-approved mortgage insurers ("eligible mortgage insurers"). The PMIERs impose limitations on the type of risk insured, the forms and insurance policies issued, standards for the geographic and customer diversification of risk, acceptable underwriting practices, quality assurance, loss mitigation, claims handling, standards for certain reinsurance cessions and financial requirements, among other things. The financial requirements require a 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. Arch MI U.S.'s minimum required assets under the PMIERs will be determined, in part, by the particular risk profiles of the loans it insures. If, absent other changes, Arch MI U.S.'s mix of business changes to include more loans with higher loan-to-value ratios or lower credit scores, it will have a higher minimum required asset amount under the PMIERs and, accordingly, be required to hold more capital in order to maintain GSE eligibility. Our eligible mortgage insurers each satisfied the PMIERs' financial requirements as of December 31, 2021. While we intend to continue to comply with these requirements, there can be no assurance that the GSEs will not change the PMIERs or that Arch Mortgage Insurance Company or United Guaranty Residential Insurance Company will continue as eligible mortgage insurers. If either or both of the GSEs were to cease to consider Arch Mortgage Insurance Company or United Guaranty Residential Insurance Company as eligible mortgage insurers and, therefore, cease accepting our mortgage insurance products, our results of operations and financial condition would be adversely affected.

The implementation of the Basel III Capital Accord and FHFA's Enterprise Capital Rule may adversely affect the use of mortgage insurance and CRT opportunities.

With certain exceptions, the Basel III Rules became effective on January 1, 2014. In December 2017, the Basel Committee published final revisions to the Basel Capital Accord which is informally denominated in the U.S. as "Basel IV." The Basel Committee expects the new rules to be fully implemented by January 2027. Under the revised Basel rules, banks using the standardized approach for credit risk management will determine the risk-weight for residential mortgages based on the loan-to-value ratio at loan origination, without consideration of mortgage insurance. The U.S. regulatory agencies have not proposed adopting the Basel IV rules on mortgage capital requirements and could determine that current U.S. rules are "at least as stringent" as the Basel IV provisions, and therefore do not need to be modified. However, if the U.S. regulators decide to adopt the Basel IV

approach, the capital relief benefits of mortgage insurance would be diminished, which could adversely affect the demand for mortgage insurance.

On December 17, 2020, the FHFA published a new capital framework for Fannie Mae and Freddie Mac that significantly increases minimum capital requirements for these GSEs. The new rule requires each GSE to maintain both higher minimum capital ratios and capital “buffers” to avoid restrictions on capital distributions and discretionary bonus payments. The rule also imposes a risk-weight floor of 10 percent on retained CRT positions.

The new framework continues to take into account the benefits of mortgage insurance, provided the mortgage insurer is compliant with the PMIERs. The amount of capital relief afforded for mortgage insurers will depend on a number of factors, including the GSEs’ determination of the creditworthiness of the mortgage insurer. It is possible that the higher capital standards imposed on the GSEs will result in increased fees for homebuyers that will reduce the demand for mortgage loans, and therefore the demand for mortgage insurance. Further, the GSEs will independently determine the creditworthiness of mortgage insurance counterparties, which could affect the competitive position of individual mortgage insurance providers. Moreover, the higher risk-capital charges for residential mortgages could be incorporated into the PMIERs standards, thereby requiring mortgage insurers to hold higher capital levels in order to be recognized as approved counterparties for the GSEs. This could have a negative impact on our return on equity.

On September 27, 2021, FHFA published a proposed revision to the capital standards that would roll back some of the increases in required capital that were adopted in 2020. This proposal would also reduce the risk-weight floor on retained CRT positions from 10 percent to 5 percent. If this proposal is adopted, it would moderate the potential adverse consequences that could result from the capital framework adopted in 2020.

Risk Relating to Our Company and Our Shares

Some of the provisions of our bye-laws and our shareholders agreement may have the effect of hindering, delaying or preventing third party takeovers or changes in management initiated by shareholders. These provisions may also prevent our shareholders from receiving premium prices for their shares in an unsolicited takeover.

Some provisions of our bye-laws could have the effect of discouraging unsolicited takeover bids from third parties or changes in management initiated by shareholders. These provisions may encourage companies interested in acquiring us to negotiate in advance with our board of directors, since the board has the authority to overrule the operation of several of the limitations.

Among other things, our bye-laws provide: for a classified board of directors, in which the directors of the class elected at each annual general meeting holds office for a term of three years, with the term of each class expiring at successive annual general meetings of shareholders; that the number of directors is determined by the board from time to time by a vote of the majority of our board; that directors may only be removed for cause, and cause removal shall be deemed to exist only if the director whose removal is proposed has been convicted of a felony or been found by a court to be liable for gross negligence or misconduct in the performance of his or her duties; that our board has the right to fill vacancies, including vacancies created by an expansion of the board; and for limitations on a shareholder’s right to raise proposals or nominate directors at general meetings. Our bye-laws provide that certain provisions that may have anti-takeover effects may be repealed or altered only with prior board approval and upon the affirmative vote of holders of shares representing at least 65% of the total voting power of our shares entitled generally to vote at an election of directors.

The bye-laws also contain a provision limiting the rights of any U.S. person (as defined in section 7701(a)(30) of the Internal Revenue Code of 1986, as amended (the “Code”)) that owns shares of Arch Capital, directly, indirectly or constructively (within the meaning of section 958 of the Code), representing more than 9.9% of the voting power of all shares entitled to vote generally at an election of directors. The votes conferred by such shares of such U.S. person will be reduced by whatever amount is necessary so that after any such reduction the votes conferred by the shares of such person will constitute 9.9% of the total voting power of all shares entitled to vote generally at an election of directors. Notwithstanding this provision, the board may make such final adjustments to the aggregate number of votes conferred by the shares of any U.S. person that the board considers fair and reasonable in all circumstances to ensure that such votes represent 9.9% of the aggregate voting power of the votes conferred by all shares of Arch Capital entitled to vote generally at an election of directors. Arch Capital will assume that all shareholders (other than specified persons) are U.S. persons unless we receive assurance satisfactory to us that they are not U.S. persons.

The bye-laws also provide that the affirmative vote of at least 66 2/3% of the outstanding voting power of our shares (excluding shares owned by any person (and such person’s affiliates and associates) that is the owner of 15% or more (a “15% Holder”) of our outstanding voting shares) shall be required for various corporate actions, including: merger or consolidation of the company into a 15% Holder; sale of any or all of our assets to a 15% Holder; the issuance of voting securities to a 15% Holder; or amendment of these

provisions; provided, however, the super majority vote will not apply to any transaction approved by the board.

The provisions described above may have the effect of making more difficult or discouraging unsolicited takeover bids from third parties. To the extent that these effects occur, shareholders could be deprived of opportunities to realize takeover premiums for their shares and the market price of their shares could be depressed. In addition, these provisions could also result in the entrenchment of incumbent management.

There are regulatory limitations on the ownership and transfer of our common shares.

The jurisdictions where we operate have laws and regulations that require regulatory approval of a change in control of an insurer or an insurer's holding company. Where such laws apply to us, there can be no effective change in our control unless the person seeking to acquire control has filed a statement with the regulators and obtained prior approval for the proposed change. Certain regulators may at any time, by written notice, object to a person holding shares in an insurer or an insurer's holding company if it appears to the regulator that the person is not or is no longer fit and proper to be such a holder. The regulator may require the shareholder to reduce its holding in the insurer or an insurer's holding company and direct, among other things, that such shareholder’s voting rights attaching to the shares in an insurer or an insurer's holding company shall not be exercisable.

Arch Capital is a holding company and is dependent on dividends and other distributions from its operating subsidiaries.

Arch Capital is a holding company whose assets primarily consist of the shares in our subsidiaries. Generally, Arch Capital depends on its available cash resources, liquid investments and dividends or other distributions from subsidiaries to make payments, including the payment of debt service obligations and operating expenses it may incur and any payments of dividends, redemption amounts or liquidation amounts with respect to our preferred shares and common shares, and to fund the share repurchase program. The ability of our regulated insurance and reinsurance subsidiaries to pay dividends or make distributions is subject to legislative constraints and dependent on their ability to meet applicable regulatory standards. In addition, the ability of our insurance and reinsurance subsidiaries to pay dividends to Arch Capital and to intermediate parent companies owned by Arch Capital could be constrained by our dependence on financial strength ratings from independent rating agencies. Our ratings from these agencies depend to a large extent on the capitalization levels of our insurance and reinsurance subsidiaries.

General market conditions and unpredictable factors could adversely affect market prices for our outstanding preferred shares.

There can be no assurance about the market prices for our series of preferred shares that are traded publicly. Several factors, many of which are beyond our control, will influence the fair value of our preferred shares, including, but not limited to:

- whether dividends have been declared and are likely to be declared on any series of our preferred shares from time to time;
- our creditworthiness, financial condition, performance and prospects;
- whether the ratings on any series of our preferred shares provided by any ratings agency have changed;
- the market for similar securities; and
- economic, financial, geopolitical, regulatory or judicial events that affect us and/or the insurance or financial markets generally.

Dividends on our preferred shares are non-cumulative.

Dividends on our preferred shares are non-cumulative and payable only out of lawfully available funds of Arch Capital under Bermuda law. Consequently, if Arch Capital's board of directors (or a duly authorized committee of the board) does not authorize and declare a dividend for any dividend period with respect to any series of our preferred shares, holders of such preferred shares would not be entitled to receive any such dividend, and such unpaid dividend will not accrue and will never be payable. Arch Capital will have no obligation to pay dividends for a dividend period on or after the dividend payment date for such period if its board of directors (or a duly authorized committee of the board) has not declared such dividend before the related dividend payment date; if dividends on our series F or series G preferred shares are authorized and declared with respect to any subsequent dividend period, Arch Capital will be free to pay dividends on any other series of preferred shares and/or our common shares. In the past, we have not paid dividends on our common shares.

Our preferred shares are equity and are subordinate to our existing and future indebtedness.

Our preferred shares are equity interests and do not constitute indebtedness. As such, these preferred shares will rank junior to all of our indebtedness and other non-equity claims with respect to assets available to satisfy our claims, including in our liquidation. Our existing and future indebtedness may restrict payments of dividends on our preferred shares. Additionally, unlike indebtedness, where principal and interest would customarily be payable on specified due dates,

in the case of preferred shares, (1) dividends are payable only if declared by the board of directors of Arch Capital (or a duly authorized committee of the board) and (2) as described under “Risks Relating to Our Company—Arch Capital is a holding company and is dependent on dividends and other distributions from its operating subsidiaries,” we are subject to certain regulatory and other constraints affecting our ability to pay dividends and make other payments.

We may issue additional securities that rank equally with or senior to our series F and series G preferred shares without limitation. The issuance of securities ranking equally with or senior to our preferred shares may reduce the amount available for dividends and the amount recoverable by holders of such series in the event of a liquidation, dissolution or winding-up of Arch Capital.

The voting rights of holders of our preferred shares are limited.

Holders of our preferred shares have no voting rights with respect to matters that generally require the approval of voting shareholders. The limited voting rights of holders of our preferred shares include the right to vote as a class on certain fundamental matters that affect the preference or special rights of our preferred shares as set forth in the certificate of designations relating to each series of preferred shares. In addition, if dividends on our series F or series G preferred shares have not been declared or paid for the equivalent of six dividend payments, whether or not for consecutive dividend periods, holders of the outstanding series F or series G preferred shares will be entitled to vote for the election of two additional directors to our board of directors subject to the terms and to the limited extent as set forth in the certificate of designations relating to such series of preferred shares.

Risks Relating to Taxation

We and our non-U.S. subsidiaries may become subject to U.S. federal income taxation and/or the U.S. federal income tax liabilities of our U.S. subsidiaries may increase, including as a result of changes in tax law.

Arch Capital and its non-U.S. subsidiaries intend to operate their business in a manner that will not cause them to be treated as engaged in a trade or business in the U.S. and, thus, will not be required to pay U.S. federal income taxes (other than U.S. excise taxes on insurance and reinsurance premiums and withholding taxes on certain U.S. source investment income) on their income. However, because there is uncertainty as to the activities which constitute being engaged in a trade or business in the U.S., there can be no assurance that the IRS will not contend successfully that Arch Capital or its non-U.S. subsidiaries are engaged in a trade or business in the U.S., in which case our shareholders' equity and earnings could be adversely affected.

Congress has been considering several legislative proposals intended to eliminate certain perceived tax advantages of Bermuda and other non-U.S. jurisdictions. There is no assurance that any such legislative proposal will not be enacted into law or that any such enacted law would not materially increase our income tax liabilities or those of our subsidiaries.

The continuing implementation of the Tax Cuts Act may have a material and adverse impact on our operations and financial condition.

Certain provisions in the Tax Cuts Act could have a material and adverse impact on our financial condition and business operation. One such provision imposes a 10% minimum base erosion and anti-abuse tax (increased to 12.5% for taxable years after 2025) on the “modified taxable income” of a U.S. corporation (or a non-U.S. corporation engaged in a U.S. trade or business) over such corporation’s regular U.S. federal income tax, reduced by certain tax credits. The “modified taxable income” of a corporation is determined without deduction for certain payments by such corporation to its non-U.S. affiliates (including reinsurance premiums). Other provisions of the Tax Cuts Act that could have a material and adverse impact on us include a provision that defers or disallows a U.S. corporation’s deduction of interest expense to the extent such interest expense exceeds a specified percentage of such U.S. corporation’s “adjusted taxable income” and a provision that adjusts the manner in which a U.S. property and casualty insurance company computes its loss reserve.

In addition, there is no assurance that subsequent changes in tax laws or regulations will not materially and adversely affect our operations and financial condition.

Recently proposed Treasury Regulations, if finalized in their current form, could (on prospective basis) cause our U.S. shareholders (including tax-exempt U.S. shareholders) to be subject to current U.S. federal income tax on the portion of our earnings attributable to certain intercompany reinsurance income (whether or not such income is distributed).

Unless an exception applies, U.S. shareholders generally are required to include currently in income a portion of any RPII recognized by our foreign subsidiaries, whether or not distributed. Generally, RPII is insurance income (including reinsurance income) of a foreign corporation with respect to which the insured is a United States shareholder of the foreign corporation or a related person to such a shareholder.

Under one exception to the foregoing RPII rules, U.S. shareholders are not required to include a CFC’s RPII currently in income if the CFC’s gross RPII is less than 20% of its total gross insurance income for the taxable year in question (the “RPII 20% gross income exception”).

Under current law, we currently expect each of our non-U.S. subsidiaries to satisfy the RPII 20% gross income exception, and therefore we currently do not expect any U.S. shareholder to be required to include RPII in income currently (although there can be no assurance that this is or will continue be the case). However, recently proposed Treasury Regulations (issued on January 24, 2022), if finalized in their current form, would for the first time (on a prospective basis) expand the definition of RPII to include certain intercompany insurance income (including reinsurance income) in a manner that could cause certain of our foreign subsidiaries not to satisfy the RPII 20% gross income exception. In such event, (1) all U.S. shareholders (not just 10% U.S. shareholders) would be required to include RPII in income currently, whether or not distributed, and (2) U.S. shareholders that are tax exempt entities would be required to treat such RPII inclusions as unrelated business taxable income. Current and prospective U.S. shareholders should consult their own tax advisors as to the potential impact of these recently proposed Treasury Regulations.

We may become subject to taxes in Bermuda after March 31, 2035, which may have a material adverse effect on our results of operations.

Under current Bermuda law, we are not subject to tax on income, profits, withholding, capital gains or capital transfers. Furthermore, we have obtained from the Minister of Finance of Bermuda under the Exempted Undertakings Tax Protection Act 1966 of Bermuda, an assurance that, in the event that Bermuda enacts legislation imposing tax computed on profits, income, any capital asset, gain or appreciation, or any tax in the nature of estate duty or inheritance tax, then the imposition of the tax will not be applicable to us or our operations until March 31, 2035. Given the limited duration of the Minister of Finance's assurance we cannot be certain that we will not be subject to any Bermuda tax after that date, which may have a material adverse effect on our results of operations. This assurance does not, however, prevent the imposition of taxes on any person ordinarily resident in Bermuda or any company in respect of its ownership of real property or leasehold interests in Bermuda.

The impact of Bermuda's letter of commitment to the OECD to eliminate harmful tax practices is uncertain and could adversely affect our tax status in Bermuda

The Organization for Economic Cooperation and Development (“OECD”) has published reports and launched a global initiative among member and non-member countries on measures to limit harmful tax competition. These measures are largely directed at counteracting the effects of tax havens and preferential tax regimes in countries around the world. Bermuda was not listed in the most recent report as an uncooperative tax haven jurisdiction because it had previously committed to eliminate harmful tax practices, to embrace international tax standards for transparency, to exchange information and to eliminate an environment that attracts business with no substantial domestic activity. We are not able to predict what changes will arise from the commitment or whether such changes will subject us to additional taxes.

Legislation enacted in Bermuda as to Economic Substance may affect our operations.

Pursuant to the Economic Substance Act 2018 (as amended) of Bermuda and related regulations (the “ES Act”), which came into force on January 1, 2019, a registered entity other than an entity which is resident for tax purposes in certain jurisdictions outside Bermuda (“non-resident entity”) that carries on as a business any one or more of the “relevant activities” referred to in the ES Act must comply with economic substance requirements. The ES Act may require in-scope Bermuda entities which are engaged in such “relevant activities” to be directed and managed in Bermuda, have an adequate level of qualified employees in Bermuda, incur an adequate level of annual expenditure in Bermuda, maintain physical offices and premises in Bermuda or perform core income-generating activities in Bermuda. The list of “relevant activities” includes carrying on any one or more of the following activities: banking, insurance, fund management, financing, leasing, headquarters, shipping, distribution and service center, intellectual property and holding entities. An in-scope Bermuda entity that carries on a relevant activity is obliged under the ES Act to file a declaration with the Bermuda Registrar of Companies on an annual basis containing certain information. Any entity found to be lacking adequate economic substance may be fined or ordered by a court to take action to remedy such failure (or face being struck off the companies register). As a result, there is a risk that non-compliance with its economic substance requirements under the ES Act could require Arch to enhance its infrastructure in Bermuda, and this may result in some additional operational expenditures, increased tax liabilities and/or compliance costs for Arch.

We may become subject to increased taxation in Bermuda and other countries as a result of the OECD's plan on "Base erosion and profit shifting."

The OECD, with the support of the G20, initiated the "base erosion and profit shifting" ("BEPS") project in 2013 in response to concerns that changes are needed to international tax laws to address situations where multinationals may pay little or no tax in certain jurisdictions by shifting profits away from jurisdictions where the activities creating those profits may take place. In November 2015, "final reports" were approved for adoption by the G20 finance ministers. The final reports provide the basis for international standards for corporate taxation that are designed to prevent, among other things, the artificial shifting of income to tax havens and low-tax jurisdictions, the erosion of the tax base through interest deductions on intercompany debt and the artificial avoidance of permanent establishments (*i.e.*, tax nexus with a jurisdiction).

Legislation to adopt and implement these standards, including country by country reporting, has been enacted or is currently under consideration in a number of jurisdictions. As a result, our income may be taxed in jurisdictions where it is not currently taxed and at higher rates of tax than currently taxed, which may substantially increase our effective tax rate. Also, the continued adoption of these standards may increase the complexity and costs associated with tax compliance and adversely affect our financial position and results of operations.

In May 2019, the OECD published a "Programme of Work," divided into two pillars, which is designed to address the tax challenges created by an increasing digitalized economy. Pillar I addresses the broader challenge of a digitalized economy and focuses on the allocation of group profits among taxing jurisdictions based on a market-based concept rather than historical "permanent establishment" concepts. In January 2020, the OECD released a statement excluding most financial services activities, including insurance activities, from the scope of the profit reallocation mechanism in Pillar I. The OECD statement cited the presence of commercial (rather than consumer) customers as grounds for the carve-out, but also acknowledged that a "compelling case" could be made that the consumer-facing business lines of insurance companies should be excluded from the scope of Pillar I given the impact of regulations and licensing requirements that typically ensure that residual profits are largely realized in local customer markets. However, the OECD noted that the proper scope for Pillar I as applied to "unregulated elements of the financial services sector" may require further consideration. To date, the proposal has been written broadly enough to potentially apply to our activities, and we are unable to determine at this time when such measures would be implemented and if so, whether they will be in a form that whether it would have a material adverse impact on our operations and results. Pillar II addresses the remaining BEPS risk of profit shifting to entities in low tax jurisdictions by introducing a global minimum tax (15%) and a proposed tax on base eroding payments, which would operate through a denial of a deduction or imposition of source-based taxation (including withholding tax) on certain payments. In October 2021, 136 jurisdictions agreed on a two-pillar solution to address the tax challenges arising from the digitalization of the economy. In December 2021, the OECD released Model Rules for implementation of Pillar II but have not yet released detailed commentary necessary to fully interpret the application of the rules including potential co-existence with the U.S. Global Intangible Low-Taxed Income ("GILTI") rules. The OECD expects the rules to be enacted into domestic legislation in 2022 in order for the rules to be effective from 2023 (with a key element of the rules, the Undertaxed Payment Rule ("UTPR"), deferred for one year until 2024).

The adoption of these rules may increase the complexity and costs associated with tax compliance and may adversely affect our financial position and results of operations.

Application of the EU Anti-Tax Avoidance Directives

As part of the BEPS project, the EU Council adopted on 12 July 2016 Council Directive (EU) 2016/1164 ("ATAD I"), as amended by Council Directive (EU) 2017/952 ("ATAD II", together with ATAD I, "ATAD"), to provide for minimum standards across EU Member States for tackling aggressive tax planning involving hybrid tax mismatches and interest deductibility. ATAD I was required to be transposed into domestic Member State law with effect from January 1, 2019, whilst ATAD II was required to be transposed into domestic Member State law with effect from January 1, 2020 (with an exception in respect of reverse hybrid mismatch provisions, which will take effect on January 1, 2022). On December 22, 2021, the European Commission published a proposal for a Directive ("ATAD III") laying down rules to prevent the misuse of shell entities for improper tax purposes and amending the Directive on administrative cooperation (Directive 2011/16/EU). If adopted, ATAD III will be effective from January 1, 2024. ATAD and ATAD III could result in increased tax liabilities and/or compliance costs and administrative burden for us.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

We lease office space in Bermuda where our principal offices are located. Our insurance group leases space for offices in the U.S., Canada, Bermuda, U.K., Europe and Australia. Our reinsurance group leases space for offices in the U.S., Bermuda, U.K., Europe, Canada and Dubai. Our mortgage group leases space for offices in the U.S., Hong Kong and Australia. We believe that the above described office space is adequate for our needs. However, as we continue to develop our business, we may open additional office locations in 2022.

ITEM 3. 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 December 31, 2021, 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 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

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

HOLDERS

As of February 21, 2022, and based on information provided to us by our transfer agent and proxy solicitor, there were 1,052 holders of record of our common shares (NASDAQ: ACGL) and approximately 143,000 beneficial holders of our common shares.

ISSUER PURCHASES OF EQUITY SECURITIES

The following table summarizes our purchases of common shares for the 2021 fourth quarter:

	Issuer Purchases of Common Shares			
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 (2)
10/1/2021-10/31/2021	1,188,948	$ 38.82	1,174,663	$ 1,498,782
11/1/2021-11/30/2021	4,183,059	$ 42.18	4,159,310	$ 1,323,335
12/1/2021-12/31/2021	3,342,978	$ 42.32	3,334,127	$ 1,182,234
Total	8,714,985	$ 41.78	8,668,100	$ 1,182,234

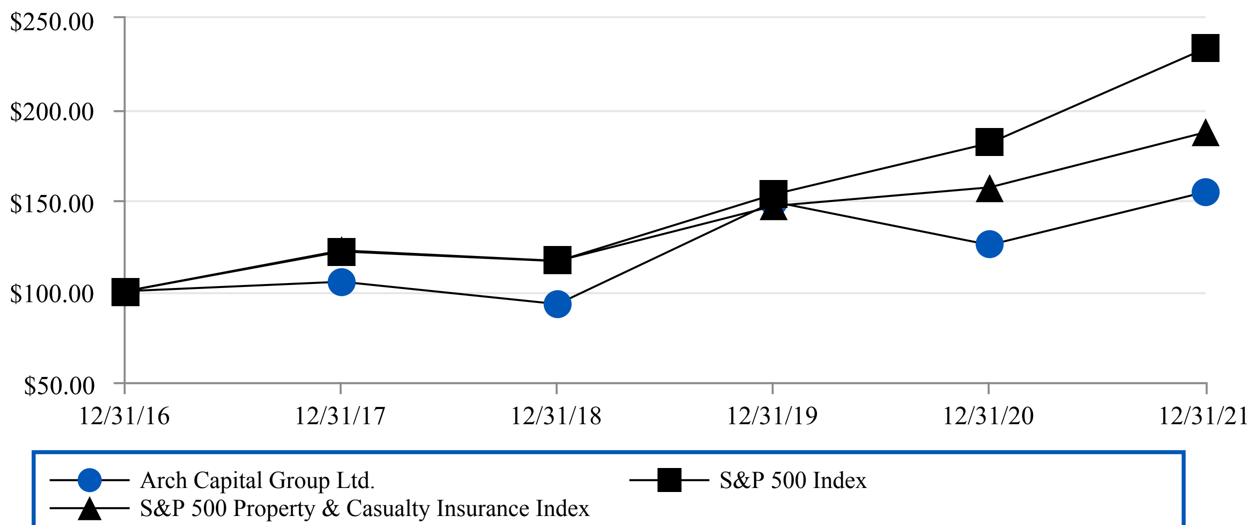
(1) Includes repurchases by Arch Capital of shares, from time to time, from employees in order to facilitate the payment of withholding taxes on restricted shares granted and the exercise of stock appreciation rights. We purchased these shares at their fair market value, as determined by reference to the closing price of our common shares on the day the restricted shares vested or the stock appreciation rights were exercised.

(2) Remaining amount available at December 31, 2021 under Arch Capital's $1.5 billion share repurchase authorization, authorized by the board of directors of ACGL on October 8, 2021. Repurchases under this authorization may be effected from time to time in open market or privately negotiated transactions through December 31, 2022.

PERFORMANCE GRAPH

The following graph compares the cumulative total shareholder return on our common shares for each of the last five years through December 31, 2021 to the cumulative total return, assuming reinvestment of dividends, of (1) S&P 500 Composite Stock Index ("S&P 500 Index") and (2) the S&P 500 Property & Casualty Insurance Index. The share price performance presented below is not necessarily indicative of future results.

CUMULATIVE TOTAL SHAREHOLDER RETURN (1)(2)(3)



Company Name/Index	Base Period 12/31/16	12/31/17	12/31/18	12/31/19	12/31/20	12/31/21
● **Arch Capital Group Ltd.**	$100.00	$105.19	$92.90	$149.11	$125.40	$154.54
■ **S&P 500 Index**	$100.00	$121.83	$116.49	$153.17	$181.35	$233.41
▲ **S&P 500 Property & Casualty Insurance Index**	$100.00	$122.39	$116.64	$146.82	$157.04	$187.31

(1) Stock price appreciation plus dividends.
(2) The above graph assumes that the value of the investment was $100 on December 31, 2016.
(3) This graph is not "soliciting material," is not deemed filed with the SEC and is not to be incorporated by reference in any filing by us under the Securities Act of 1933 or the Securities and Exchange Act of 1934, whether made before or after the date hereof and irrespective of any general incorporation language in any such filing.

ITEM 6. [RESERVED]

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following is a discussion and analysis of the financial condition and results of operations for the year ended December 31, 2021 and 2020. Comparisons between 2020 and 2019 have been omitted from this Form 10-K, but may be found in "Management's Discussion and Analysis of Financial Condition and Results of Operations" in Part II, Item 7 of the Company's Annual Report on Form 10-K year ended December 31, 2020 filed with the SEC. This discussion and analysis contains forward-looking statements which involve inherent risks and uncertainties. All statements other than statements of historical fact are forward-looking statements. These statements are based on our current assessment of risks and uncertainties. Actual results may differ materially from those expressed or implied in these statements and, therefore, undue reliance should not be placed on them. Important factors that could cause actual events or results to differ materially from those indicated in such statements are discussed in this report, including the sections entitled "Cautionary Note Regarding Forward-Looking Statements," and "Risk Factors."

This discussion and analysis should be read in conjunction with our audited consolidated financial statements and notes thereto presented under Item 8. Tabular amounts are in U.S. Dollars in thousands, except share amounts, unless otherwise noted.

GENERAL

Overview

Arch Capital Group Ltd. ("Arch Capital" and, together with its subsidiaries, "we" or "us") is a publicly listed Bermuda exempted company with approximately $16.3 billion in capital at December 31, 2021. Through operations in Bermuda, the United States, United Kingdom, Europe, Canada, Australia and Hong Kong, we write specialty lines of property and casualty insurance and reinsurance, as well as mortgage insurance and reinsurance, on a worldwide basis. It is our belief that our underwriting platform, our experienced management team and our strong capital base have enabled us to establish a strong presence in the insurance and reinsurance markets.

The worldwide property casualty insurance and reinsurance industry is highly competitive and has traditionally been subject to an underwriting cycle. In that cycle, a "hard" market is evidenced by high premium rates, restrictive underwriting standards, favorable terms and conditions, and underwriting gains. A hard market is eventually followed by a "soft" market which has the opposite characteristics of low premium rates, relaxed underwriting standards, broader terms and conditions, and underwriting losses. Market conditions in the property and casualty arena may affect, among other things, the demand for our products, our ability to increase premium rates, the terms and conditions of the insurance policies we write, changes in the products offered by us or changes in our business strategy.

The financial results of the property casualty insurance and reinsurance industry are influenced by factors such as the frequency and/or severity of claims and losses, including natural disasters or other catastrophic events, variations in interest rates and financial markets, changes in the legal, regulatory and judicial environments, inflationary pressures and general economic conditions. These factors influence, among other things, the demand for insurance or reinsurance, the supply of which is generally related to the total capital of competitors in the market.

Mortgage insurance and reinsurance is subject to similar cycles to property casualty except that they have historically been more dependent on macroeconomic conditions.

Current Outlook

Our three areas of focus during the year have remained constant. In our property and casualty segments we continued to focus and grow in sectors where rates allow for returns that are substantially higher than our cost of capital. Our mortgage insurance segment has transitioned, for the most part, from forbearance to recovery and produced results that made a significant contribution to our underwriting income. We have also continued to focus on actively managing our investments and capital to enhance our returns.

In keeping with our longstanding underwriting approach, we look for acceptable books of business to underwrite without sacrificing discipline. Our corporate culture of being patient in soft markets while maintaining an agile mindset is a key to our success and allows us to seize opportunities when the odds for success are more in our favor. The 2021 year reflected the benefits of attractive pricing in almost all of our insurance markets. As a result, we currently expect favorable market conditions to continue in 2022, partially due to the compounding of rate-on-rate increases and the rebalancing of our mix of business. We believe that this time-tested strategy of protecting capital through soft markets and increasing our writings in hard markets gives us the best chance to generate superior risk adjusted returns over time. As long as rate increases support returns above our required thresholds, we expect to continue to grow our writings.

The property casualty industry is facing many degrees of uncertainty, including heightened catastrophe activity, rising inflation, COVID's ongoing influence on the global economy and perennially low interest rates. These factors continue to influence the trajectory and market acceptance of rate increases and reinforce why we remain optimistic that improved economics in the property casualty market will be sustainable for some time.

Rate improvements have enabled us to continue to expand writings in our property casualty segments as we have been for two years now. Rate momentum remained healthy and rate increases were well above the long-term loss cost trends and have spread to more lines than last year. Our early focus on Lloyd's and business in the U.K. has improved our scale and our economics in this market. Some of our business lines that were most impacted by COVID, like travel, are recapturing some of the lost volume as both business and consumer travel increases.

In reinsurance, strong growth was observed across most of our lines of business, a reflection of our diversified specialty mix of business and our larger participation in quota share reinsurance which allows us to participate in the improved premium rates of cedents more directly. We continue to write a portion of our overall book in catastrophe exposed business, which has the potential to increase the volatility of our operating results. While property catastrophe rates were up broadly at January 1, 2022 renewals, the increases were not enough for us to deploy more capital into our peak zones. However, we found many opportunities to grow in the other 93% of our reinsurance business that is specialty in nature, including property excluding property catastrophe.

For our U.S. primary mortgage operations, delinquencies continue to be lower than our expectations at the beginning of the COVID-19 pandemic. Overall, the U.S. market remains competitive but rational and our mortgage business continues to generate returns on capital in the mid teens. Outside of the U.S., we increased our writings in Australia as a result of the housing market remaining strong and due to our acquisition of Westpac's LMI business.

We remain committed to providing solutions across many offerings as the marketplace evolves, including the mortgage credit risk transfer programs initiated by government sponsored enterprises ("GSEs"). In addition, we enter into aggregate excess of loss mortgage reinsurance agreements with various special purpose reinsurance companies domiciled in Bermuda and issue mortgage insurance linked notes, increasing our protection for mortgage tail risk. The Bellemeade structures provide approximately $4.6 billion of aggregate reinsurance coverage at December 31, 2021.

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 and common share equivalents 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 $33.56 at December 31, 2021, a 10.7% increase from $30.31 at December 31, 2020. The growth in 2021 reflected strong underwriting returns and income from operating affiliates.

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 average common shareholders' equity available to Arch during the period. After-tax operating income available to Arch common shareholders, a "non-GAAP measure" as defined in the SEC rules, represents net income available to Arch common shareholders, excluding net realized gains or losses, equity in net income or loss of investments accounted for using the equity method, net foreign exchange gains or losses and transaction costs and other, net of income taxes. Management uses Operating ROAE as a key measure of the return generated to Arch common shareholders. See "Comment on Non-GAAP Financial Measures." Our Operating ROAE was 11.5% for 2021, compared to 4.8% for 2020. Returns for the 2021 period reflected strong underwriting returns and income from operating affiliates, while the 2020 period reflected the impact of COVID-19 on underwriting results.

Total Return on Investments

Total return on investments includes investment income, equity in net income or loss of investments accounted for using the equity method, net realized gains and losses and the change in unrealized gains and losses generated by Arch's investment portfolio. Total return is calculated on a pre-tax basis before investment expenses, excluding amounts reflected in the 'other' segment, and reflects the effect of financial market conditions along with foreign currency fluctuations. Management uses total return on investments as a key measure of the return generated for Arch common shareholders on the capital held in the business, and compares the return generated by our investment portfolio against benchmark returns.

The following table summarizes the pre-tax total return (before investment expenses) of investments held by Arch compared to the benchmark return (both based in U.S. Dollars) against which we measured our portfolio during the periods:

	Arch Portfolio (1)	Benchmark Return
Pre-tax total return (before investment expenses):		
Year Ended December 31, 2021	1.90%	1.20%
Year Ended December 31, 2020	7.77%	7.16%

(1) Our investment expenses were approximately 0.32% and 0.31%, respectively, of average invested assets in 2021 and 2020.

Total return for our investment portfolio outperformed the benchmark return index in 2021 and reflected the impact of strong returns on alternatives and equities, partially offset by low returns on our fixed income portfolio.

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 December 31, 2021, the benchmark return index had an average credit quality of "Aa3" by Moody's, an estimated duration of 3.14 years.

The benchmark return index included weightings to the following indices:

	%
ICE BoAML 1-10 Year A - AAA U.S. Corporate Index	21.00%
ICE BoAML 1-5 Year U.S. Treasury Index	15.00
MSCI ACWI Net Total Return USD Index	8.60
ICE BoAML 3-5 Year Fixed Rate Asset Backed Securities Index	7.00
S&P Leveraged Loan Total Return Index	5.20
Bloomberg Barclays CMBS Invest Grade Aaa Total Return Index	5.00
ICE BoAML 1-10 Year BBB U.S. Corporate Index	4.00
ICE BoAML U.S. Mortgage Backed Securities Index	4.00
ICE BoAML 1-5 Year U.K. Gilt Index	4.00
ICE BoAML German Government 1-10 Year Index	3.50
ICE BoAML 0-3 Month U.S. Treasury Bill Index	3.25
ICE BoAML 1-10 Year U.S. Municipal Securities Index	3.00
ICE BoAML 5-10 Year U.S. Treasury Index	3.00
ICE BoAML 1-5 Year Australia Government Index	2.75
ICE BoAML U.S. High Yield Constrained Index	2.50
ICE BoAML 1-5 Year Canada Government Index	2.00
Bloomberg Barclays Global High Yield Total Return Index	1.50
Hedge Fund Research HFRX ED Distressed Restructuring Index (Flagship Funds)	1.50
Dow Jones Global ex-US Select Real Estate Securities Total Return Net Index	0.90
FTSE Nareit All Mortgage Capped Index Total Return USD	0.90
Bloomberg Barclays CMBS: Erisa Eligible Unhedged USD	0.90
ICE BoAML 20+ Year Canada Government Index	0.50
Total	100.00%

COMMENT ON NON-GAAP FINANCIAL MEASURES

Throughout this filing, we present our operations in the way 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, equity in net income or loss of investments accounted for using the equity method, net foreign exchange gains or losses, transaction costs and other and 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 investments accounted for using the equity method, net foreign exchange gains or losses and 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 investments accounted for using the equity method and net foreign exchange gains or losses are an integral part of our operations, the decision to realize investment gains or losses, the recognition of the change in the carrying value of investments accounted for using the fair value option in net realized gains or losses, the recognition of net impairment losses, the recognition of equity in net income or loss of investments accounted for using the equity method and the recognition of foreign exchange gains or losses 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 allowance for credit losses and net impairment losses recognized in earnings on the Company’s 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 in certain funds that invest in fixed maturity securities 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 we account for our other fixed maturity securities and the timing of the recognition of equity in net income or loss of investments 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. The loss on redemption of preferred shares related to the redemption of the Company's Series E preferred shares in September 2021 had no impact on shareholders' equity or cash flows. Due to these reasons, we exclude net realized gains or losses, equity in net income or loss of investments accounted for using the equity method, net foreign exchange gains or losses, transaction costs and other and loss on redemption of preferred shares 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 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 and a subtotal of underwriting income or loss before the contribution from the ‘other’ segment. 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,” to our consolidated financial statements in Item 8, 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 and a subtotal before the contribution from the ‘other’ segment, in accordance with Regulation G, is shown in note 4, “Segment Information,” to our consolidated financial statements in Item 8.

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 intangible assets, and, accordingly, investment income, income from operating affiliates and other non-underwriting related items are not allocated to each underwriting segment.

Along with consolidated underwriting income, we provide a subtotal of underwriting income or loss before the contribution from the ‘other’ segment. Through June 30, 2021, the ‘other’ segment included the results of Somers Holdings Ltd. (formerly Watford Holdings Ltd.). Somers Holdings Ltd. is the parent of Somers Re Ltd., a multi-line Bermuda reinsurance company (together with Somers Holdings Ltd., “Somers”). Pursuant to GAAP, Somers was

considered a variable interest entity and we concluded that we were the primary beneficiary of Somers. As such, we consolidated the results of Somers in our consolidated financial statements through June 30, 2021. In the 2020 fourth quarter, Arch Capital, Somers, and Greysbridge Ltd., a wholly-owned subsidiary of Arch Capital, entered into an Agreement and Plan of Merger (as amended, the "Merger Agreement"). Arch Capital assigned its rights under the Merger Agreement to Greysbridge Holdings Ltd. ("Greysbridge"). The merger and the related Greysbridge equity financing closed on July 1, 2021. Effective July 1, 2021, Somers is wholly owned by Greysbridge, and Greysbridge is owned 40% by Arch and 30% by certain funds managed by Kelso and 30% by certain funds managed by Warburg. Based on the governing documents of Greysbridge, we concluded that, while we retain significant influence over Greysbridge, Greysbridge does not constitute a variable interest entity. Accordingly, effective July 1, 2021, we no longer consolidate the results of Somers in our consolidated financial statements and footnotes.

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 investments accounted for using the equity method, net realized gains and losses 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, excludes amounts reflected in the 'other' segment, 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 on the capital held in the business, and compares the return generated by our investment portfolio against benchmark returns which we measured our portfolio against during the periods.

RESULTS OF OPERATIONS

The following table summarizes our consolidated financial data, including a reconciliation of net income available to Arch common shareholders to after-tax operating income available to Arch common shareholders.

	Year Ended December 31,	
	2021	2020
Net income available to Arch common shareholders	$ 2,093,405	$ 1,363,909
Net realized (gains) losses	(307,466)	(814,808)
Equity in net (income) loss of investments accounted for using the equity method	(366,402)	(146,693)
Net foreign exchange (gains) losses	(42,743)	80,591
Transaction costs and other	1,199	9,964
Loss on redemption of preferred shares	15,101	—
Income tax expense (benefit) (1)	41,836	64,145
After-tax operating income available to Arch common shareholders	$ 1,434,930	$ 557,108
Beginning common shareholders' equity	$12,325,886	$10,717,371
Ending common shareholders' equity	12,715,896	12,325,886
Average common shareholders' equity	$12,520,891	$11,521,629
Annualized net income return on average common equity %	16.7	11.8
Annualized operating return on average common equity %	11.5	4.8

(1) Income tax on net realized gains or losses, equity in net income or loss of investments 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.

Results in all periods presented reflected the impact of current insurance and reinsurance market conditions and the impact of low interest yields on our investment portfolio.

Segment Information

We classify our businesses into three underwriting segments– insurance, reinsurance and mortgage– and two operating segments– corporate and 'other.' 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 of Arch Capital, Chief Financial Officer and Treasurer of Arch Capital and the President and Chief Underwriting Officer of Arch Capital. The chief operating decision makers 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:

	Year Ended December 31,		
	2021	2020	% Change
Gross premiums written	$5,867,734	$4,688,562	25.1
Premiums ceded	(1,719,541)	(1,525,655)	
Net premiums written	4,148,193	3,162,907	31.2
Change in unearned premiums	(521,725)	(291,487)	
Net premiums earned	3,626,468	2,871,420	26.3
Other underwriting income	—	(31)	
Losses and loss adjustment expenses	(2,344,365)	(2,092,453)	
Acquisition expenses	(606,265)	(418,483)	
Other operating expenses	(558,906)	(489,153)	
Underwriting income (loss)	$ 116,932	$ (128,700)	190.9
Underwriting Ratios			**% Point Change**
Loss ratio	64.6 %	72.9 %	(8.3)
Acquisition expense ratio	16.7 %	14.6 %	2.1
Other operating expense ratio	15.4 %	17.0 %	(1.6)
Combined ratio	96.7 %	104.5 %	(7.8)

The insurance segment consists of our insurance underwriting units which offer specialty product lines on a worldwide basis, as described in note 4, "Segment Information," to our consolidated financial statements in Item 8.

Premiums Written.

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

	Year Ended December 31,			
	2021		2020	
	Amount	%	Amount	%
Professional lines	$ 1,177,144	28.4	$ 743,486	23.5
Property, energy, marine and aviation	770,954	18.6	619,034	19.6
Programs	595,824	14.4	437,973	13.8
Construction and national accounts	383,580	9.2	364,104	11.5
Excess and surplus casualty	359,458	8.7	297,330	9.4
Travel, accident and health	305,390	7.4	212,974	6.7
Lenders products	146,984	3.5	156,119	4.9
Other	408,859	9.9	331,887	10.5
Total	$ 4,148,193	100.0	$ 3,162,907	100.0

Net premiums written by the insurance segment were 31.2% higher in 2021 than in 2020. The higher level of net premiums written reflected increases across most lines of business, due in part to new business opportunities, rate increases and growth in existing accounts.

Net Premiums Earned.

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

	Year Ended December 31,			
	2021		2020	
	Amount	%	Amount	%
Professional lines	$ 942,817	26.0	$ 655,872	22.8
Property, energy, marine and aviation	702,693	19.4	517,247	18.0
Programs	506,867	14.0	432,854	15.1
Construction and national accounts	381,306	10.5	387,934	13.5
Excess and surplus casualty	318,027	8.8	270,620	9.4
Travel, accident and health	255,590	7.0	190,944	6.6
Lenders products	153,958	4.2	114,687	4.0
Other	365,210	10.1	301,262	10.5
Total	$ 3,626,468	100.0	$ 2,871,420	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 by the insurance segment were 26.3% higher in 2021 than in 2020, reflecting changes in net premiums written over the previous five quarters.

Losses and Loss Adjustment Expenses.

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

	Year Ended December 31,	
	2021	2020
Current year	65.0 %	73.2 %
Prior period reserve development	(0.4)%	(0.3)%
Loss ratio	64.6 %	72.9 %

Current Year Loss Ratio.

The insurance segment's current year loss ratio was 8.2 points lower in 2021 than in 2020. The 2021 loss ratio included 5.6 points of current year catastrophic event activity, primarily related to Hurricane Ida and winter storms Uri and Viola, compared to 9.5 points in 2020, which included exposure to the COVID-19 global pandemic. The balance of the change in the 2021 loss ratio resulted, in part, from the effect of rate increases, changes in mix of business and the level of attritional losses.

Prior Period Reserve Development.

The insurance segment's net favorable development was $16.2 million, or 0.4 points, for 2021, compared to $7.8 million, or 0.3 points, for 2020. See note 5, "Reserve for Losses and Loss Adjustment Expenses," to our consolidated financial statements in Item 8 for information about the insurance segment's prior year reserve development.

Underwriting Expenses.

The insurance segment's underwriting expense ratio was 32.1% in 2021, compared to 31.6% in 2020, with the increase primarily reflected growth in lines of business with higher acquisition costs, partially offset by growth in net premiums earned.

Reinsurance Segment

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

	Year Ended December 31,		
	2021	2020	% Change
Gross premiums written	$5,093,930	$3,472,086	46.7
Premiums ceded	(1,839,556)	(1,014,716)	
Net premiums written	3,254,374	2,457,370	32.4
Change in unearned premiums	(413,931)	(295,141)	
Net premiums earned	2,840,443	2,162,229	31.4
Other underwriting income (loss)	3,669	4,454	
Losses and loss adjustment expenses	(1,924,719)	(1,628,320)	
Acquisition expenses	(536,754)	(354,048)	
Other operating expenses	(212,810)	(168,011)	
Underwriting income	$ 169,829	$ 16,304	941.6
Underwriting Ratios			% Point Change
Loss ratio	67.8 %	75.3 %	(7.5)
Acquisition expense ratio	18.9 %	16.4 %	2.5
Other operating expense ratio	7.5 %	7.8 %	(0.3)
Combined ratio	94.2 %	99.5 %	(5.3)

The reinsurance segment consists of our reinsurance underwriting units which offer specialty product lines on a worldwide basis, as described in note 4, "Segment Information," to our consolidated financial statements in Item 8.

Premiums Written.

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

	Year Ended December 31,			
	2021		2020	
	Amount	%	Amount	%
Property excluding property catastrophe	$ 1,004,086	30.9	$ 697,086	28.4
Other Specialty	955,474	29.4	709,308	28.9
Casualty	808,164	24.8	542,319	22.1
Property catastrophe	233,260	7.2	286,210	11.6
Marine and aviation	171,753	5.3	141,414	5.8
Other	81,637	2.5	81,033	3.3
Total	$ 3,254,374	100.0	$ 2,457,370	100.0

Gross premiums written by the reinsurance segment in 2021 were 46.7% higher than in 2020, while net premiums written were 32.4% higher than in 2020. The growth in net premiums written reflected increases in most lines of business, primarily due to growth in existing accounts, new business, and rate increases.

Net Premiums Earned.

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

	Year Ended December 31,			
	2021		2020	
	Amount	%	Amount	%
Property excluding property catastrophe	$ 836,573	29.5	$ 562,208	26.0
Other Specialty	818,801	28.8	626,409	29.0
Casualty	666,754	23.5	549,056	25.4
Property catastrophe	280,738	9.9	237,736	11.0
Marine and aviation	152,955	5.4	109,624	5.1
Other	84,622	3.0	77,196	3.6
Total	$ 2,840,443	100.0	$ 2,162,229	100.0

Net premiums earned in 2021 were 31.4% higher than in 2020, reflecting changes in net premiums written over the previous five quarters, including the mix and type of business written.

Other Underwriting Income (Loss).

Other underwriting income in 2021 was $3.7 million, compared to $4.5 million in 2020.

Losses and Loss Adjustment Expenses.

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

	Year Ended December 31,	
	2021	2020
Current year	74.1 %	81.5 %
Prior period reserve development	(6.3)%	(6.2)%
Loss ratio	67.8 %	75.3 %

Current Year Loss Ratio.

The reinsurance segment's current year loss ratio was 7.4 points lower in 2021 than in 2020. The 2021 loss ratio included 16.5 points for current year catastrophic event activity, primarily related to Hurricane Ida and winter storms Uri and Viola, as well as other minor global events, compared to 20.1 points in 2020. The 2020 period loss ratio included exposure to the COVID-19 pandemic. The balance of the change in the 2021 current year loss ratio resulted, in part, from the effect of rate increases, changes in mix of business and the level of attritional losses.

Prior Period Reserve Development.

The reinsurance segment's net favorable development was $178.8 million, or 6.3 points, for 2021, compared to $134.0 million, or 6.2 points, for 2020, See note 5, "Reserve for Losses and Loss Adjustment Expenses," to our consolidated financial statements in Item 8 for information about the reinsurance segment's prior year reserve development.

Underwriting Expenses.

The underwriting expense ratio for the reinsurance segment was 26.4% in 2021, compared to 24.2% in 2020, with the increase primarily resulting from changes in mix of business to lines with higher acquisition costs and expenses related to favorable development of prior year loss reserves.

Mortgage Segment

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

	Year Ended December 31,		
	2021	2020	% Change
Gross premiums written	$1,507,825	$1,473,999	2.3
Premiums ceded	(246,757)	(194,149)	
Net premiums written	1,261,068	1,279,850	(1.5)
Change in unearned premiums	22,351	118,085	
Net premiums earned	1,283,419	1,397,935	(8.2)
Other underwriting income	17,665	20,316	
Losses and loss adjustment expenses	(56,677)	(528,344)	
Acquisition expenses	(97,418)	(134,240)	
Other operating expenses	(194,010)	(162,202)	
Underwriting income	$ 952,979	$ 593,465	60.6
Underwriting Ratios			**% Point Change**
Loss ratio	4.4 %	37.8 %	(33.4)
Acquisition expense ratio	7.6 %	9.6 %	(2.0)
Other operating expense ratio	15.1 %	11.6 %	3.5
Combined ratio	27.1 %	59.0 %	(31.9)

Premiums Written.

The following table sets forth our mortgage segment's net premiums written by underwriting location (*i.e.*, where the business is underwritten):

	Year Ended December 31,	
	2021	2020
Net premiums written by underwriting location		
United States	$ 914,477	$ 1,021,950
Other	346,591	257,900
Total	$ 1,261,068	$ 1,279,850

Gross premiums written by the mortgage segment in 2021 were 2.3% higher than in 2020, primarily reflecting growth in Australian single premium mortgage insurance and due to the acquisition of Westpac Lenders Mortgage Insurance Limited in 2021, which was partially offset by a lower level of U.S. primary mortgage insurance monthly and single premium volume. Net premiums written for 2021 were 1.5% lower than in the 2020 period. Net premiums written for the 2021 period reflected a higher level of premiums ceded than in the 2020 period.

The persistency rate of the U.S. primary portfolio of mortgage loans was 62.4% at December 31, 2021 compared to 58.7% at December 31, 2020, with the increase primarily reflecting a lower level of refinancing activity due to a higher interest rate environment. The persistency rate 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.

Net Premiums Earned.

The following table sets forth our mortgage segment's net premiums earned by underwriting location (*i.e.*, where the business is underwritten):

	Year Ended December 31,	
	2021	2020
Net premiums earned by underwriting location		
United States	$ 970,507	$ 1,158,563
Other	312,912	239,372
Total	$ 1,283,419	$ 1,397,935

Net premiums earned for 2021 were 8.2% lower than in 2020, primarily reflecting a lower level of earnings from single premium policy terminations.

Other Underwriting Income.

Other underwriting income, which is primarily related to GSE risk-sharing transactions, was $17.7 million for 2021, compared to $20.3 million for 2020.

Losses and Loss Adjustment Expenses.

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

	Year Ended December 31,	
	2021	2020
Current year	17.6 %	39.2 %
Prior period reserve development	(13.2)%	(1.4)%
Loss ratio	4.4 %	37.8 %

Unlike property and casualty business for which we estimate ultimate losses on premiums earned, losses on mortgage insurance business are only recorded at the time a borrower is delinquent on their mortgage, in accordance with primary mortgage insurance industry practice. Because our primary mortgage insurance reserving process does not take into account the impact of future losses from loans that are not delinquent, mortgage insurance loss reserves are not an estimate of ultimate losses. In addition to establishing loss reserves for delinquent loans, under GAAP, we are required to establish a premium deficiency reserve for our mortgage insurance products if the amount of expected future losses and maintenance costs exceeds expected future premiums, existing reserves and the anticipated investment income for such product. We assess the need for a premium deficiency reserve on a quarterly basis and perform a full analysis annually. No such reserve was established during 2021 or 2020.

Current Year Loss Ratio.

The mortgage segment's current year loss ratio was 21.6 points lower in 2021 compared to 2020. The percentage of loans in default on U.S. primary mortgage insurance decreased from 4.19% at December 31, 2020 to 2.36% at December 31, 2021.

Incurred losses for the 2020 periods reflected elevated delinquency rates due, in part, to financial stress from the COVID-19 pandemic. Segregating estimated losses due to COVID-19 from the overall mortgage segment estimated losses would require knowledge of the number of delinquencies specifically attributable to COVID-19. As this exercise cannot be performed accurately, the Company is not reporting COVID-19 provisions separately from its overall loss provisions.

We insure mortgages for homes in areas that have been impacted by catastrophic events. Generally, mortgage insurance losses occur only when a credit event occurs and, following a physical damage event, when the home is restored to pre-storm condition. Our ultimate claims exposure will depend on the number of delinquency notices received and the ultimate claim rate related to such notices. In the event of natural disasters, cure rates are influenced by the adequacy of homeowners and flood insurance carried on a related property, and a borrower's access to aid from government entities and private organizations, in addition to other factors which generally impact cure rates in unaffected areas.

Prior Period Reserve Development.

The mortgage segment's net favorable development was $169.6 million, or 13.2 points, for 2021, compared to $19.0 million, or 1.4 points, for 2020. See note 5, "Reserve for Losses and Loss Adjustment Expenses," to our consolidated financial statements in Item 8 for information about the mortgage segment's prior year reserve development.

Underwriting Expenses.

The underwriting expense ratio for the mortgage segment was 22.7% for 2021, in line with 21.2% for 2020, with the increase primarily due to a lower level of net premiums earned in the U.S. primary mortgage insurance business.

Corporate Segment

The corporate segment results include net investment income, net realized gains or losses, 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 from operating affiliates and items related to our non-cumulative preferred shares. Such amounts exclude the results of the 'other' segment.

Net Investment Income.

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

	Year Ended December 31,	
	2021	2020
Fixed maturities	$ 307,536	$ 358,804
Equity securities	42,094	28,007
Short-term investments	6,799	6,573
Other (1)	68,411	77,951
Gross investment income	424,840	471,335
Investment expenses (2)	(78,032)	(69,427)
Net investment income	$ 346,808	$ 401,908

(1) Amounts include dividends and other distributions on investment funds, term loan investments, funds held balances, cash balances and other.
(2) Investment expenses were approximately 0.32% of average invested assets for 2021, compared to 0.31% for 2020.

The pre-tax investment income yield was 1.41% for 2021, compared to 1.78% for 2020. The lower level of net investment income for 2021 compared to 2020 reflected lower yields available in the financial markets. The pre-tax investment income yields were calculated based on amortized cost. Yields on future investment income may vary based on financial market conditions, investment allocation decisions and other factors.

Net Realized Gains (Losses).

We recorded net realized gains of $299.2 million for 2021, compared to net realized gains of $813.8 million for 2020. 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 9, "Investment Information—Net Realized Gains (Losses)," and note 9, "Investment Information—Allowance for Credit Losses," to our consolidated financial statements for additional information.

Equity in Net Income (Loss) of Investments Accounted for Using the Equity Method.

We recorded $366.4 million of equity in net income related to investments accounted for using the equity method for 2021, compared to $146.7 million for 2020. Investments accounted for using the equity method totaled $3.1 billion at December 31, 2021, compared to $2.0 billion at December 31, 2020. See note 9, "Investment Information—Equity in Net Income (Loss) of Investments Accounted For Using the Equity Method," to our consolidated financial statements in Item 8 for additional information.

Other Income (Loss)

Other income of $10.2 million for 2021 period primarily reflected our investment in corporate-owned life insurance.

Corporate Expenses.

Corporate expenses were $77.1 million for 2021, compared to $68.5 million for 2020. Such amounts primarily represent certain holding company costs necessary to support our worldwide operations and costs associated with operating as a publicly traded company.

Transaction Costs and Other.

Transaction costs and other were $1.1 million for 2021, compared to $9.5 million for 2020. Amounts in both periods are primarily related to acquisition activity.

Amortization of Intangible Assets.

Amortization of intangible assets for 2021 was $82.1 million, compared to $69.0 million for 2020. Amounts in 2021 and 2020 primarily related to amortization of finite-lived intangible assets. The increase in amortization of intangible assets expense was a result of acquisitions closed during the 2021 period. See note 2, "Acquisitions."

Interest Expense.

Interest expense was $131.1 million for 2021, compared to $120.2 million for 2020. Interest expense primarily reflects amounts related to our outstanding senior notes. The higher level of interest expense mainly resulted from the issuance of $1.0 billion of 3.635% senior notes in June 2020.

Net Foreign Exchange Gains or Losses.

Net foreign exchange gains for 2021 were $42.9 million, compared to net foreign exchange losses for 2020 of $80.2 million. Amounts in such 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 before income taxes resulted in an expense of 5.6% for 2021, compared to an expense of 7.4% for 2020. The effective tax rate for 2021 period included discrete income tax benefits of $39.3 million, compared to a benefit of $2.5 million for 2020. The discrete tax items in the 2021 period primarily relate to the release of valuation allowances on certain international deferred tax assets. Our effective tax rate fluctuates from year to year consistent with the relative mix of income or loss reported by jurisdiction and the varying tax rates in each jurisdiction.

See note 15, "Income Taxes," to our consolidated financial statements in Item 8 for a reconciliation of the difference between the provision for income taxes and the expected tax provision at the weighted average statutory tax rate for 2021 and 2020.

Income (Loss) from Operating Affiliates.

We recorded $264.7 million of net income from our operating affiliates in the 2021 period, compared to income of $16.8 million in the 2020 period. Results for the 2021 period included a one-time gain of $95.7 million recognized from the Company's investment in Greysbridge and a one-time gain of $74.5 million recognized from the Company's investment in Coface SA ("Coface"), a France-based leader in the global trade credit insurance market.

Loss on Redemption of Preferred Shares.

In 2021, we redeemed all 5.25% Series E preferred shares and recorded a loss of $15.1 million to remove original issuance costs related to the redeemed shares from additional paid-in capital. Such adjustment had no impact on total shareholders' equity or cash flows.

Other Segment

Through June 30, 2021, the 'other' segment included the results of Somers. Pursuant to GAAP, Somers was considered a variable interest entity and we concluded that we were the primary beneficiary of Somers. As such, we consolidated the results of Somers in our consolidated financial statements through June 30, 2021. In July 2021, we announced the completion of the previously disclosed acquisition of Somers by Greysbridge. Based on the governing documents of Greysbridge, the Company has concluded that, while it retains significant influence over Somers, Somers no longer constitutes a variable interest entity. Accordingly, effective July 1, 2021, Arch no longer consolidates the results of Somers in its consolidated financial statements. See note 12, "Variable Interest Entity and Noncontrolling Interests," and note 4, "Segment Information," to our consolidated financial statements in Item 8 for additional information.

SUMMARY OF CRITICAL ACCOUNTING ESTIMATES

The preparation of consolidated financial statements in accordance with GAAP requires us to make many estimates and judgments that affect the reported amounts of assets, liabilities (including reserves), revenues and expenses, and related disclosures of contingent liabilities. On an ongoing basis, we evaluate our estimates, including those related to revenue recognition, insurance and other reserves, reinsurance recoverables, allowance for current expected credit losses, investment valuations, goodwill and intangible assets, bad debts, income taxes, contingencies and litigation. We base our estimates on historical experience, where possible, and on various other assumptions that we believe to be reasonable under the circumstances, which form the basis for our judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results will differ from these estimates and such differences may be material. We believe that the following critical accounting policies affect significant estimates used in the preparation of our consolidated financial statements.

Loss Reserves

We are required by applicable insurance laws and regulations and GAAP to establish reserves for losses and loss adjustment expenses, or "Loss Reserves", that arise from the business we underwrite. Loss Reserves for our insurance, reinsurance and mortgage operations are balance sheet liabilities representing estimates of future amounts required to pay losses and loss adjustment expenses for insured or reinsured events which have occurred at or before the balance sheet date. Loss Reserves do not reflect contingency reserve allowances to account for future loss occurrences. Losses arising from future events will be estimated and recognized at the time the losses are incurred and could be substantial. See note 6, "Short Duration Contracts," to our consolidated financial statements in Item 8 for additional information on our reserving process.

At December 31, 2021 and 2020, our Loss Reserves, net of unpaid losses and loss adjustment expenses recoverable, by type and by operating segment were as follows:

	December 31,	
	2021	2020
Insurance segment:		
Case reserves	$ 2,102,891	$ 2,051,640
IBNR reserves	4,269,904	3,889,823
Total net reserves	6,372,795	5,941,463
Reinsurance segment:		
Case reserves	1,733,571	1,560,523
Additional case reserves	426,531	280,472
IBNR reserves	2,656,527	2,253,953
Total net reserves	4,816,629	4,094,948
Mortgage segment:		
Case reserves	741,897	631,921
IBNR reserves	226,604	271,702
Total net reserves	968,501	903,623
Other segment:		
Case reserves	—	566,587
Additional case reserves	—	32,321
IBNR reserves	—	660,132
Total net reserves	—	1,259,040
Total:		
Case reserves	4,578,359	4,810,671
Additional case reserves	426,531	312,793
IBNR reserves	7,153,035	7,075,610
Total net reserves	$ 12,157,925	$ 12,199,074

At December 31, 2021 and 2020, the insurance segment's Loss Reserves by major line of business, net of unpaid losses and loss adjustment expenses recoverable, were as follows:

	December 31,	
	2021	2020
Professional lines (1)	$ 1,673,615	$ 1,482,820
Construction and national accounts	1,490,206	1,395,067
Excess and surplus casualty (2)	657,307	816,495
Programs	793,187	699,354
Property, energy, marine and aviation	599,093	517,692
Travel, accident and health	96,051	98,910
Lenders products	58,351	48,946
Other (3)	1,004,985	882,179
Total net reserves	$ 6,372,795	$ 5,941,463

(1) Includes professional liability, executive assurance and healthcare business.
(2) Includes casualty and contract binding business.
(3) Includes alternative markets, excess workers' compensation and surety business.

At December 31, 2021 and 2020, the reinsurance segment's Loss Reserves by major line of business, net of unpaid losses and loss adjustment expenses recoverable, were as follows:

	December 31,	
	2021	2020
Casualty (1)	$ 2,123,360	$ 1,995,849
Other specialty (2)	1,113,766	917,178
Property excluding property catastrophe (3)	711,859	594,033
Marine and aviation	246,861	204,205
Property catastrophe	486,911	268,858
Other (4)	133,872	114,825
Total net reserves	$ 4,816,629	$ 4,094,948

(1) Includes executive assurance, professional liability, workers' compensation, excess motor, healthcare and other.
(2) Includes non-excess motor, surety, accident and health, workers' compensation catastrophe, agriculture, trade credit and other.
(3) Includes property facultative business.
(4) Includes life, casualty clash and other.

At December 31, 2021 and 2020, the mortgage segment's Loss Reserves by major line of business, net of unpaid losses and loss adjustment expenses recoverable, were as follows:

	December 31,	
	2021	2020
U.S. primary mortgage insurance (1)	$ 710,708	$ 649,748
U.S. credit risk transfer (CRT) and other	112,549	134,857
International mortgage insurance/ reinsurance	145,244	119,017
Total net reserves	$ 968,501	$ 903,623

(1) At December 31, 2021, 27.0% of total net reserves represent policy years 2011 and prior and the remainder from later policy years. At December 31, 2020, 28.3% of total net reserves represent policy years 2011 and prior and the remainder from later policy years.

Potential Variability in Loss Reserves

The tables below summarize the effect of reasonably likely scenarios on the key actuarial assumptions used to estimate our Loss Reserves, net of unpaid losses and loss adjustment expenses recoverable, at December 31, 2021 by underwriting segment. The scenarios shown in the tables summarize the effect of (i) changes to the expected loss ratio selections used at December 31, 2021, which represent loss ratio point increases or decreases to the expected loss ratios used, and (ii) changes to the loss development patterns used in our reserving process at December 31, 2021, which represent claims reporting that is either slower or faster than the reporting patterns used. We believe that the illustrated sensitivities are indicative of the potential variability inherent in the estimation process of those parameters. The results show the impact of varying each key actuarial assumption using the chosen sensitivity on our IBNR reserves, on a net basis and across all accident years.

INSURANCE SEGMENT	Higher Expected Loss Ratios	Slower Loss Development Patterns
Reserving lines selected assumptions:		
Property, energy, marine and aviation	5 points	3 months
Third party occurrence business	10	6
Third party claims-made business	10	6
Multi-line and other specialty	10	6
Increase (decrease) in Loss Reserves:		
Property, energy, marine and aviation	$ 44,245	$ 73,192
Third party occurrence business	317,483	165,701
Third party claims-made business	149,689	148,642
Multi-line and other specialty	145,365	132,792

INSURANCE SEGMENT	Lower Expected Loss Ratios	Faster Loss Development Patterns
Reserving lines selected assumptions:		
Property, energy, marine and aviation	(5) points	(3) months
Third party occurrence business	(10)	(6)
Third party claims-made business	(10)	(6)
Multi-line and other specialty	(10)	(6)
Increase (decrease) in Loss Reserves:		
Property, energy, marine and aviation	$ (41,610)	$ (35,731)
Third party occurrence business	(316,771)	(144,688)
Third party claims-made business	(149,618)	(118,728)
Multi-line and other specialty	(141,854)	(89,390)

REINSURANCE SEGMENT	Higher Expected Loss Ratios	Slower Loss Development Patterns
Reserving lines selected assumptions:		
Casualty	10 points	6 months
Other specialty	5	3
Property excluding property catastrophe	5	3
Property catastrophe	5	3
Marine and aviation	5	3
Other	5	3
Increase (decrease) in Loss Reserves:		
Casualty	$ 159,539	$ 184,503
Other specialty	86,426	79,244
Property excluding property catastrophe	30,662	77,092
Property catastrophe	28,532	46,563
Marine and aviation	13,801	21,679
Other	7,253	4,901

REINSURANCE SEGMENT	Lower Expected Loss Ratios	Faster Loss Development Patterns
Reserving lines selected assumptions:		
Casualty	(10) points	(6) months
Other specialty	(5)	(3)
Property excluding property catastrophe	(5)	(3)
Property catastrophe	(5)	(3)
Marine and aviation	(5)	(3)
Other	(5)	(3)
Increase (decrease) in Loss Reserves:		
Casualty	$ (159,539)	$ (142,727)
Other specialty	(86,397)	(98,539)
Property excluding property catastrophe	(30,662)	(70,358)
Property catastrophe	(28,532)	(30,353)
Marine and aviation	(13,924)	(22,699)
Other	(7,253)	(4,688)

It is not necessarily appropriate to sum the total impact for a specific factor or the total impact for a specific business category as the business categories are not perfectly correlated. In addition, the potential variability shown in the tables above are reasonably likely scenarios of changes in our key assumptions at December 31, 2021 and are not meant to be a “best case” or “worst case” series of outcomes and, therefore, it is possible that future variations may be more or less than the amounts set forth above.

For our mortgage segment, we considered the sensitivity of loss reserve estimates at December 31, 2021 by assessing the potential changes resulting from a parallel shift in severity and default to claim rate. For example, assuming all other factors remain constant, for every one percentage point change in primary claim severity (which we estimate to be approximately 34% of the unpaid principal balance at December 31, 2021), we estimated that our loss reserves would change by approximately $28.0 million at December 31, 2021. For every one percentage point change in our primary net default to claim rate (which we estimate to

be approximately 39% at December 31, 2021), we estimated a $24.0 million change in our loss reserves at December 31, 2021.

Simulation Results

In order to illustrate the potential volatility in our Loss Reserves, we used a Monte Carlo simulation approach to simulate a range of results based on various probabilities. Both the probabilities and related modeling are subject to inherent uncertainties. The simulation relies on a significant number of assumptions, such as the potential for multiple entities to react similarly to external events, and includes other statistical assumptions. The simulation results shown for each segment do not add to the total simulation results, as the individual segment simulation results do not reflect the diversification effects across our segments.

At December 31, 2021, our recorded Loss Reserves by underwriting segment, net of unpaid losses and loss adjustment expenses recoverable, and the results of the simulation were as follows:

	Insurance Segment	Reinsurance Segment	Mortgage Segment	Total
Loss Reserves (1)	$6,372,795	$4,816,629	$968,501	$12,157,925
Simulation results:				
90th percentile (2)	$7,670,396	$5,851,277	$1,159,743	$14,001,252
10th percentile (3)	$5,128,642	$3,903,565	$791,504	$10,398,665

(1) Net of reinsurance recoverables.
(2) Simulation results indicate that a 90% probability exists that the net reserves for losses and loss adjustment expenses will not exceed the indicated amount.
(3) Simulation results indicate that a 10% probability exists that the net reserves for losses and loss adjustment expenses will be at or below the indicated amount.

For informational purposes, based on the total simulation results, a change in our Loss Reserves to the amount indicated at the 90th percentile would result in a decrease in income before income taxes of approximately $1.8 billion, or $4.60 per diluted share, while a change in our Loss Reserves to the amount indicated at the 10th percentile would result in an increase in income before income taxes of approximately $1.8 billion, or $4.39 per diluted share. The simulation results noted above are informational only, and no assurance can be given that our ultimate losses will not be significantly different than the simulation results shown above, and such differences could directly and significantly impact earnings favorably or unfavorably in the period they are determined. We do not have significant exposure to pre-2002 liabilities, such as asbestos-related illnesses and other long-tail liabilities. It is difficult to provide meaningful trend information for certain liability/casualty coverages for which the claim-tail may be especially long, as claims are often reported and ultimately paid or settled years, or even decades, after the related loss events occur. Any estimates and assumptions made as part of the reserving process could prove to be inaccurate due to several factors, including the fact that for certain lines of business relatively limited historical information has been reported to us through December 31, 2021. Accordingly, the reserving for incurred losses in these lines of business could be subject to greater variability. See Item 1A, "Risk Factors – Risks Relating to Our Industry, Business & Operations – Underwriting risks and reserving for losses are based on probabilities and related modeling which are subject to inherent uncertainties."

Mortgage Operations Supplemental Information

The mortgage segment's insurance in force ("IIF") and risk in force ("RIF") were as follows at December 31, 2021 and 2020:

(U.S. Dollars in millions)	December 31,			
	2021		2020	
	Amount	%	Amount	%
Insurance In Force (IIF) (1):				
U.S. primary mortgage insurance	$ 280,945	61.0	$ 280,579	66.2
U.S. credit risk transfer (CRT) and other (2)	110,018	23.9	103,535	24.4
International mortgage insurance/reinsurance (3)	69,655	15.1	39,425	9.3
Total	$ 460,618	100.0	$ 423,539	100.0
Risk In Force (RIF) (4):				
U.S. primary mortgage insurance	$ 70,619	84.3	$ 70,522	90.5
U.S. credit risk transfer (CRT) and other (2)	5,120	6.1	4,699	6.0
International mortgage insurance/reinsurance (3)	7,983	9.5	2,673	3.4
Total	$ 83,722	100.0	$ 77,894	100.0

(1) Represents the aggregate dollar amount of each insured mortgage loan's current principal balance.
(2) Includes all CRT transactions, which are predominantly with GSEs, and other U.S. reinsurance transactions.
(3) Includes risks primarily located in Australia.
(4) 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.

The insurance in force and risk in force for our U.S. primary mortgage insurance business by policy year were as follows at December 31, 2021:

(U.S. Dollars in millions)	IIF		RIF		Delinquency
	Amount	%	Amount	%	Rate (1)
Policy year:					
2011 and prior	$ 11,245	4.0	$ 2,509	3.6	9.24 %
2012	1,785	0.6	451	0.6	2.33 %
2013	4,206	1.5	1,148	1.6	2.63 %
2014	4,822	1.7	1,328	1.9	3.14 %
2015	8,703	3.1	2,340	3.3	2.67 %
2016	14,344	5.1	3,841	5.4	3.29 %
2017	13,128	4.7	3,436	4.9	4.09 %
2018	14,046	5.0	3,562	5.0	5.28 %
2019	25,841	9.2	6,467	9.2	3.13 %
2020	82,502	29.4	20,341	28.8	0.97 %
2021	100,323	35.7	25,196	35.7	0.29 %
Total	$ 280,945	100.0	$ 70,619	100.0	2.36 %

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

The insurance in force and risk in force for our U.S. primary mortgage insurance business by policy year were as follows at December 31, 2020:

(U.S. Dollars in millions)	IIF		RIF		Delinquency
	Amount	%	Amount	%	Rate (1)
Policy year:					
2011 and prior	$ 14,588	5.2	$ 3,327	4.7	11.36 %
2012	3,651	1.3	992	1.4	2.98 %
2013	7,546	2.7	2,107	3.0	3.30 %
2014	8,261	2.9	2,273	3.2	4.06 %
2015	15,032	5.4	4,048	5.7	3.72 %
2016	24,958	8.9	6,648	9.4	4.77 %
2017	24,748	8.8	6,413	9.1	5.52 %
2018	27,304	9.7	6,918	9.8	6.76 %
2019	48,304	17.2	12,001	17.0	4.61 %
2020	106,187	37.8	25,795	36.6	0.76 %
Total	$ 280,579	100.0	$ 70,522	100.0	4.19 %

(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 December 31, 2021 and 2020:

(U.S. Dollars in millions)	December 31,			
	2021		2020	
	Amount	%	Amount	%
Credit quality (FICO):				
>=740	$ 42,451	60.1	$ 40,774	57.8
680-739	23,646	33.5	24,498	34.7
620-679	4,196	5.9	4,837	6.9
<620	326	0.5	413	0.6
Total	$ 70,619	100.0	$ 70,522	100.0
Weighted average FICO score	746		743	
Loan-to-Value (LTV):				
95.01% and above	$ 7,538	10.7	$ 8,643	12.3
90.01% to 95.00%	38,829	55.0	37,877	53.7
85.01% to 90.00%	20,006	28.3	20,013	28.4
85.00% and below	4,246	6.0	3,989	5.7
Total	$ 70,619	100.0	$ 70,522	100.0
Weighted average LTV	92.8 %		92.8 %	
Total RIF, net of external reinsurance	$ 54,574		$ 56,658	

(U.S. Dollars in millions)	December 31,			
	2021		2020	
	Amount	%	Amount	%
Total RIF by State:				
Texas	$ 5,594	7.9	$ 5,636	8.0
California	5,559	7.9	5,261	7.5
Florida	3,303	4.7	3,632	5.2
Illinois	2,933	4.2	2,762	3.9
North Carolina	2,921	4.1	2,622	3.7
Minnesota	2,916	4.1	2,520	3.6
Georgia	2,902	4.1	2,959	4.2
Massachusetts	2,537	3.6	2,464	3.5
Michigan	2,492	3.5	2,073	2.9
Virginia	2,446	3.5	2,526	3.6
Others	37,016	52.4	38,067	54.0
Total	$ 70,619	100.0	$ 70,522	100.0

The following table provides supplemental disclosures for our U.S. primary mortgage insurance business related to insured loans and loss metrics for the years ended December 31, 2021 and 2020:

(U.S. Dollars in thousands, except loan and claim count)	Year Ended December 31,	
	2021	2020
Rollforward of insured loans in default:		
Beginning delinquent number of loans	52,234	20,163
New notices	35,554	102,324
Cures	(59,372)	(68,691)
Paid claims	(771)	(1,562)
Ending delinquent number of loans (1)	27,645	52,234
Ending number of policies in force (1)	1,171,835	1,245,771
Delinquency rate (1)	2.36 %	4.19 %
Losses:		
Number of claims paid	771	1,562
Total paid claims	$ 30,979	$ 64,903
Average per claim	$ 40.2	$ 41.6
Severity (2)	80.8 %	92.4 %
Average reserve per default (in thousands) (1)	$ 26.7	$ 12.6

(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 8 to 1 at December 31, 2021, compared to 9.3 to 1 at December 31, 2020.

Ceded Reinsurance

In the normal course of business, our insurance and mortgage insurance operations cede a portion of their premium on a quota share or excess of loss basis through treaty or facultative reinsurance agreements. Our reinsurance operations also obtain reinsurance whereby another reinsurer contractually agrees to indemnify it for all or a portion of the reinsurance risks underwritten by our reinsurance operations. Such arrangements, where one reinsurer provides reinsurance to another reinsurer, are usually referred to as “retrocessional reinsurance” arrangements. In addition, our reinsurance subsidiaries participate in “common account” retrocessional arrangements for certain pro rata treaties. Such arrangements reduce the effect of individual or aggregate losses to all companies participating on such treaties, including the reinsurers, such as our reinsurance operations, and the ceding company. Estimating reinsurance recoverables can be more subjective than estimating the underlying reserves for losses and loss adjustment expenses as discussed under the heading “Loss Reserves” above. In particular, reinsurance recoverables may be affected by deemed inuring reinsurance, industry losses reported by various statistical reporting services, and other factors. Reinsurance recoverables are recorded as assets, predicated on the reinsurers’ ability to meet their obligations under the reinsurance agreements. If the reinsurers are unable to satisfy their obligations under the agreements, our insurance or reinsurance operations would be liable for such defaulted amounts.

The availability and cost of reinsurance and retrocessional protection is subject to market conditions, which are beyond our control. Although we believe that our insurance and reinsurance operations have been successful in obtaining adequate reinsurance and retrocessional protection, it is not certain that they will be able to continue to obtain adequate protection at cost effective levels. As a result of such market conditions and other factors, our insurance, reinsurance and mortgage operations may not be able to successfully mitigate risk through reinsurance and retrocessional arrangements and may lead to increased volatility in our results of operations in future periods. See “Risk Factors—Risks Relating to Our Industry, Business and Operations—The failure of any of the loss limitation methods we employ could have a material adverse effect on our financial condition or results of operations.”

For purposes of managing risk, we reinsure a portion of our exposures, paying to reinsurers a part of the premiums received on the policies we write, and we may also use retrocessional protection. On a consolidated basis, ceded premiums written represented 29.3% of gross premiums written for 2021, compared to 26.3% for 2020. We monitor the financial condition of our reinsurers and attempt to place coverages only with substantial, financially sound carriers. If the financial condition of our reinsurers or retrocessionaires deteriorates, resulting in an impairment of their ability to make payments, we will be responsible for probable losses resulting from our inability to collect amounts due from such parties, as appropriate. We evaluate the credit worthiness of all the reinsurers to which we cede business. We report reinsurance recoverables net of an allowance for expected credit loss. The allowance is based upon our ongoing review of amounts outstanding, the financial condition of our reinsurers, amounts and form of collateral obtained and other relevant factors. A ratings based probability-of-default and loss-given-default methodology is used to estimate the allowance for expected credit loss. See “Risk Factors—Risks Relating to Our Industry, Business and Operations—We are exposed to credit risk in certain of our business operations” and “Financial Condition, Liquidity and Capital Resources” for further details.

We have entered into various aggregate excess of loss reinsurance agreements with various special purpose reinsurance companies domiciled in Bermuda. These are special purpose variable interest entities that are not consolidated in our financial results because we do not have the unilateral power to direct those activities that are significant to its economic performance. As of December 31, 2021, our estimated off-balance sheet maximum exposure to loss from such entities was $42.2 million. See note 12, “Variable Interest Entity and Noncontrolling Interests,” to

our consolidated financial statements in Item 8 for additional information.

Premium Revenues and Related Expenses

Insurance premiums written are generally recorded at the policy inception and are primarily earned on a pro rata basis over the terms of the policies for all products, usually 12 months. Premiums written include estimates in our insurance operations' programs, specialty lines, collateral protection business and for participation in involuntary pools. Such premium estimates are derived from multiple sources which include the historical experience of the underlying business, similar business and available industry information. Unearned premium reserves represent the portion of premiums written that relates to the unexpired terms of in-force insurance policies.

Reinsurance premiums written include amounts reported by brokers and ceding companies, supplemented by our own estimates of premiums where reports have not been received. The determination of premium estimates requires a review of our experience with the ceding companies, familiarity with each market, the timing of the reported information, an analysis and understanding of the characteristics of each line of business, and management's judgment of the impact of various factors, including premium or loss trends, on the volume of business written and ceded to us. On an ongoing basis, our underwriters review the amounts reported by these third parties for reasonableness based on their experience and knowledge of the subject class of business, taking into account our historical experience with the brokers or ceding companies. In addition, reinsurance contracts under which we assume business generally contain specific provisions which allow us to perform audits of the ceding company to ensure compliance with the terms and conditions of the contract, including accurate and timely reporting of information. Based on a review of all available information, management establishes premium estimates where reports have not been received. Premium estimates are updated when new information is received and differences between such estimates and actual amounts are recorded in the period in which estimates are changed or the actual amounts are determined. Premiums written are recorded based on the type of contracts we write. Premiums on our excess of loss and pro rata reinsurance contracts are estimated when the business is underwritten. For excess of loss contracts, premiums are recorded as written based on the terms of the contract. Estimates of premiums written under pro rata contracts are recorded in the period in which the underlying risks incept and are based on information provided by the brokers and the ceding companies. For multi-year reinsurance treaties which are payable in annual installments, generally, only the initial annual installment is included as premiums written at policy inception due to the ability of the reinsured to commute or cancel coverage during the term of the policy. The remaining annual installments are included as premiums written at each successive anniversary date within the multi-year term.

Reinstatement premiums for our insurance and reinsurance operations are recognized at the time a loss event occurs, where coverage limits for the remaining life of the contract are reinstated under pre-defined contract terms. Reinstatement premiums, if obligatory, are fully earned when recognized. The accrual of reinstatement premiums is based on an estimate of losses and loss adjustment expenses, which reflects management's judgment, as described above in "—Loss Reserves."

The amount of reinsurance premium estimates included in premiums receivable and the amount of related acquisition expenses by type of business were as follows at December 31, 2021:

	December 31, 2021		
	Gross Amount	Acquisition Expenses	Net Amount
Other specialty	$ 421,504	$ (118,878)	$ 302,626
Property excluding property catastrophe	288,622	(88,745)	199,877
Casualty	275,889	(76,342)	199,547
Marine and aviation	149,161	(34,338)	114,823
Property catastrophe	25,097	(2,723)	22,374
Other	48,733	(4,142)	44,591
Total	$ 1,209,006	$ (325,168)	$ 883,838

Premium estimates are reviewed by management at least quarterly. Such review includes a comparison of actual reported premiums to expected ultimate premiums along with a review of the aging and collection of premium estimates. Based on management's review, the appropriateness of the premium estimates is evaluated, and any adjustment to these estimates is recorded in the period in which it becomes known. Adjustments to premium estimates could be material and such adjustments could directly and significantly impact earnings favorably or unfavorably in the period they are determined because the estimated premium may be fully or substantially earned.

A significant portion of amounts included as premiums receivable, which represent estimated premiums written, net of commissions, are not currently due based on the terms of the underlying contracts. Based on currently available information, we report premiums receivable net of an allowance for expected credit loss. We monitor credit risk associated with premiums receivable through our ongoing review of amounts outstanding, aging of the receivable, historical data and counterparty financial strength measures.

Reinsurance premiums assumed, irrespective of the class of business, are generally earned on a pro rata basis over the terms of the underlying policies or reinsurance contracts.

Contracts and policies written on a “losses occurring” basis cover claims that may occur during the term of the contract or policy, which is typically 12 months. Accordingly, the premium is earned evenly over the term. Contracts which are written on a “risks attaching” basis cover claims which attach to the underlying insurance policies written during the terms of such contracts. Premiums earned on such contracts usually extend beyond the original term of the reinsurance contract, typically resulting in recognition of premiums earned over a 24-month period.

Certain of our reinsurance contracts include provisions that adjust premiums or acquisition expenses based upon the experience under the contracts. Premiums written and earned, as well as related acquisition expenses, are recorded based upon the projected experience under such contracts.

Retroactive reinsurance reimburses a ceding company for liabilities incurred as a result of past insurable events covered by the underlying policies reinsured. In certain instances, reinsurance contracts cover losses both on a prospective basis and on a retroactive basis and, accordingly, we bifurcate the prospective and retrospective elements of these reinsurance contracts and accounts for each element separately where practical. Underwriting income generated in connection with retroactive reinsurance contracts is deferred and amortized into income over the settlement period while losses are charged to income immediately. Subsequent changes in estimated amount or timing of cash flows under such retroactive reinsurance contracts are accounted for by adjusting the previously deferred amount to the balance that would have existed had the revised estimate been available at the inception of the reinsurance transaction, with a corresponding charge or credit to income.

Mortgage guaranty insurance policies are contracts that are generally non-cancelable by the insurer, are renewable at a fixed price, and provide for payment of premiums on a monthly, annual or single basis. Upon renewal, we are not able to re-underwrite or re-price our policies. Consistent with industry accounting practices, premiums written on a monthly basis are earned as coverage is provided. Premiums written on an annual basis are amortized on a monthly pro rata basis over the year of coverage. Primary mortgage insurance premiums written on policies covering more than one year are referred to as single premiums. A portion of the revenue from single premiums is recognized in premiums earned in the current period, and the remaining portion is deferred as unearned premiums and earned over the estimated expiration of risk of the policy. If single premium policies related to insured loans are canceled for any reason and the policy is a non-refundable product, the remaining unearned premium related to each canceled policy is recognized as earned premium upon notification of the cancellation.

Unearned premiums represent the portion of premiums written that is applicable to the estimated unexpired risk of insured loans. A portion of premium payments may be refundable if the insured cancels coverage, which generally occurs when the loan is repaid, the loan amortizes to a sufficiently low amount to trigger a lender permitted or legally required cancellation, or the value of the property has increased sufficiently in accordance with the terms of the contract. Premium refunds reduce premiums earned in the consolidated statements of income. Generally, only unearned premiums are refundable.

Acquisition costs that are directly related and incremental to the successful acquisition or renewal of business are deferred and amortized based on the type of contract. For property and casualty insurance and reinsurance contracts, deferred acquisition costs are amortized over the period in which the related premiums are earned. Consistent with mortgage insurance industry accounting practice, amortization of acquisition costs related to the mortgage insurance contracts for each underwriting year’s book of business is recorded in proportion to estimated gross profits. Estimated gross profits are comprised of earned premiums and losses and loss adjustment expenses. For each underwriting year, we estimate the rate of amortization to reflect actual experience and any changes to persistency or loss development.

Acquisition expenses and other expenses related to our underwriting operations that vary with, and are directly related to, the successful acquisition or renewal of business are deferred and amortized based on the type of contract. Our insurance and reinsurance operations capitalize incremental direct external costs that result from acquiring a contract but do not capitalize salaries, benefits and other internal underwriting costs. For our mortgage insurance operations, which include a substantial direct sales force, both external and certain internal direct costs are deferred and amortized. Deferred acquisition costs are carried at their estimated realizable value and take into account anticipated losses and loss adjustment expenses, based on historical and current experience, and anticipated investment income.

A premium deficiency occurs if the sum of anticipated losses and loss adjustment expenses, unamortized acquisition costs and maintenance costs and anticipated investment income exceed unearned premiums. A premium deficiency reserve (“PDR”) is recorded by charging any unamortized acquisition costs to expense to the extent required in order to eliminate the deficiency. If the premium deficiency exceeds unamortized acquisition costs then a liability is accrued for the excess deficiency.

To assess the need for a PDR on our mortgage exposures, we develop loss projections based on modeled loan defaults related to our current policies in force. This projection is based on recent trends in default experience, severity and

rates of defaulted loans moving to claim, as well as recent trends in the rate at which loans are prepaid, and incorporates anticipated interest income. Evaluating the expected profitability of our existing mortgage insurance business and the need for a PDR for our mortgage business involves significant reliance upon assumptions and estimates with regard to the likelihood, magnitude and timing of potential losses and premium revenues. The models, assumptions and estimates we use to evaluate the need for a PDR may prove to be inaccurate, especially during an extended economic downturn or a period of extreme market volatility and uncertainty.

No premium deficiency charges were recorded by us during 2021 or 2020.

Fair Value Measurements

We review our securities measured at fair value and discuss the proper classification of such investments with investment advisors and others. See note 10, "Fair Value," to our consolidated financial statements in Item 8 for a summary of our financial assets and liabilities measured at fair value at December 31, 2021 by valuation hierarchy.

Reclassifications

We have reclassified the presentation of certain prior year information to conform to the current presentation, including the correct presentation of 'income (loss) from operating affiliates' on its consolidated statements of income for all periods presented to reclass such item from 'other income (loss)'. We also changed the presentation of 'investment in operating affiliates' on our consolidated balance sheet for all periods presented to reclass such item from 'other assets'. Such reclassifications had no effect on our net income, shareholders' equity or cash flows.

Significant Accounting Pronouncements

For all other significant accounting policies see note 3, "Significant Accounting Policies" and note 3-(s), "Recent Accounting Pronouncements" to our consolidated financial statements in Item 8 for disclosures concerning our companies significant accounting policies and recent accounting pronouncements.

FINANCIAL CONDITION

Investable Assets

At December 31, 2021, total investable assets held by Arch were $27.4 billion.

Investable Assets Held by Arch

The Finance, Investment and Risk Committee ("FIR") of our board of directors establishes our investment policies and sets the parameters for creating guidelines for our investment managers. The FIR reviews the implementation of the investment strategy on a regular basis. Our current approach stresses preservation of capital, market liquidity and diversification of risk. While maintaining our emphasis on preservation of capital and liquidity, we expect our portfolio to become more diversified and, as a result, we may expand into areas which are not currently part of our investment strategy. Our Chief Investment Officer administers the investment portfolio, oversees our investment managers and formulates investment strategy in conjunction with the FIR. At December 31, 2021, approximately $18.5 billion, or 67%, of total investable assets held by Arch were internally managed, compared to $19.2 billion, or 71%, at December 31, 2020.

The following table summarizes the fair value of investable assets held by Arch:

Investable assets (1):	Estimated Fair Value	% of Total
December 31, 2021		
Fixed maturities (2)	$18,414,807	67.1
Short-term investments (2)	1,832,522	6.7
Cash	858,668	3.1
Equity securities (2)	1,830,663	6.7
Other investments (2)	1,432,553	5.2
Investments accounted for using the equity method	3,077,611	11.2
Securities transactions entered into but not settled at the balance sheet date	(4,671)	—
Total investable assets held by Arch	$27,442,153	100.0
Average effective duration (in years)	2.70	
Average S&P/Moody's credit ratings (4)	AA-/Aa3	
Embedded book yield (5)	1.63 %	
December 31, 2020		
Fixed maturities (2)	$18,771,296	69.9
Short-term investments (2)	2,063,240	7.7
Cash	694,997	2.6
Equity securities (2)	1,436,104	5.3
Other investments (2)	1,480,347	5.5
Other investable assets (3)	500,000	1.9
Investments accounted for using the equity method	2,047,889	7.6
Securities transactions entered into but not settled at the balance sheet date	(137,578)	(0.5)
Total investable assets held by Arch	$26,856,295	100.0
Average effective duration (in years)	3.01	
Average S&P/Moody's credit ratings (4)	AA/Aa2	
Embedded book yield (5)	1.56 %	

(1) In securities lending transactions, we receive collateral in excess of the fair value of the securities pledged. For purposes of this table, we have excluded the collateral received under securities lending, at fair value and included the securities pledged under securities lending, at fair value.
(2) Includes investments carried as available for sale, at fair value and at fair value under the fair value option.
(3) Participation interests in a receivable of a reverse repurchase agreement.
(4) Average credit ratings on our investment portfolio on securities with ratings by Standard & Poor's Rating Services ("S&P") and Moody's Investors Service ("Moody's").
(5) Before investment expenses.

The following table summarizes our fixed maturities and fixed maturities pledged under securities lending agreements ("Fixed Maturities") by type:

	Estimated Fair Value	% of Total
December 31, 2021		
Corporate bonds	$ 6,941,879	37.7
Mortgage backed securities	408,477	2.2
Municipal bonds	404,666	2.2
Commercial mortgage backed securities	1,046,484	5.7
U.S. government and government agencies	4,772,764	25.9
Non-U.S. government securities	2,144,079	11.6
Asset backed securities	2,696,458	14.6
Total	$ 18,414,807	100.0
December 31, 2020		
Corporate bonds	$ 8,039,745	42.8
Mortgage backed securities	616,619	3.3
Municipal bonds	492,734	2.6
Commercial mortgage backed securities	390,990	2.1
U.S. government and government agencies	5,354,863	28.5
Non-U.S. government securities	2,310,157	12.3
Asset backed securities	1,566,188	8.3
Total	$ 18,771,296	100.0

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
December 31, 2021		
U.S. government and gov't agencies (1)	$ 5,063,191	27.5
AAA	3,783,386	20.5
AA	2,459,413	13.4
A	2,943,594	16.0
BBB	2,936,398	15.9
BB	501,588	2.7
B	371,747	2.0
Lower than B	43,756	0.2
Not rated	311,734	1.7
Total	$ 18,414,807	100.0
December 31, 2020		
U.S. government and gov't agencies (1)	$ 5,963,758	31.8
AAA	3,117,046	16.6
AA	2,063,738	11.0
A	3,760,280	20.0
BBB	2,699,201	14.4
BB	574,189	3.1
B	268,095	1.4
Lower than B	54,795	0.3
Not rated	270,194	1.4
Total	$ 18,771,296	100.0

(1) Includes U.S. government-sponsored agency 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
December 31, 2021			
0-10%	$ 12,231,146	$ (166,867)	97.6
10-20%	16,884	(2,412)	1.4
20-30%	2,593	(759)	0.4
Greater than 30%	684	(916)	0.5
Total	$ 12,251,307	$ (170,954)	100.0
December 31, 2020			
0-10%	$ 3,583,981	$ (55,542)	79.4
10-20%	95,495	(12,183)	17.4
20-30%	1,061	(406)	0.6
Greater than 30%	1,249	(1,785)	2.6
Total	$ 3,681,786	$ (69,916)	100.0

The following table summarizes our top ten exposures to fixed income corporate issuers by fair value at December 31, 2021, excluding guaranteed amounts and covered bonds:

	Estimated Fair Value	Credit Rating (1)
Bank of America Corporation	$ 406,807	A-/A2
JPMorgan Chase & Co.	338,647	A-/A2
The Goldman Sachs Group, Inc.	237,628	BBB+/A2
Citigroup Inc.	220,915	BBB+/A3
Morgan Stanley	198,106	BBB+/A1
Wells Fargo & Company	183,261	BBB+/A1
Blackstone Inc.	128,138	NA/Baa3
Dai-ichi Life Holdings, Inc.	109,924	AA-/A1
Apple Inc.	109,008	AA+/Aaa
Westpac Banking Corporation	107,678	AA-/Aa3
Total	$ 2,040,112	

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

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

	Agencies	Investment Grade	Below Investment Grade	Total
Dec. 31, 2021				
RMBS	$ 268,229	$ 129,296	$ 10,952	$ 408,477
CMBS	22,198	926,302	97,984	1,046,484
ABS	—	2,543,907	152,551	2,696,458
Total	$ 290,427	$ 3,599,505	$ 261,487	$ 4,151,419
Dec. 31, 2020				
RMBS	$ 584,499	$ 4,102	$ 28,018	$ 616,619
CMBS	24,396	342,491	24,103	390,990
ABS	—	1,403,137	163,051	1,566,188
Total	$ 608,895	$ 1,749,730	$ 215,172	$ 2,573,797

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

	December 31,	
	2021	2020
Equities (1)	$ 883,722	$ 676,437
Exchange traded funds		
Fixed income (2)	455,467	341,139
Equity and other (3)	491,474	418,528
Total	$ 1,830,663	$ 1,436,104

(1) Primarily in consumer non-cyclical, technology, communications, consumer cyclical and financial at December 31, 2021.
(2) Primarily in corporate and MBS at December 31, 2021.
(3) Primarily in large cap stocks, foreign equities, technology and utilities at December 31, 2021.

The following table summarizes our other investments and other investable assets:

	December 31,	
	2021	2020
Lending	536,345	572,636
Term loan investments	484,950	380,193
Investment grade fixed income	147,810	138,646
Private equity	91,126	48,750
Energy	81,692	65,813
Credit related funds	70,278	90,780
Infrastructure	20,352	165,516
Real estate	—	18,013
Total fair value option	1,432,553	1,480,347
Other investable assets	—	500,000
Total other investments	$ 1,432,553	$ 1,980,347

The following table summarizes our investments accounted for using the equity method, by strategy:

	December 31,	
	2021	2020
Credit related funds	$ 1,022,334	$ 740,060
Private equity	436,042	235,289
Real estate	396,395	258,518
Equities	395,090	343,058
Lending	376,649	179,629
Infrastructure	230,070	175,882
Energy	119,141	115,453
Fixed income	101,890	—
Total	$ 3,077,611	$ 2,047,889

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 11, "Derivative Instruments," to our consolidated financial statements in Item 8 for additional disclosures concerning 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 10, "Fair Value," to our consolidated financial statements in Item 8 for a summary of our financial assets and liabilities measured at fair value at December 31, 2021 and 2020 segregated by level in the fair value hierarchy.

Reinsurance Recoverables

The following table details our reinsurance recoverables at December 31, 2021:

	% of Total	A.M. Best Rating (1)
Somers Re	6.7	A-
Fortitude Reinsurance Company Ltd.	2.4	A
Hannover Rück SE	1.8	A+
Swiss Reinsurance America Corporation	1.7	A+
Partner Reinsurance Company of the U.S.	1.4	A+
Everest Reinsurance Company	1.4	A+
Munich Reinsurance America, Inc.	1.3	A+
XL Re	1.2	A+
Lloyd's syndicates (2)	1.1	A
Berkley Insurance Company	1.0	A+
All other -- "A-" or better	49.7	
All other -- rated carriers	0.1	
All other -- not rated (3)	30.2	
Total	100.0	

(1) The financial strength ratings are as of February 4, 2022 and were assigned by A.M. Best based on its opinion of the insurer's financial strength as of such date. An explanation of the ratings listed in the table follows: the rating of "A+" is designated "Superior"; and the "A" rating is designated "Excellent."

(2) The A.M. Best group rating of "A" (Excellent) has been applied to all Lloyd's syndicates.

(3) Over 91% of such amount is collateralized through reinsurance trusts, funds withheld arrangements, letters of credit or other.

See note 8, "Reinsurance," to our consolidated financial statements in Item 8 for further details.

Reserves for Losses and Loss Adjustment Expenses

We establish 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. See "Management's Discussion and Analysis of Financial Condition and Results of Operations—Summary of Critical Accounting Estimates—Loss Reserves" and see Item 1 "Business—Reserves" for further details.

Shareholders' Equity and Book Value per Share

Total shareholders' equity available to Arch was $13.5 billion at December 31, 2021, compared to $13.1 billion at December 31, 2020. The increase in 2021 primarily reflected the impact of underwriting returns and income from operating affiliates, partially offset by the impact of a higher level of catastrophic activity on underwriting returns.

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

(U.S. dollars in thousands, except share data)	December 31, 2021	December 31, 2020
Total shareholders' equity available to Arch	$ 13,545,896	$ 13,105,886
Less preferred shareholders' equity	830,000	780,000
Common shareholders' equity available to Arch	$ 12,715,896	$ 12,325,886
Common shares and common share equivalents outstanding, net of treasury shares (1)	378,923,894	406,720,642
Book value per share	$ 33.56	$ 30.31

(1) Excludes the effects of 17,083,160 and 17,839,333 stock options and 729,636 and 1,153,784 restricted stock and performance units outstanding at December 31, 2021 and 2020, 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. In 2021, Arch Capital completed a $500.0 million underwritten public offering of 20.0 million depositary shares, each of which represents a 1/1,000th interest in a share of its 4.55% Non-Cumulative Series G Preferred Shares. See note 21, "Shareholder's Equity."

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.

In 2021, Arch Capital received dividends of $1.8 billion from Arch Reinsurance Ltd. ("Arch Re Bermuda"), our Bermuda-based reinsurer and insurer which can pay approximately $3.8 billion to Arch Capital in 2022 without providing an affidavit to the Bermuda Monetary Authority ("BMA"). In 2021, Arch-U.S. received $200.0 million of dividends from Arch U.S. MI Holdings Inc., a subsidiary of Arch-U.S., which received a total of $300.0 million of ordinary and extraordinary dividends, $140 million from United Guaranty Residential Insurance Company ("UGRIC") and $160 million from Arch Mortgage Insurance Company ("AMIC").

Our insurance and reinsurance operations provide liquidity in that premiums are received in advance, sometimes substantially in advance, of the time losses are paid. The period of time from the occurrence of a claim through the settlement of the liability may extend many years into the future. Sources of liquidity include cash flows from operations, financing arrangements or routine sales of investments.

As part of our investment strategy, we seek to establish a level of cash and highly liquid short-term and intermediate-term securities which, combined with expected cash flow, is believed by us to be adequate to meet our foreseeable payment obligations. However, due to the nature of our operations, cash flows are affected by claim payments that may comprise large payments on a limited number of claims and which can fluctuate from year to year. We believe that our liquid investments and cash flow will provide us with sufficient liquidity in order to meet our claim payment obligations. However, the timing and amounts of actual claim payments related to recorded Loss Reserves vary based on many factors, including large individual losses, changes in the legal environment, as well as general market conditions. The ultimate amount of the claim payments could differ materially from our estimated amounts. Certain lines of business written by us, such as excess casualty, have loss experience characterized as low frequency and high severity. The foregoing may result in significant variability in loss payment patterns. The impact of this variability can be exacerbated by the fact that the timing of the receipt of reinsurance recoverables owed to us may be slower than anticipated by us. Therefore, the irregular timing of claim payments can create significant variations in cash flows from operations between periods and may require us to utilize other sources of liquidity to make these payments, which may include the sale of investments or utilization of existing or new credit facilities or capital market transactions. If the source of liquidity is the sale of investments, we may be forced to sell such investments at a loss, which may be material.

We expect that our liquidity needs, including our anticipated insurance obligations and operating and capital expenditure needs, for the next twelve months, at a minimum, 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.

Dividend Restrictions

Arch Capital has no material restrictions on its ability to make distributions to shareholders. However, the ability of our regulated insurance and reinsurance subsidiaries to pay dividends or make distributions or other payments to us is limited by the applicable local laws and relevant regulations of the various countries and states in which we operate. See note 25, "Statutory Information," to our consolidated financial statements in Item 8 for additional information on dividend restrictions.

The payment of dividends from Arch Re Bermuda is, under certain circumstances, limited under Bermuda law, which requires our Bermuda operating subsidiary to maintain certain measures of solvency and liquidity.

Our U.S. insurance and reinsurance subsidiaries are subject to insurance laws and regulations in the jurisdictions in which they operate. The ability of our regulated insurance subsidiaries to pay dividends or make distributions is dependent on their ability to meet applicable regulatory standards. These regulations include restrictions that limit the amount of dividends or other distributions, such as loans or cash advances, available to shareholders without prior approval of the insurance regulatory authorities. Each state requires prior regulatory approval of any payment of extraordinary dividends.

We also have insurance subsidiaries that are the parent company for other insurance subsidiaries, which means that dividends and other distributions will be subject to multiple layers of regulations in order for our insurance subsidiaries to be able to dividend funds to Arch Capital. The inability of the subsidiaries of Arch Capital to pay dividends and other permitted distributions could have a material adverse effect on Arch Capital's cash requirements and our ability to make principal, interest and dividend payments on the senior notes, preferred shares and common shares.

In addition to meeting applicable regulatory standards, the ability of our insurance and reinsurance subsidiaries to pay dividends is also constrained by our dependence on the financial strength ratings of our insurance and reinsurance subsidiaries from independent rating agencies. The ratings from these agencies depend to a large extent on the capitalization levels of our insurance and reinsurance subsidiaries. We believe that Arch Capital has sufficient cash resources and available dividend capacity to service its indebtedness and other current outstanding obligations.

Restricted Assets

Our insurance, reinsurance and mortgage insurance subsidiaries are required to maintain assets on deposit, which primarily consist of fixed maturities, with various regulatory authorities to support their operations. The assets on deposit are available to settle insurance and reinsurance liabilities to third parties. Our insurance and reinsurance subsidiaries maintain assets in trust accounts as collateral for insurance and reinsurance transactions with affiliated companies and also have investments in segregated portfolios primarily to provide collateral or guarantees for letters of credit to third parties. At December 31, 2021 and 2020, such amounts approximated $8.2 billion and $7.7 billion, respectively.

Our investments in certain securities, including certain fixed income and structured securities, investments in funds accounted for using the equity method, other alternative investments and investments in operating affiliates may be illiquid due to contractual provisions or investment market conditions. If we require significant amounts of cash on short notice in excess of anticipated cash requirements, then we may have difficulty selling these investments in a timely manner or may be forced to sell or terminate them at unfavorable values. Our unfunded investment commitments totaled approximately $3.0 billion at December 31, 2021 and are callable by our investment managers. The timing of the funding of investment commitments is uncertain and may require us to access cash on short notice.

Cash Flows

The following table summarizes our cash flows from operating, investing and financing activities, excluding amounts related to the 'other' segment:

	Year Ended December 31,	
	2021	2020
Total cash provided by (used for):		
Operating activities	$ 3,380,700	$ 2,705,054
Investing activities	(1,870,885)	(3,301,816)
Financing activities	(1,243,613)	856,771
Effects of exchange rate changes on foreign currency cash	(30,524)	17,822
Increase (decrease) in cash	$ 235,678	$ 277,831

Cash provided by operating activities for 2021 was higher than in 2020, primarily reflected a higher level of premiums collected than in the 2020 period.

Cash used for investing activities for 2021 was lower than in 2020. Activity for 2021 period reflected cash used to invest in Coface and Somers, while the 2020 period reflected a higher level of securities purchased, and the investing of proceeds from our issuance of the senior notes.

Cash used for financing activities for 2021 was higher than in 2020. Activity for 2021 period, primarily reflected $485.8 million inflow from issuance of preferred shares, $450.0 million related to redemption of our Series E preferred shares and $1.2 billion of repurchases under our share repurchase program. Activity for the 2020 period primarily reflected the

issuance of $1.0 billion of our senior notes and $83.5 million of repurchases under our share repurchase program.

Investments

At December 31, 2021, our investable assets were $27.4 billion. The primary goals of our asset liability management process are to meet our insurance liabilities, manage the interest rate risk embedded in those insurance liabilities and maintain sufficient liquidity to cover fluctuations in projected liability cash flows, including debt service obligations. Generally, the expected principal and interest payments produced by our fixed income portfolio adequately fund the estimated runoff of our insurance reserves. Although this is not an exact cash flow match in each period, the substantial degree by which the fair value of the fixed income portfolio exceeds the expected present value of the net insurance liabilities, as well as the positive cash flow from newly sold policies and the large amount of high quality liquid bonds, provide assurance of our ability to fund the payment of claims and to service our outstanding debt without having to sell securities at distressed prices or access credit facilities. Please refer to Item 1A "Risk Factors" for a discussion of other risks relating to our business and investment portfolio.

CAPITAL RESOURCES

The following table provides an analysis of our capital structure:

(U.S. dollars in thousands, except share data)	December 31,	
	2021	2020
Senior notes	$ 2,724,394	$ 2,723,423
Shareholders' equity available to Arch:		
Series E non-cumulative preferred shares	—	450,000
Series F non-cumulative preferred shares	330,000	330,000
Series G non-cumulative preferred shares	500,000	—
Common shareholders' equity	12,715,896	12,325,886
Total	$13,545,896	$13,105,886
Total capital available to Arch	$16,270,290	$15,829,309
Debt to total capital (%)	16.7	17.2
Preferred to total capital (%)	5.1	4.9
Debt and preferred to total capital (%)	21.8	22.1

See note 19, "Debt and Financing Arrangement" and note 21, "Shareholder's Equity", to our consolidated financial statements in Item 8 for additional information on capital structure.

Capital Adequacy

We monitor our capital adequacy on a regular basis and will seek to adjust our capital base (up or down) according to the needs of our business. The future capital requirements of our business will depend on many factors, including our ability to write new business successfully and to establish premium rates and reserves at levels sufficient to cover losses. Our ability to underwrite is largely dependent upon the quality of our claims paying and financial strength ratings as evaluated by independent rating agencies. In particular, we require (1) sufficient capital to maintain our financial strength ratings, as issued by several ratings agencies, at a level considered necessary by management to enable our key operating subsidiaries to compete; (2) sufficient capital to enable our underwriting subsidiaries to meet the capital adequacy tests performed by statutory agencies in the U.S. and other key markets; and (3) our non-U.S. operating companies are required to post letters of credit and other forms of collateral that are necessary for them to operate as they are "non-admitted" under U.S. state insurance regulations.

In addition, AMIC and UGRIC (together, "Arch MI U.S.") are required to maintain compliance with the GSEs requirements, known as 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 as of December 31, 2021 with a PMIER sufficiency ratio of 197%, compared to 173% at December 31, 2020.

As part of our capital management program, we may seek to raise additional capital or may seek to return capital to our shareholders through share repurchases, cash dividends or other methods (or a combination of such methods). Any such determination will be at the discretion of our board of directors and will be dependent upon our profits, financial requirements and other factors, including legal restrictions, rating agency requirements and such other factors as our board of directors deems relevant.

To the extent that our existing capital is insufficient to fund our future operating requirements or maintain such ratings, we may need to raise additional funds through financings or limit our growth. We can provide no assurance that, if needed, we would be able to obtain additional funds through financing on satisfactory terms or at all. Any adverse developments in the financial markets, such as disruptions, uncertainty or volatility in the capital and credit markets, may result in realized and unrealized capital losses that could have

a material adverse effect on our results of operations, financial position and our businesses, and may also limit our access to capital required to operate our business. In addition to common share capital, we depend on external sources of finance to support our underwriting activities, which can be in the form (or any combination) of debt securities, preference shares, common equity and bank credit facilities providing loans and/or letters of credit.

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 U.S.-based insurance, reinsurance and mortgage insurance subsidiaries have entered into separate reinsurance arrangements with Arch Re Bermuda covering individual lines of business.

Except as described in the above paragraph, or where express reinsurance, guarantee or other financial support contractual arrangements are in place, each of Arch Capital's subsidiaries or affiliates is solely responsible for its own liabilities and commitments (and no other Arch Capital subsidiary or affiliate is so responsible). Any reinsurance arrangements, guarantees or other financial support contractual arrangements that are in place are solely for the benefit of the Arch Capital subsidiary or affiliate involved and third parties (creditors or insureds of such entity) are not express beneficiaries of such arrangements.

Share Repurchase Program

The board of directors of Arch Capital has authorized the investment in Arch Capital's common shares through a share repurchase program. Since the inception of the share repurchase program through December 31, 2021, Arch Capital has repurchased approximately 420.7 million common shares for an aggregate purchase price of $5.3 billion. At December 31, 2021, $1.2 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, 2022. The timing and amount of the repurchase transactions under this program will depend on a variety of factors, including market conditions, the development of the economy, corporate and regulatory considerations. We will continue to monitor our share price and, depending upon results of operations, market conditions and the development of the economy, as well as other factors, we will consider share repurchases on an opportunistic basis.

GUARANTOR INFORMATION

The below table provides a description of our senior notes payable at December 31, 2021:

Issuer/Due	Interest (Fixed)	Principal Amount	Carrying Amount
Arch Capital:			
May 1, 2034	7.350 %	$ 300,000	$ 297,488
June 30, 2050	3.635 %	1,000,000	988,720
Arch-U.S.:			
Nov. 1, 2043 (1)	5.144 %	500,000	495,063
Arch Finance:			
Dec. 15, 2026 (1)	4.011 %	500,000	497,633
Dec. 15, 2046 (1)	5.031 %	450,000	445,490
Total		$ 2,750,000	$ 2,724,394

(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 Capital and Arch-U.S. are each holding companies and, accordingly, they conduct substantially all of their operations through their operating subsidiaries. Arch Finance is a wholly owned subsidiary of Arch U.S. MI Holdings Inc., a U.S. holding company. As a result, Arch Capital, Arch-U.S. and Arch Finance's cash flows and their ability to service their debt depends upon the earnings of their operating subsidiaries and on their ability to distribute the earnings, loans or other payments from such subsidiaries to Arch Capital, Arch-U.S. and Arch Finance, respectively.

See note 19, "Debt and Financing Arrangements," to our consolidated financial statements in Item 8 for additional disclosures concerning our senior notes and revolving credit agreement borrowings. For additional information on our preferred shares, see note 21, "Shareholders' Equity," to our consolidated financial statements in Item 8.

During 2021 and 2020, we made interest payments of $131.0 million and $110.5 million respectively, related to our senior notes and other financing arrangements.

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

	December 31, 2021		December 31, 2020	
	Arch Capital	Arch-U.S.	Arch Capital	Arch-U.S.
Assets				
Total investments	$ 2,038	$ 137,124	$ 172	$ 396,547
Cash	16,317	18,392	18,932	11,368
Investment in operating affiliates	6,877		7,731	—
Due from subsidiaries and affiliates	—	26,000	—	201,515
Other assets	9,615	37,040	10,659	34,405
Total assets	$ 34,847	$ 218,556	$ 37,494	$ 643,835
Liabilities				
Senior notes	1,286,208	495,063	1,285,867	494,944
Due to subsidiaries and affiliates	—	521,839	—	586,805
Other liabilities	24,767	47,410	23,270	41,876
Total liabilities	1,310,975	1,064,312	1,309,137	1,123,625
Non-cumulative preferred shares	$ 830,000	$ —	$ 780,000	$ —

	Year Ended December 31, 2021		Year Ended December 31, 2020	
	Arch Capital	Arch-U.S.	Arch Capital	Arch-U.S.
Revenues				
Net investment income	$ 1,524	$ 11,596	$ 53	$ 18,084
Net realized gains (losses)	—	72,437	(2,110)	26,096
Equity in net income (loss) of investments accounted for using the equity method	—	18,149	—	2,507
Total revenues	1,524	102,182	(2,057)	46,687
Expenses				
Corporate expenses	71,818	5,875	65,566	7,227
Interest expense	58,741	47,292	40,445	47,566
Net foreign exchange (gains) losses	7	—	3	—
Total expenses	130,566	53,167	106,014	54,793
Income (loss) before income taxes	(129,042)	49,015	(108,071)	(8,106)
Income tax (expense) benefit	—	(12,513)	—	2,689
Income (loss) from operating affiliates	(590)	—	(437)	—
Net income available to Arch	(129,632)	36,502	(108,508)	(5,417)
Preferred dividends	(48,343)	—	(41,612)	—
Loss on redemption of preferred shares	(15,101)	—	—	—
Net income available to Arch common shareholders	$ (193,076)	$ 36,502	$ (150,120)	$ (5,417)

CONTRACTUAL OBLIGATIONS AND COMMITMENTS

Contractual Obligations

The following table provides an analysis of our contractual commitments at December 31, 2021:

	Payment due by period				
	Total	**2022**	**2023 and 2024**	**2025 and 2026**	**Thereafter**
Operating activities					
Estimated gross payments for losses and loss adjustment expenses (1)	$ 17,757,156	$ 4,893,981	$ 5,830,065	$ 2,711,728	$ 4,321,382
Deposit accounting liabilities (2)	11,838	6,167	2,043	382	3,246
Contractholder payables (3)	1,832,127	584,992	632,551	252,498	362,086
Operating lease obligations	148,598	32,064	48,837	31,275	36,422
Purchase obligations	114,143	58,191	50,991	4,961	—
Investing activities					
Unfunded investment commitments (4)	2,973,492	2,973,492	—	—	—
Financing activities					
Senior notes (including interest payments)	5,290,334	126,815	253,629	251,958	4,657,932
Total contractual obligations and commitments	$ 28,127,688	$ 8,675,702	$ 6,818,116	$ 3,252,802	$ 9,381,068

(1) The estimated expected contractual commitments related to the reserves for losses and loss adjustment expenses are presented on a gross basis (*i.e.*, not reflecting any corresponding reinsurance recoverable amounts that would be due to us). It should be noted that until a claim has been presented to us, determined to be valid, quantified and settled, there is no known obligation on an individual transaction basis, and while estimable in the aggregate, the timing and amount contain significant uncertainty.
(2) The estimated expected contractual commitments related to deposit accounting liabilities have been estimated using projected cash flows from the underlying contracts. It should be noted that, due to the nature of such liabilities, the timing and amount contain significant uncertainty.
(3) Certain insurance policies written by our insurance operations feature large deductibles, primarily in construction and national accounts lines. Under such contracts, we are obligated to pay the claimant for the full amount of the claim and are subsequently reimbursed by the policyholder for the deductible amount. In the event we are unable to collect from the policyholder, we would be liable for such defaulted amounts.
(4) Unfunded investment commitments are callable by our investment managers. We have assumed that such investments will be funded in the next year but the funding may occur over a longer period of time, due to market conditions and other factors.

Letter of Credit and Revolving Credit Facilities

In the normal course of its operations, the Company enters into agreements with financial institutions to obtain secured and unsecured credit facilities.

On December 17, 2019 Arch Capital and certain of its subsidiaries entered into an $750.0 million five-year credit facility (the "Credit Facility") with a syndication of lenders. The Credit Facility consists of a $250.0 million secured facility for letters of credit (the "Secured Facility") and a $500.0 million unsecured facility for revolving loans and letters of credit (the "Unsecured Facility"). Obligations of each borrower under the Secured Facility for letters of credit are secured by cash and eligible securities of such borrower held in collateral accounts. Commitments under the Credit Facility may be increased up to, but not exceeding, an aggregate of $1.3 billion. Arch Capital has a one-time option to convert any or all outstanding revolving loans of Arch Capital and/or Arch-U.S. to term loans with the same terms as the revolving loans except that any prepayments may not be re-borrowed. Arch-U.S. guarantees the obligations of Arch Capital, and Arch Capital guarantees the obligations of Arch-U.S. Borrowings of revolving loans may be made at a variable rate based on LIBOR or an alternative base rate at the option of Arch Capital. Arch Capital and its lenders may agree on a LIBOR successor rate at the appropriate time to address the replacement of LIBOR. Secured letters of credit are available for issuance on behalf of Arch Capital insurance and reinsurance subsidiaries. The Credit Facility is structured such that each party that requests a letter of credit or borrowing does so only for itself and for only its own obligations.

The Credit Facility contains certain restrictive covenants customary for facilities of this type, including restrictions on indebtedness, consolidated tangible net worth, minimum shareholders' equity levels and minimum financial strength ratings. Arch Capital and its subsidiaries which are party to the agreement were in compliance with all covenants contained therein at December 31, 2021.

See note 19, "Debt and Financing Arrangements," to our consolidated financial statements in Item 8 for additional disclosures concerning our senior notes and revolving credit agreement borrowings.

RATINGS

Our ability to underwrite business is affected by the quality of our claims paying ability and financial strength ratings as evaluated by independent agencies. Such ratings from third party internationally recognized statistical rating organizations or agencies are instrumental in establishing the financial security of companies in our industry. We believe that the primary users of such ratings include commercial and investment banks, policyholders, brokers, ceding companies and investors. Insurance ratings are also used by insurance and reinsurance intermediaries as an important means of assessing the financial strength and quality of insurers and reinsurers, and are often an important factor in the decision by an insured or intermediary of whether to place business with a particular insurance or reinsurance provider. Periodically, rating agencies evaluate us to confirm that we continue to meet their criteria for the ratings assigned to us by them. S&P, Moody's, A.M. Best Company and Fitch Ratings are ratings agencies which have assigned financial strength ratings to one or more of Arch Capital's subsidiaries.

If we are not able to obtain adequate capital, our business, results of operations and financial condition could be adversely affected, which could include, among other things, the following possible outcomes: (1) potential downgrades in the financial strength ratings assigned by ratings agencies to our operating subsidiaries, which could place those operating subsidiaries at a competitive disadvantage compared to higher-rated competitors; (2) reductions in the amount of business that our operating subsidiaries are able to write in order to meet capital adequacy-based tests enforced by statutory agencies; and (3) any resultant ratings downgrades could, among other things, affect our ability to write business and increase the cost of bank credit and letters of credit. In addition, under certain of the reinsurance agreements assumed by our reinsurance operations, upon the occurrence of a ratings downgrade or other specified triggering event with respect to our reinsurance operations, such as a reduction in surplus by specified amounts during specified periods, our ceding company clients may be provided with certain rights, including, among other things, the right to terminate the subject reinsurance agreement and/or to require that our reinsurance operations post additional collateral.

The ratings issued on our companies by these agencies are announced publicly and are available directly from the agencies. Our website *www.archgroup.com (Investor Relations-Credit Ratings)* contains information about our ratings, but such information on our website is not incorporated by reference into this report.

CATASTROPHIC EVENTS 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. 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.

We have substantial exposure to unexpected, large losses resulting from future man-made catastrophic events, such as acts of war, acts of terrorism and political instability. These risks are inherently unpredictable. It is difficult to predict the timing of such events with statistical certainty or estimate the amount of loss any given occurrence will generate. It is not possible to completely eliminate our exposure to unforecasted or unpredictable events and, to the extent that losses from such risks occur, our financial condition and results of operations could be materially adversely affected. Therefore, claims for natural and man-made catastrophic events could expose us to large losses and cause substantial volatility in our results of operations, which could cause the value of our common shares to fluctuate widely. In certain instances, we specifically insure and reinsure risks resulting from terrorism. Even in cases where we attempt to exclude losses from terrorism and certain other similar risks from some coverages written by us, we may not be successful in doing so. Moreover, irrespective of the clarity and inclusiveness of policy language, there can be no assurance that a court or arbitration panel will limit enforceability of policy language or otherwise issue a ruling adverse to us.

We seek to limit our loss exposure by writing a number of our reinsurance contracts on an excess of loss basis, adhering to maximum limitations on reinsurance written in defined geographical zones, limiting program size for each client and prudent underwriting of each program written. In the case of proportional treaties, we may seek per occurrence limitations or loss ratio caps to limit the impact of losses from any one or series of events. In our insurance operations, we seek to limit our exposure through the purchase of reinsurance. We cannot be certain that any of these loss limitation methods will be effective. We also seek to limit our loss exposure by geographic diversification. Geographic zone limitations involve significant underwriting judgments, including the determination of the area of the zones and the inclusion of a particular policy within a particular zone's limits. There can

be no assurance that various provisions of our policies, such as limitations or exclusions from coverage or choice of forum, will be enforceable in the manner we intend. Disputes relating to coverage and choice of legal forum may also arise. Underwriting is inherently a matter of judgment, involving important assumptions about matters that are inherently unpredictable and beyond our control, and for which historical experience and probability analysis may not provide sufficient guidance. One or more catastrophic or other events could result in claims that substantially exceed our expectations, which could have a material adverse effect on our financial condition or our results of operations, possibly to the extent of eliminating our shareholders' equity.

For our natural catastrophe exposed business, we seek to limit the amount of exposure we will assume from any one insured or reinsured and the amount of the exposure to catastrophe losses from a single event in any geographic zone. We monitor our exposure to catastrophic events, including earthquake and wind and periodically reevaluate the estimated probable maximum pre-tax loss for such exposures. Our estimated probable maximum pre-tax loss is determined through the use of modeling techniques, but such estimate does not represent our total potential loss for such exposures.

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 January 1, 2022, our modeled peak zone catastrophe exposure is a windstorm affecting the Northeast U.S., with a net probable maximum pre-tax loss of $748 million, followed by windstorms affecting Florida Tri-County and the Gulf of Mexico with net probable maximum pre-tax losses of $727 million and $649 million, 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 in both periods. As of January 1, 2022, our modeled peak zone earthquake exposure (San Francisco area earthquake) represented approximately 78% of our peak zone catastrophe exposure, and our modeled peak zone international exposure (U.K. 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 total 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 January 1, 2022, our modeled RDS loss was 6.3% 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, including 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, Business and Operations” Depending on business opportunities and the mix of business that may comprise our insurance, reinsurance and mortgage portfolios, we may seek to adjust our self-imposed limitations on probable maximum pre-tax loss for catastrophe exposed business and mortgage default exposed business. See “—Summary of Critical Accounting Estimates

—Ceded Reinsurance” for a discussion of our catastrophe reinsurance programs.

MARKET SENSITIVE INSTRUMENTS AND RISK MANAGEMENT

Our investment results are subject to a variety of risks, including risks related to changes in the business, financial condition or results of operations of the entities in which we invest, as well as changes in general economic conditions and overall market conditions. We are also exposed to potential loss from various market risks, including changes in equity prices, interest rates and foreign currency exchange rates.

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 December 31, 2021. Market risk represents the risk of changes in the fair value of a financial instrument and consists of several components, including liquidity, basis and price risks.

The sensitivity analysis performed as of December 31, 2021 presents hypothetical losses in cash flows, earnings and fair values of market sensitive instruments which were held by us on December 31, 2021 and are sensitive to changes in interest rates and equity security prices. This risk management discussion and the estimated amounts generated from the following sensitivity analysis represent forward-looking statements of market risk assuming certain adverse market conditions occur. Actual results in the future may differ materially from these projected results due to actual developments in the global financial markets. The analysis methods used by us to assess and mitigate risk should not be considered projections of future events of losses.

The focus of the SEC’s market risk rules is on price risk. For purposes of specific risk analysis, we employ 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. The financial instruments included in the following sensitivity analysis consist of all of our investments and cash.

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, fixed maturities pledged under securities lending agreements, 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 investment portfolio at December 31, 2021 and 2020:

(U.S. dollars in billions)	Interest Rate Shift in Basis Points				
	-100	**-50**	**-**	**+50**	**+100**
Dec. 31, 2021					
Total fair value	$ 25.79	$ 25.44	$ 25.21	$ 24.75	$ 24.43
Change from base	2.3 %	0.9 %		(1.8)%	(3.1)%
Change in unrealized value	$ 0.58	$ 0.23		$ (0.45)	$ (0.78)
Dec. 31, 2020					
Total fair value	$ 25.82	$ 25.44	$ 25.07	$ 24.69	$ 24.31
Change from base	3.0 %	1.5 %		(1.5)%	(3.0)%
Change in unrealized value	$ 0.75	$ 0.38		$ (0.38)	$ (0.75)

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 the portfolio at December 31, 2021 and 2020:

(U.S. dollars in billions)	Credit Spread Shift in Percentage				
	-100	**-50**	**-**	**+50**	**+100**
Dec. 31, 2021					
Total fair value	$ 26.17	$ 25.69	$ 25.21	$ 24.72	$ 24.24
Change from base	3.8 %	1.9 %		(1.9)%	(3.8)%
Change in unrealized value	$ 0.97	$ 0.48		$ (0.48)	$ (0.97)
Dec. 31, 2020					
Total fair value	$ 25.54	$ 25.32	$ 25.07	$ 24.82	$ 24.59
Change from base	1.9 %	1.0 %		(1.0)%	(1.9)%
Change in unrealized value	$ 0.48	$ 0.25		$ (0.25)	$ (0.48)

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 December 31, 2021, our portfolio’s VaR was estimated to be 4.83%, compared to an estimated 4.30% at December 31, 2020.

Equity Securities. At December 31, 2021 and 2020, the fair value of our investments in equity securities (excluding securities included in Fixed Income Securities above) totaled $1.4 billion and $1.1 billion, 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 $137.5 million and $109.5 million at December 31, 2021 and 2020, respectively, and would have decreased book value per share by approximately $0.36 and $0.27, respectively. An immediate hypothetical 10% increase in the value of each position would increase the fair value of such investments by approximately $137.5 million and $109.5 million at December 31, 2021 and 2020, respectively, and would have increased book value per share by approximately $0.36 and $0.27, respectively.

Investment-Related Derivatives. At December 31, 2021, the notional value of all derivative instruments (excluding foreign currency forward contracts which are included in the foreign currency exchange risk analysis below) was $6.4 billion, compared to $8.6 billion at December 31, 2020. If the underlying exposure of each investment-related derivative held at December 31, 2021 depreciated by 100 basis points, it would have resulted in a reduction in net income of approximately $63.8 million, and a decrease in book value per share of $0.17, compared to $85.7 million and $0.21, respectively, on investment-related derivatives held at December 31, 2020. If the underlying exposure of each investment-related derivative held at December 31, 2021 appreciated by 100 basis points, it would have resulted in an increase in net income of approximately $63.8 million, and an increase in book value per share of $0.17, compared to $85.7 million and $0.21, respectively, on investment-related derivatives held at December 31, 2020. See note 11, “Derivative Instruments,” to our consolidated financial statements in Item 8 for additional disclosures concerning derivatives.

For further discussion on investment activity, please refer to “—Financial Condition, Liquidity and Capital Resources—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 11, “Derivative Instruments,” to our consolidated financial statements in Item 8 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:

(U.S. dollars in thousands, except per share data)	December 31, 2021	December 31, 2020
Net assets (liabilities), denominated in foreign currencies, excluding shareholders’ equity and derivatives	$ (825,371)	$ (309,968)
Shareholders’ equity denominated in foreign currencies (1)	1,095,706	695,355
Net foreign currency forward contracts outstanding (2)	15,151	1,108,161
Net exposures denominated in foreign currencies	$ 285,486	$ 1,493,548
Pre-tax impact of a hypothetical 10% appreciation of the U.S. Dollar against foreign currencies:		
Shareholders’ equity	$ (28,549)	$ (149,355)
Book value per share	$ (0.08)	$ (0.37)
Pre-tax impact of a hypothetical 10% decline of the U.S. Dollar against foreign currencies:		
Shareholders’ equity	$ 28,549	$ 149,355
Book value per share	$ 0.08	$ 0.37

(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 the Company generally attempts to match the currency of its projected liabilities with investments in the same currencies, from time to time the Company may elect to over or underweight one or more currencies, which could increase the Company's exposure to foreign currency fluctuations and increase the volatility of the Company's 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

We do not believe that inflation has had a material effect on our consolidated results of operations, except insofar as inflation may affect our reserves for losses and loss adjustment expenses and interest rates. The potential exists, after a catastrophe loss, for the development of inflationary pressures in a local economy. The anticipated effects of inflation on us are considered in our catastrophe loss models. The actual effects of inflation on our results cannot be accurately known until claims are ultimately settled.

ITEM 7A. 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 Operation," which information is hereby incorporated by reference.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

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Report of Independent Registered Public Accounting Firm

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

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Arch Capital Group Ltd. and its subsidiaries (the "Company") as of December 31, 2021 and 2020, and the related consolidated statements of income, of comprehensive income, of changes in shareholders' equity, and of cash flows for each of the three years in the period ended December 31, 2021, including the related notes and financial statement schedules listed in the index appearing under Item 15(a)(2) (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2021, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2021 and 2020, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2021, in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2021, based on criteria established in Internal Control- Integrated Framework (2013) issued by the COSO.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Annual Report on Internal Control Over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States)(PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Critical Audit Matters

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that (i) relates to accounts or disclosures that are material to the consolidated financial statements and (ii) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Valuation of Reserve for Losses and Loss Adjustment Expenses

As described in Notes 3, 5 and 6 to the consolidated financial statements, the reserve for losses and loss adjustment expenses represents estimates of future amounts required to pay losses and loss adjustment expenses for insured or reinsured events which have occurred at or before the balance sheet date. As of December 31, 2021, the Company's total reserve for losses and loss adjustment expenses was $17.8 billion. For the insurance and reinsurance segments, management estimates ultimate losses and loss adjustment expenses using various generally accepted actuarial methods applied to known losses and other relevant information. Ultimate losses and loss adjustment expenses are generally determined by extrapolation of claim emergence and settlement patterns observed in the past that can reasonably be expected to persist into the future. Management makes a number of key assumptions in their reserving process, including estimating loss development patterns and expected loss ratios. For the mortgage segment, the lead actuarial methodology used by management is a frequency-severity method based on the inventory of pending delinquencies. The assumptions of frequency and severity reflect judgments based on historical data and experience.

The principal considerations for our determination that performing procedures relating to the valuation of the reserve for losses and loss adjustment expenses is a critical audit matter are (i) the significant judgment by management when developing their estimate, which in turn led to a high degree of auditor subjectivity and judgment in performing procedures related to the valuation of the reserve for losses and loss adjustment expenses, (ii) the significant auditor effort and judgment in evaluating audit evidence related to the aforementioned key actuarial methods and key assumptions, and (iii) the audit effort included the involvement of professionals with specialized skill and knowledge to assist in performing these procedures and evaluating the audit evidence obtained.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the valuation of the reserve for losses and loss adjustment expenses, including controls over the selection of key actuarial methods and development of key assumptions. These procedures also included, among others, the involvement of professionals with specialized skill and knowledge to assist in performing one or a combination of procedures, including (i) developing an independent estimate, on a test basis, of the reserve for losses and loss adjustment expenses, and comparing the independent estimate to management's actuarially determined reserve for losses and loss adjustment expenses to evaluate the reasonableness of the reserve for losses and loss adjustment expenses and (ii) evaluating the appropriateness of the actuarial methods and reasonableness of the assumptions, related to loss development patterns, expected loss ratios, frequency, and severity used by management to determine the Company's reserve for losses and loss adjustment expenses. Developing the independent estimate and evaluating the appropriateness of the key methods and reasonableness of the key assumptions related to loss development patterns, expected loss ratios, frequency and severity, as applicable, involved testing the completeness and accuracy of historical data provided by management.

/s/ PricewaterhouseCoopers LLP

New York, New York

February 25, 2022
We have served as the Company's or its predecessor's auditor since 1995.

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS
(U.S. dollars in thousands, except share data)

	December 31,	
	2021	**2020**
Assets		
Investments:		
Fixed maturities available for sale, at fair value (amortized cost: $17,973,823 and $18,143,305; net of allowance for credit losses: $2,883 and $2,397)	$ 17,998,109	$ 18,717,825
Short-term investments available for sale, at fair value (amortized cost: $1,734,738 and $1,924,292; net of allowance for credit losses: $0 and $0)	1,734,716	1,924,922
Collateral received under securities lending, at fair value (amortized cost: $0 and $301,089)	—	301,096
Equity securities, at fair value	1,804,170	1,444,830
Other investments (portion measured at fair value: $1,973,550 and $3,824,796)	1,973,550	4,324,796
Investments accounted for using the equity method	3,077,611	2,047,889
Total investments	26,588,156	28,761,358
Cash	858,668	906,448
Accrued investment income	85,453	103,299
Securities pledged under securities lending, at fair value (amortized cost: $0 and $294,493)	—	294,912
Investment in operating affiliates	1,135,655	129,291
Premiums receivable (net of allowance for credit losses: $39,958 and $37,781)	2,633,280	2,064,586
Reinsurance recoverable on unpaid and paid losses and loss adjustment expenses (net of allowance for credit losses: $13,230 and $11,636)	5,880,735	4,500,802
Contractholder receivables (net of allowance for credit losses: $3,437 and $8,638)	1,828,691	1,986,924
Ceded unearned premiums	1,729,455	1,234,075
Deferred acquisition costs	901,841	790,708
Receivable for securities sold	60,179	92,743
Goodwill and intangible assets	944,983	692,863
Other assets	2,453,849	1,724,288
Total assets	$ 45,100,945	$ 43,282,297
Liabilities		
Reserve for losses and loss adjustment expenses	$ 17,757,156	$ 16,513,929
Unearned premiums	6,011,942	4,838,965
Reinsurance balances payable	1,583,253	683,263
Contractholder payables	1,832,127	1,995,562
Collateral held for insured obligations	242,352	215,581
Senior notes	2,724,394	2,861,113
Revolving credit agreement borrowings	—	155,687
Securities lending payable	—	301,089
Payable for securities purchased	64,850	218,779
Other liabilities	1,329,742	1,510,888
Total liabilities	31,545,816	29,294,856
Commitments and Contingencies		
Redeemable noncontrolling interests	9,233	58,548
Shareholders’ Equity		
Non-cumulative preferred shares	830,000	780,000
Common shares ($0.0011 par, shares issued: 583,289,850 and 579,000,841)	648	643
Additional paid-in capital	2,085,075	1,977,794
Retained earnings	14,455,868	12,362,463
Accumulated other comprehensive income (loss), net of deferred income tax	(64,600)	488,895
Common shares held in treasury, at cost (shares: 204,365,956 and 172,280,199)	(3,761,095)	(2,503,909)
Total shareholders' equity available to Arch	13,545,896	13,105,886
Non-redeemable noncontrolling interests	—	823,007
Total shareholders' equity	13,545,896	13,928,893
Total liabilities, noncontrolling interests and shareholders' equity	$ 45,100,945	$ 43,282,297

See Notes to Consolidated Financial Statements

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

	Year Ended December 31,		
	2021	2020	2019
Revenues			
Net premiums earned	$ 8,082,298	$ 6,991,935	$ 5,786,498
Net investment income	389,118	519,608	627,738
Net realized gains (losses)	379,845	823,460	363,198
Other underwriting income	22,073	26,784	24,861
Equity in net income of investments accounted for using the equity method	366,402	146,693	123,672
Other income (loss)	10,244	29	—
Total revenues	9,249,980	8,508,509	6,925,967
Expenses			
Losses and loss adjustment expenses	4,584,803	4,689,599	3,133,452
Acquisition expenses	1,303,178	1,004,842	840,945
Other operating expenses	998,595	875,176	800,997
Corporate expenses	79,157	81,988	80,111
Amortization of intangible assets	82,955	69,031	82,104
Interest expense	139,470	143,456	120,872
Net foreign exchange losses (gains)	(41,529)	83,634	20,609
Total expenses	7,146,629	6,947,726	5,079,090
Income before income taxes and income (loss) from operating affiliates	2,103,351	1,560,783	1,846,877
Income taxes:			
Current tax expense (benefit)	295,533	197,662	144,361
Deferred tax expense (benefit)	(166,951)	(85,824)	11,449
Income tax expense	128,582	111,838	155,810
Income (loss) from operating affiliates	264,693	16,766	2,233
Net income	$ 2,239,462	$ 1,465,711	$ 1,693,300
Net (income) loss attributable to noncontrolling interests	(82,613)	(60,190)	(56,981)
Net income available to Arch	2,156,849	1,405,521	1,636,319
Preferred dividends	(48,343)	(41,612)	(41,612)
Loss on redemption of preferred shares	(15,101)	—	—
Net income available to Arch common shareholders	$ 2,093,405	$ 1,363,909	$ 1,594,707
Net income per common share and common share equivalent			
Basic	$ 5.34	$ 3.38	$ 3.97
Diluted	$ 5.23	$ 3.32	$ 3.87
Weighted average common shares and common share equivalents outstanding			
Basic	391,748,715	403,062,179	401,802,815
Diluted	400,345,936	410,259,455	411,609,478

See Notes to Consolidated Financial Statements

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

	Year Ended December 31,		
	2021	2020	2019
Comprehensive Income			
Net income	$ 2,239,462	$ 1,465,711	$ 1,693,300
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 year	(386,929)	678,717	500,771
Reclassification of net realized (gains) losses, included in net income	(116,068)	(426,187)	(118,941)
Foreign currency translation adjustments	(64,482)	33,336	18,110
Comprehensive income	1,671,983	1,751,577	2,093,240
Net (income) loss attributable to noncontrolling interests	(82,613)	(60,190)	(56,981)
Other comprehensive (income) loss attributable to noncontrolling interests	13,984	(9,062)	(9,130)
Comprehensive income available to Arch	$ 1,603,354	$ 1,682,325	$ 2,027,129

See Notes to Consolidated Financial Statements

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

	Year Ended December 31,		
	2021	**2020**	**2019**
Non-cumulative preferred shares			
Balance at beginning of year	$ 780,000	$ 780,000	$ 780,000
Preferred shares issued	500,000	—	—
Preferred shares redeemed	(450,000)	—	—
Balance at end of year	830,000	780,000	780,000
Common shares			
Balance at beginning of year	643	638	634
Common shares issued, net	5	5	4
Balance at end of year	648	643	638
Additional paid-in capital			
Balance at beginning of year	1,977,794	1,889,683	1,793,781
Issue costs on preferred shares issued	(14,179)	—	—
Reversal of issue costs on preferred shares redeemed	15,101	—	—
Amortization of share-based compensation	86,053	70,535	64,152
Other changes	20,306	17,576	31,750
Balance at end of year	2,085,075	1,977,794	1,889,683
Retained earnings			
Balance at beginning of year	12,362,463	11,021,006	9,426,299
Cumulative effect of an accounting change	—	(22,452)	—
Balance at beginning of year, as adjusted	12,362,463	10,998,554	9,426,299
Net income	2,239,462	1,465,711	1,693,300
Net (income) loss attributable to noncontrolling interests	(82,613)	(60,190)	(56,981)
Preferred share dividends	(48,343)	(41,612)	(41,612)
Loss on redemption of preferred shares	(15,101)	—	—
Balance at end of year	14,455,868	12,362,463	11,021,006
Accumulated other comprehensive income (loss)			
Balance at beginning of year	488,895	212,091	(178,720)
Unrealized appreciation (decline) in value of available-for-sale investments, net of deferred income tax:			
Balance at beginning of year	501,295	258,486	(114,178)
Unrealized holding gains (losses) during period, net of reclassification adjustment	(502,997)	252,530	381,830
Unrealized holding gains (losses) during period attributable to noncontrolling interests	15,188	(9,721)	(9,166)
Balance at end of year	13,486	501,295	258,486
Foreign currency translation adjustments, net of deferred income tax:			
Balance at beginning of year	(12,400)	(46,395)	(64,542)
Foreign currency translation adjustments	(64,482)	33,336	18,110
Foreign currency translation adjustments attributable to noncontrolling interests	(1,204)	659	37
Balance at end of year	(78,086)	(12,400)	(46,395)
Balance at end of year	(64,600)	488,895	212,091
Common shares held in treasury, at cost			
Balance at beginning of year	(2,503,909)	(2,406,047)	(2,382,167)
Shares repurchased for treasury	(1,257,186)	(97,862)	(23,880)
Balance at end of year	(3,761,095)	(2,503,909)	(2,406,047)
Total shareholders’ equity available to Arch	13,545,896	13,105,886	11,497,371
Non-redeemable noncontrolling interests	—	823,007	762,777
Total shareholders’ equity	$ 13,545,896	$ 13,928,893	$ 12,260,148

See Notes to Consolidated Financial Statements

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

	Year Ended December 31,		
	2021	**2020**	**2019**
Operating Activities			
Net income	$ 2,239,462	$ 1,465,711	$ 1,693,300
Adjustments to reconcile net income to net cash provided by operating activities:			
Net realized (gains) losses	(427,367)	(844,625)	(377,967)
Equity in net income or loss of investments accounted for using the equity method and other income or loss	(464,050)	(47,951)	(14,013)
Amortization of intangible assets	82,955	69,031	82,104
Share-based compensation	87,094	71,262	66,417
Changes in:			
Reserve for losses and loss adjustment expenses, net of unpaid losses and loss adjustment expenses recoverable	1,762,190	2,113,827	489,981
Unearned premiums, net of ceded unearned premiums	936,039	445,781	252,569
Premiums receivable	(685,214)	(318,643)	(237,752)
Deferred acquisition costs	(263,243)	(143,948)	(47,260)
Reinsurance balances payable	500,065	65,950	182,132
Other items, net	(340,376)	10,110	(41,052)
Net cash provided by operating activities	3,427,555	2,886,505	2,048,459
Investing Activities			
Purchases of fixed maturity investments	(35,451,858)	(39,765,277)	(30,053,777)
Purchases of equity securities	(1,175,480)	(1,595,010)	(811,967)
Purchases of other investments	(1,859,096)	(1,808,727)	(1,470,545)
Proceeds from sales of fixed maturity investments	33,577,445	37,949,346	28,595,865
Proceeds from sales of equity securities	918,145	1,147,264	429,818
Proceeds from sales, redemptions and maturities of other investments	1,765,533	1,029,578	1,209,559
Proceeds from redemptions and maturities of fixed maturity investments	1,628,755	871,134	643,265
Net settlements of derivative instruments	(40,072)	179,006	59,982
Net (purchases) sales of short-term investments	165,272	(1,029,681)	39,833
Change in cash collateral related to securities lending	—	81,210	(62,193)
Purchase of operating affiliate	(753,916)	—	—
Impact of the deconsolidation of the variable interest entity	(349,202)	—	—
Purchases of fixed assets	(41,394)	(39,872)	(37,837)
Other	(523,864)	(62,197)	(348,486)
Net cash provided by (used for) investing activities	(2,139,732)	(3,043,226)	(1,806,483)
Financing Activities			
Proceeds from issuance of preferred shares, net	485,821	—	—
Redemption of preferred shares	(450,000)	—	—
Purchases of common shares under share repurchase program	(1,234,294)	(83,472)	(2,871)
Proceeds from common shares issued, net	6,418	1,876	6,203
Proceeds from borrowings	—	1,018,793	200,083
Repayments of borrowings	—	(359,000)	(49,182)
Change in cash collateral related to securities lending	—	(81,210)	62,193
Change in third party investment in non-redeemable noncontrolling interests	15,971	(2,867)	(75,056)
Change in third party investment in redeemable noncontrolling interests	—	—	(161,882)
Dividends paid to redeemable noncontrolling interests	(1,907)	(4,945)	(12,515)
Other	(3,278)	73,715	(6,023)
Preferred dividends paid	(48,280)	(41,612)	(41,612)
Net cash provided by (used for) financing activities	(1,229,549)	521,278	(80,662)
Effects of exchange rate changes on foreign currency cash and restricted cash	(34,047)	22,289	17,741
Increase (decrease) in cash and restricted cash	24,227	386,846	179,055
Cash and restricted cash, beginning of year	1,290,544	903,698	724,643
Cash and restricted cash, end of year	$ 1,314,771	$ 1,290,544	$ 903,698
Income taxes paid (received)	$ 286,810	$ 202,940	$ 109,463
Interest paid	$ 139,301	$ 133,491	$ 126,945

See Notes to Consolidated Financial Statements

1. 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. Similarly, "Common Shares" means the common shares of Arch Capital.

The Company's consolidated financial statements included the results of Somers Holdings Ltd. (formerly Watford Holdings Ltd.) and its wholly owned subsidiaries ("Somers") through June 30, 2021. Effective July 1, 2021, Somers is wholly owned by Greysbridge Holdings Ltd., ("Greysbridge") and Greysbridge is owned 40% by the Company, 30% by certain investment funds managed by Kelso & Company ("Kelso") and 30% by certain investment funds managed by Warburg Pincus LLC ("Warburg"). Based on the governing documents of Greysbridge, the Company concluded that, while it retains significant influence over Somers, Somers no longer constitutes a variable interest entity. Accordingly, effective July 1, 2021, Arch no longer consolidates the results of Somers in its consolidated financial statements and footnotes. See note 12, "Variable Interest Entity and Noncontrolling Interests".

The Company has reclassified the presentation of certain prior year information to conform to the current presentation, including the correct presentation of 'income (loss) from operating affiliates' on its consolidated statements of income for all periods presented to reclass such item from 'other income (loss)'. The Company also changed its presentation of 'investment in operating affiliates' on its consolidated balance sheet for all periods presented to reclass such item from 'other assets'. Such reclassifications had no effect on the Company's net income, comprehensive income, shareholders' equity or cash flows. Management views the impact of the prior period misclassification as not material to the financial statements on a quantitative and qualitative basis. See note 9. Tabular amounts are in U.S. Dollars in thousands, except share amounts, unless otherwise noted.

2. Acquisitions

Westpac Lenders Mortgage Insurance Limited ("WLMI")

On August 31, 2021, the Company completed the acquisition of WLMI, an Australian Prudential Regulation Authority authorized captive lenders mortgage insurance ("LMI") provider to the Westpac Banking Corporation ("Westpac"). As part of the acquisition, WLMI will retain its existing risk in force and remain Westpac's exclusive provider of LMI on new mortgage originations for a period of 10 years. Upon completion of this transaction, the Company renamed WLMI to Arch Lenders Mortgage Indemnity Limited ("Arch Indemnity"). Arch Indemnity will become the Company's primary provider of LMI to the Australian market.

Somerset Bridge Group Limited, Southern Rock Holdings Limited and affiliates ("Somerset Group")

On August 6, 2021, the Company completed the acquisition of Somerset Group. The acquisition includes Somerset Group's motor insurance managing general agent, distribution capabilities through direct and aggregator channels, affiliated insurer and fully integrated claims operation.

In connection with the acquisitions noted above, the Company increased its goodwill and intangible assets by $350.1 million.

Barbican Group Holdings Limited

On November 29, 2019, the Company closed the acquisition of Barbican Group Holdings Limited and its subsidiaries (collectively, "Barbican").

The Ardonagh Group

On January 1, 2019, the Company's U.K. insurance operations entered into a transaction with The Ardonagh Group to acquire renewal rights for a U.K. commercial lines book of business, consisting of commercial property, casualty, motor, professional liability, personal accident and travel business.

3. Significant Accounting Policies

(a) Basis of Presentation

The consolidated financial statements have been prepared in conformity with accounting principles generally accepted in the United States of America ("GAAP") and include the accounts of Arch Capital and its subsidiaries, including Arch Reinsurance Ltd. ("Arch Re Bermuda"), Arch Reinsurance Company ("Arch Re U.S."), Arch Capital Group (U.S.) Inc. ("Arch-U.S."), Arch Insurance Company, Arch Specialty Insurance Company, Arch Property & Casualty Insurance Company ("Arch P&C"), Arch Indemnity Insurance Company ("Arch Indemnity Insurance"), Arch Insurance Canada Ltd. ("Arch Insurance Canada"), Arch Reinsurance Europe Designated Activity Company ("Arch Re Europe"), Arch Mortgage Insurance Company ("AMIC"), Arch Mortgage Guaranty Company, United Guaranty Residential Insurance Company ("UGRIC"), Arch Indemnity, Arch Insurance (EU) Designated Activity Company ("Arch Insurance (EU)"), Arch Insurance (U.K.) Limited ("Arch Insurance (U.K.)") and the Company's participation on Lloyd's of London syndicates 2012 ("Arch Syndicate 2012")

and 1955 (“Arch Syndicate 1955”). 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. The Company’s principal estimates include:

- The reserve for losses and loss adjustment expenses;
- Reinsurance recoverable on unpaid and paid losses and loss adjustment expenses, including the provision for uncollectible amounts;
- Estimates of written and earned premiums;
- The valuation of the investment portfolio and assessment of allowance for credit losses;
- The valuation of purchased intangible assets;
- The assessment of goodwill and intangible assets for impairment; and
- The valuation of deferred tax assets.

(b) Premium Revenues and Related Expenses

Insurance. Insurance premiums written are generally recorded at the policy inception and are primarily earned on a pro rata basis over the terms of the policies for all products, usually 12 months. Premiums written include estimates that are derived from multiple sources which include the historical experience of the underlying business, similar business and available industry information. Unearned premium reserves represent the portion of premiums written that relates to the unexpired terms of in-force insurance policies.

Reinsurance. Reinsurance premiums written include amounts reported by brokers and ceding companies, supplemented by the Company’s own estimates of premiums where reports have not been received. The determination of premium estimates requires a review of the Company’s experience with the ceding companies, familiarity with each market, the timing of the reported information, an analysis and understanding of the characteristics of each line of business, and management’s judgment of the impact of various factors, including premium or loss trends, on the volume of business written and ceded to the Company. On an ongoing basis, the Company’s underwriters review the amounts reported by these third parties for reasonableness based on their experience and knowledge of the subject class of business, taking into account the Company’s historical experience with the brokers or ceding companies. In addition, reinsurance contracts under which the Company assumes business generally contain specific provisions which allow the Company to perform audits of the ceding company to ensure compliance with the terms and conditions of the contract, including accurate and timely reporting of information. Based on a review of all available information, management establishes premium estimates where reports have not been received. Premium estimates are updated when new information is received and differences between such estimates and actual amounts are recorded in the period in which estimates are changed or the actual amounts are determined.

Reinsurance premiums written are recorded based on the type of contracts the Company writes. Premiums on the Company’s excess of loss and pro rata reinsurance contracts are estimated when the business is underwritten. For excess of loss contracts, premiums are recorded as written based on the terms of the contract. Estimates of premiums written under pro rata contracts are recorded in the period in which the underlying risks are expected to incept and are based on information provided by the brokers and the ceding companies. For multi-year reinsurance treaties which are payable in annual installments, generally, only the initial annual installment is included as premiums written at policy inception due to the ability of the reinsured to commute or cancel coverage during the term of the policy. The remaining annual installments are included as premiums written at each successive anniversary date within the multi-year term.

Reinsurance 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. Contracts and policies written on a “losses occurring” basis cover claims that may occur during the term of the contract or policy, which is typically 12 months. Accordingly, the premium is earned evenly over the term. Contracts which are written on a “risks attaching” basis cover claims which attach to the underlying insurance policies written during the terms of such contracts. Premiums earned on such contracts usually extend beyond the original term of the reinsurance contract, typically resulting in recognition of premiums earned over a 24-month period. Certain of the Company’s reinsurance contracts include provisions that adjust premiums or acquisition expenses based upon the experience under the contracts. Premiums written and earned, as well as related acquisition expenses, are recorded based upon the projected experience under such contracts.

The Company also writes certain reinsurance business that is intended to provide insurers with risk management solutions that complement traditional reinsurance. Under these contracts, the Company assumes a measured amount of insurance risk in exchange for an anticipated margin, which is typically lower than on traditional reinsurance contracts. The terms and conditions of these contracts may include additional or return premiums based on loss experience, loss

corridors, sublimits and caps. Examples of such business include aggregate stop-loss coverages, financial quota share coverages and multi-year retrospectively rated excess of loss coverages. If these contracts are deemed to transfer risk, they are accounted for as reinsurance. Otherwise, such contracts are accounted for under the deposit method.

Mortgage. Mortgage guaranty insurance policies are contracts that are generally non-cancelable by the insurer, are renewable at a fixed price, and provide for payment of premiums on a monthly, annual or single basis. Upon renewal, the Company is not able to re-underwrite or re-price its policies. Consistent with industry accounting practices, premiums written on a monthly basis are earned as coverage is provided. Premiums written on an annual basis are amortized on a monthly pro rata basis over the year of coverage. Primary mortgage insurance premiums written on policies covering more than one year are referred to as single premiums. A portion of the revenue from single premiums is recognized in premiums earned in the current period, and the remaining portion is deferred as unearned premiums and earned over the estimated expiration of risk of the policy. If single premium policies related to insured loans are canceled due to repayment by the borrower and the policy is a non-refundable product, the remaining unearned premium related to each canceled policy is recognized as earned premium upon notification of the cancellation.

Reinstatement premiums for the Company's insurance and reinsurance operations are recognized at the time a loss event occurs, where coverage limits for the remaining life of the contract are reinstated under pre-defined contract terms. Reinstatement premiums, if obligatory, are fully earned when recognized. The accrual of reinstatement premiums is based on an estimate of losses and loss adjustment expenses, which reflects management's judgment.

Premium estimates are reviewed by management at least quarterly. Such review includes a comparison of actual reported premiums to expected ultimate premiums along with a review of the aging and collection of premium estimates. Based on management's review, the appropriateness of the premium estimates is evaluated, and any adjustment to these estimates is recorded in the period in which it becomes known. Adjustments to premium estimates could be material and such adjustments could directly and significantly impact earnings favorably or unfavorably in the period they are determined because the estimated premium may be fully or substantially earned. A significant portion of amounts included as premiums receivable, which represent estimated premiums written, net of commissions, are not currently due based on the terms of the underlying contracts.

Unearned premiums represent the portion of premiums written that is applicable to the estimated unexpired risk of insured loans. A portion of premium payments may be refundable if the insured cancels coverage, which generally occurs when the loan is repaid, the loan amortizes to a sufficiently low amount to trigger a lender permitted or legally required cancellation, or the value of the property has increased sufficiently in accordance with the terms of the contract. Premium refunds reduce premiums earned in the consolidated statements of income. Generally, only unearned premiums are refundable.

Premiums receivable include amounts receivable from agents, brokers and insured that are both currently due and amounts not yet due on insurance, reinsurance and mortgage insurance policies. Premiums receivable balances are reported net of an allowance for expected credit losses. The Company monitors credit risk associated with premiums receivable through its ongoing review of amounts outstanding, aging of the receivable, historical loss data, and counterparty financial strength measures. The allowance also includes estimated uncollectible amounts related to dispute risk. In certain instances, credit risk may be reduced by the Company's right to offset loss obligations or unearned premiums against premiums receivable. Any allowance for credit losses is charged to net realized gains (losses) in the period the receivable is recorded and revised in subsequent periods to reflect changes in the Company's estimate of expected credit losses. See note 7, "Allowance for Expected Credit Losses" for additional information.

Acquisition Costs. Acquisition costs that are directly related and incremental to the successful acquisition or renewal of business are deferred and amortized based on the type of contract. The Company's insurance and reinsurance operations capitalize incremental direct external costs that result from acquiring a contract but do not capitalize salaries, benefits and other internal underwriting costs. For the Company's mortgage insurance operations, which include a substantial direct sales force, both external and certain internal direct costs are deferred and amortized. For property and casualty insurance and reinsurance contracts, deferred acquisition costs are amortized over the period in which the related premiums are earned. Consistent with mortgage insurance industry accounting practice, amortization of acquisition costs related to the mortgage insurance contracts for each underwriting year's book of business is recorded in proportion to estimated gross profits. Estimated gross profits are comprised of earned premiums and losses and loss adjustment expenses. For each underwriting year, the Company estimates the rate of amortization to reflect actual experience and any changes to persistency or loss development.

Deferred acquisition costs are carried at their estimated realizable value and take into account anticipated losses and loss adjustment expenses, based on historical and current experience, and anticipated investment income.

A premium deficiency occurs if the sum of anticipated losses and loss adjustment expenses, unamortized acquisition costs and maintenance costs exceed unearned premiums (including expected future premiums) and anticipated investment income. A premium deficiency reserve ("PDR") is recorded by charging any unamortized acquisition costs to expense to the extent required in order to eliminate the deficiency. If the premium deficiency exceeds unamortized acquisition costs then a liability is accrued for the excess deficiency.

To assess the need for a PDR on mortgage exposures, the Company develops loss projections based on modeled loan defaults related to its current policies in force. This projection is based on recent trends in default experience, severity and rates of defaulted loans moving to claim, as well as recent trends in the rate at which loans are prepaid, and incorporates anticipated interest income. Evaluating the expected profitability of the Company's existing mortgage insurance business and the need for a PDR for its mortgage business involves significant reliance upon assumptions and estimates with regard to the likelihood, magnitude and timing of potential losses and premium revenues.

No premium deficiency charges were recorded by the Company during 2021, 2020 or 2019.

(c) Deposit Accounting

Certain assumed reinsurance contracts that are deemed not to transfer insurance risk, are accounted for using the deposit method of accounting. However, it is possible that the Company could incur financial losses on such contracts. Management exercises significant judgment in the assumptions used in determining whether assumed contracts should be accounted for as reinsurance contracts or deposit contracts. For those contracts that contain only significant underwriting risk, the estimated profit margin is deferred and amortized over the contract period and such amount is included in the Company's underwriting results. When the estimated profit margin is explicit, the margin is reflected as other underwriting income and any adverse financial results on such contracts are reflected as incurred losses. When the estimated profit margin is implicit, the margin is reflected as an offset to paid losses and any adverse financial results on such contracts are reflected as incurred losses. Additional judgments are required when applying the accounting guidance with respect to the revenue recognition criteria for contracts deemed to transfer only significant underwriting risk. For those contracts that contain only significant timing risk, an accretion rate is established at inception of the contract based on actuarial estimates whereby the deposit accounting liability is increased to the estimated amount payable over the contract term. The accretion on the deposit is based on the expected rate of return required to fund the expected future payment obligations. Periodically the Company reassesses the estimated ultimate liability and the related expected rate of return. The accretion of the deposit accounting liability as well as changes to the estimated ultimate liability and the accretion rate would be reflected as part of interest expense in the Company's results of operations. Any negative accretion in a deposit accounting liability is shown in other underwriting income in the Company's results of operations.

Under some of these contracts, the ceding company retains the related assets on a funds-held basis. Such amounts are included in "Other assets" on the Company's balance sheet. Interest income produced by those assets are recorded as part of net investment income in the Company's results of operations.

(d) Retroactive Reinsurance

Retroactive reinsurance reimburses a ceding company for liabilities incurred as a result of past insurable events covered by the underlying policies reinsured. In certain instances, reinsurance contracts cover losses both on a prospective basis and on a retroactive basis and, accordingly, the Company bifurcates the prospective and retrospective elements of these reinsurance contracts and accounts for each element separately where practical. Underwriting income generated in connection with retroactive reinsurance contracts is deferred and amortized into income over the settlement period while losses are charged to income immediately. Subsequent changes in estimated amount or timing of cash flows under such retroactive reinsurance contracts are accounted for by adjusting the previously deferred amount to the balance that would have existed had the revised estimate been available at the inception of the reinsurance transaction, with a corresponding charge or credit to income.

(e) Reinsurance Ceded

In the normal course of business, the Company purchases reinsurance to increase capacity and to limit the impact of individual losses and events on its underwriting results by reinsuring certain levels of risk with other insurance enterprises or reinsurers. The Company uses pro rata, excess of loss and facultative reinsurance contracts. Reinsurance ceding commissions that represent a recovery of acquisition costs are recognized as a reduction to acquisition costs while the remaining portion is deferred. The accompanying consolidated statement of income reflects premiums and losses and loss adjustment expenses and acquisition costs, net of reinsurance ceded. See note 8, "Reinsurance" for information on the Company's reinsurance usage. Reinsurance premiums ceded and unpaid losses and loss adjustment expenses recoverable are estimated in a manner consistent with that of the original policies issued and the terms of the reinsurance contracts. If the reinsurers are unable to satisfy their obligations under the agreements, the

Company's insurance or reinsurance subsidiaries would be liable for such defaulted amounts.

Reinsurance recoverables are recorded as assets, predicated on the reinsurers' ability to meet their obligations under the reinsurance agreements. In certain instances, the Company obtains collateral, including letters of credit and trust accounts to further reduce the credit exposure on its reinsurance recoverables. The Company reports its reinsurance recoverables net of an allowance for expected credit loss. The allowance is based upon the Company's ongoing review of amounts outstanding, the financial condition of its reinsurers, amounts and form of collateral obtained and other relevant factors. A ratings based probability-of-default and loss-given-default methodology is used to estimate the allowance for expected credit loss. Any allowance for credit losses is charged to net realized gains (losses) in the period the recoverable is recorded and revised in subsequent periods to reflect changes in the Company's estimate of expected credit losses. See note 7, "Allowance for Expected Credit Losses" for additional information.

(f) Cash

Cash includes cash equivalents, which are investments with original maturities of three months or less which are not part of the investment portfolio.

(g) Restricted Cash

Restricted cash represents amounts held for the benefit of third parties and is legally or contractually restricted as to withdrawal or usage by the Company. Such amounts are included in "Other assets" on the Company's balance sheet.

(h) Investments

The Company currently classifies substantially all of its fixed maturity investments and short-term investments as "available for sale" and, accordingly, they are carried at estimated fair value (also known as fair value) with the changes in fair value recorded as an unrealized gain or loss component of accumulated other comprehensive income in shareholders' equity. The fair value of fixed maturity securities and equity securities is generally determined from quotations received from nationally recognized pricing services, or when such prices are not available, by reference to broker or underwriter bid indications. Short-term investments comprise securities due to mature within one year of the date of issue. Short-term investments include certain cash equivalents which are part of investment portfolios under the management of external and internal investment managers.

Prior to the termination of its program in 2021, the Company entered into securities lending agreements with financial institutions to enhance investment income whereby it loaned certain of its securities to third parties, primarily major brokerage firms, for short periods of time through a lending agent. Such securities have been reclassified as "Securities pledged under securities lending, at fair value." The Company maintained legal control over the securities it lent, retained the earnings and cash flows associated with the loaned securities and received a fee from the borrower for the temporary use of the securities. Collateral received was required at a rate of 102% or greater of the fair value of the loaned securities including accrued investment income and was monitored and maintained by the lending agent. Such collateral is reflected as "Collateral received under securities lending, at fair value."

The Company's investment portfolio includes certain funds that, due to their ownership structure, are accounted for by the Company using the equity method. In applying the equity method, these 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 fair 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. Changes in the carrying value of such investments are recorded in net income as "Equity in net income (loss) of investments accounted for using the equity method." As such, fluctuations in the carrying value of the investments accounted for using the equity method may increase the volatility of the Company's reported results of operations.

The Company's investment portfolio includes equity securities that are accounted for at fair value. Such holdings primarily include publicly traded common stocks. Dividend income on equities is reflected in net investment income. Changes in fair value on equity securities are included in "Net realized gains (losses)" in the consolidated statement of income.

The Company elected to carry certain fixed maturity securities, equity securities, short-term investments and other investments at fair value under the fair value option afforded by accounting guidance regarding the fair value option for financial assets and liabilities. The fair value for certain of the Company's other investments are determined using net asset values ("NAVs") as advised by external fund managers. The NAV is based on the fund manager's valuation of the underlying holdings in accordance with the fund's governing documents.

Changes in fair value of investments accounted for using the fair value option are included in "Net realized gains (losses)." The primary reasons for electing the fair value option were to address simplification and cost-benefit considerations.

The Company invests in reverse repurchase agreements that are generally treated as collateralized receivables. Receivables for reverse repurchase agreements are reflected in “Other investments” or “Short-term investments” in the Company's consolidated balance sheet depending on their terms. These agreements are recorded at their contracted resale amount plus accrued interest, other than those that are accounted for at fair value. In reverse repurchase transactions, the Company obtains an interest in the purchased assets that are received as collateral.

The Company invests in limited partner interests and shares of limited liability companies. Such amounts are included in investments accounted for using the equity method and other investments. These investments can often have characteristics of a variable interest entity (“VIE”). A VIE refers to entities that have characteristics such as (i) insufficient equity at risk to allow the entity to finance its activities without additional financial support or (ii) instances where the equity investors, as a group, do not have the characteristic of a controlling financial interest. If the Company is determined to be the primary beneficiary, it is required to consolidate the VIE. The primary beneficiary is defined as the variable interest holder that is determined to have the controlling financial interest as a result of having both (i) the power to direct the activities of a VIE that most significantly impact the economic performance of the VIE and (ii) the obligation to absorb losses or right to receive benefits from the VIE that could potentially be significant to the VIE. At inception of the VIE as well as on an ongoing basis, the Company determines whether it is the primary beneficiary based on an analysis of the Company’s level of involvement in the VIE, the contractual terms, and the overall structure of the VIE. 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 Company conducts a periodic review to identify and evaluate credit based impairments related to the Company’s available for sale investments. The Company derives estimated credit losses by comparing expected future cash flows to be collected to the amortized cost of the security. Estimates of expected future cash flows consider among other things, macroeconomic conditions as well as the financial condition, near-term and long-term prospects for the issuer, and the likelihood of the recoverability of principal and interest. Effective January 1, 2020, credit losses are recognized through an allowance account subject to reversal, rather than a reduction in amortized cost. Declines in value attributable to factors other than credit are reported in other comprehensive income while the allowance for credit loss is charged to net realized gains (losses).

For available for sale investments that the Company intends to sell or for which it is more likely than not that the Company would be required to sell before an anticipated recovery in value, the full amount of the impairment is included in net realized gains (losses). The new cost basis of the investment is the previous amortized cost basis reduced by the impairment recognized in net realized gains (losses). The new cost basis is not adjusted for any subsequent recoveries in fair value.

The Company reports accrued investment income separately from investment balances and has elected not to measure an allowance for credit losses for accrued investment income. Any uncollectible accrued interest income is written off in the period it is deemed uncollectible.

Prior to January 1, 2020, the Company performed quarterly reviews of its investments to determine whether declines in fair value below the cost basis were considered other-than-temporary in accordance with applicable accounting guidance regarding the recognition and presentation of OTTI. The process of determining whether a security was other-than-temporarily impaired required judgment and involved analyzing many factors. These factors included (i) an analysis of the liquidity, business prospects and overall financial condition of the issuer, (ii) the time period in which there was a significant decline in value, (iii) the significance of the decline and (iv) the analysis of specific credit events. When there were credit-related losses associated with debt securities for which the Company did not have an intent to sell and it was more likely than not that it would not be required to sell the security before recovery of its cost basis, the amount of the OTTI related to a credit loss was recognized in earnings and the amount of the OTTI related to other factors (*e.g.*, interest rates, market conditions, etc.) was recorded as a component of other comprehensive income (loss). The amount of the credit loss of an impaired debt security was the difference between the amortized cost and the greater of (i) the present value of expected future cash flows and (ii) the fair value of the security. In instances where no credit loss existed but it was more likely than not that the Company would have to sell the debt security prior to the anticipated recovery, the decline in fair value below amortized cost was recognized as an OTTI in earnings. In periods after the recognition of an OTTI on debt securities, the Company accounted for such securities as if they had been purchased on the measurement date of the OTTI at an amortized cost basis equal to the previous amortized cost basis less the OTTI recognized in earnings. For debt securities for which OTTI were recognized in earnings, the difference between the new amortized cost basis and the cash flows expected to be collected would be accreted or amortized into net investment income. See note 9, “Investment Information” for additional information.

Net investment income includes interest and dividend income together with amortization of market premiums and discounts and is net of investment management and custody fees.

Anticipated prepayments and expected maturities are used in applying the interest method for certain investments such as mortgage and other asset-backed securities. When actual prepayments differ significantly from anticipated prepayments, the effective yield is recalculated to reflect actual payments to date and anticipated future payments. The net investment in such securities is adjusted to the amount that would have existed had the new effective yield been applied since the acquisition of the security. Such adjustments, if any, are included in net investment income when determined.

Investment gains or losses realized on the sale of investments, except for certain fund investments, are determined on a first-in, first-out basis and are reflected in net income. Investment gains or losses realized on the sale of certain fund investments are determined on an average cost basis. Unrealized appreciation or decline in the value of available for sale securities, which are carried at fair value, is excluded from net income and recorded as a separate component of accumulated other comprehensive income, net of applicable deferred income tax.

(i) Derivative Instruments

The Company recognizes all derivative instruments, including embedded derivative instruments, at fair value in its consolidated balance sheets. The Company employs the use of derivative instruments within its operations to mitigate risks arising from assets and liabilities held in foreign currencies as well as part of its overall investment strategy. For such instruments, changes in assets and liabilities measured at fair value are recorded as “Net realized gains” in the consolidated statements of income. In addition, the Company’s derivative instruments include amounts related to underwriting activities where an insurance or reinsurance contract meets the accounting definition of a derivative instrument. For such contracts, changes in fair value are reflected in “Other underwriting income” in the consolidated statements of income as the underlying contract originates from the Company’s underwriting operations. For the periods ended 2021, 2020, and 2019, the Company did not designate any derivative instruments as hedges under the relevant accounting guidance. See note 11, “Derivative Instruments” for additional information.

(j) Reserves for Losses and Loss Adjustment Expenses

Insurance and Reinsurance. The reserve for losses and loss adjustment expenses consists of estimates of unpaid reported losses and loss adjustment expenses and estimates for losses incurred but not reported. The reserve for unpaid reported losses and loss adjustment expenses, established by management based on reports from ceding companies and claims from insureds, excludes estimates of amounts related to losses under high deductible policies, and represents the estimated ultimate cost of events or conditions that have been reported to or specifically identified by the Company. Such reserves are supplemented by management’s estimates of reserves for losses incurred for which reports or claims have not been received. The Company’s reserves are based on a combination of reserving methods, incorporating both Company and industry loss development patterns. The Company selects the initial expected loss and loss adjustment expense ratios based on information derived by its underwriters and actuaries during the initial pricing of the business, supplemented by industry data where appropriate. Such ratios consider, among other things, rate changes and changes in terms and conditions that have been observed in the market. These estimates are reviewed regularly and, as experience develops and new information becomes known, the reserves are adjusted as necessary. Such adjustments, if any, are reflected in income in the period in which they are determined. As actual loss information has been reported, the Company has developed its own loss experience and its reserving methods include other actuarial techniques. Over time, such techniques have been given further weight in its reserving process based on the continuing maturation of the Company’s reserves. Inherent in the estimates of ultimate losses and loss adjustment expenses are expected trends in claims severity and frequency and other factors which may vary significantly as claims are settled. Accordingly, ultimate losses and loss adjustment expenses may differ materially from the amounts recorded in the accompanying consolidated financial statements. Losses and loss adjustment expenses are recorded on an undiscounted basis, except for excess workers’ compensation and employers’ liability business written by the Company’s insurance operations.

Mortgage. The reserves for mortgage guaranty insurance losses and loss adjustment expenses are the estimated claim settlement costs on notices of delinquency that have been received by the Company, as well as loan delinquencies that have been incurred but have not been reported by the lenders. Consistent with primary mortgage insurance industry accounting practice, the Company does not establish loss reserves for future claims on insured loans that are not currently delinquent (defined as two or more payments in arrears). The Company establishes loss reserves on a case-by-case basis when insured loans are reported delinquent using estimated claim rates and average claim sizes for each cohort, net of any salvage recoverable. The Company also reserves for delinquencies that have occurred but have not yet been reported to the Company prior to the close of an accounting period. To determine this reserve, the Company estimates the number of delinquencies not yet reported using historical information regarding late reported delinquencies and applies estimated claim rates and claim sizes for the estimated delinquencies not yet reported.

The establishment of reserves across the Company’s segments is an inherently uncertain process, are necessarily

based on estimates, and the ultimate net cost may vary from such estimates. The methods for making such estimates and for establishing the resulting liability are reviewed and updated using the most current information available. Any resulting adjustments, which may be material, are reflected in current operations.

(k) Contractholder Receivables and Payables and Collateral Held for Insured Obligations

Certain insurance policies written by the Company's U.S. insurance operations feature large deductibles, primarily in its construction and national accounts line of business. Under such contracts, the Company is obligated to pay the claimant for the full amount of the claim. The Company is subsequently reimbursed by the policy holder for the deductible amount. These amounts are included on a gross basis in the consolidated balance sheet as contractholder payables and contractholder receivables. In the event that the Company is unable to collect from the policyholder, the Company would be liable for such defaulted amounts. Collateral, primarily in the form of letters of credit, cash and trusts, is obtained from the policyholder to mitigate the Company's credit risk. In the instances where the Company receives collateral in the form of cash, the Company reflects it in "Collateral held for insured obligations."

Contractholder receivables are reported net of an allowance for expected credit losses. The allowance is based upon the Company's ongoing review of amounts outstanding, changes in policyholder credit standing, amounts and form of collateral obtained, and other relevant factors. A ratings based probability-of-default and loss-given-default methodology is used to estimate the allowance for expected credit losses. Any allowance for credit losses is charged to net realized gains (losses) in the period the receivable is recorded and revised in subsequent periods to reflect changes in the Company's estimate of expected credit losses. See note 7, "Allowance for Expected Credit Losses" for additional information.

(l) Foreign Exchange

Assets and liabilities of foreign operations whose functional currency is not the U.S. Dollar are translated at the prevailing exchange rates at each balance sheet date. Revenues and expenses of such foreign operations are translated at average exchange rates during the year. The net effect of the translation adjustments for foreign operations is included in accumulated other comprehensive income, net of applicable deferred income tax. Monetary assets and liabilities, such as premiums receivable and the reserve for losses and loss adjustment expenses, denominated in foreign currencies are revalued at the exchange rate in effect at the balance sheet date with the resulting foreign exchange gains and losses included in net income. Accounts that are classified as non-monetary, such as deferred acquisition costs and the unearned premium reserves, are not revalued. In the case of foreign currency denominated fixed maturity securities which are classified as "available for sale," the change in exchange rates between the local currency in which the investments are denominated and the Company's functional currency at each balance sheet date is included in unrealized appreciation or decline in value of securities, a component of accumulated other comprehensive income, net of applicable deferred income tax.

(m) Income Taxes

Deferred income taxes reflect the expected future tax consequences of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and amounts used for income tax purposes. A valuation allowance is recorded if it is more likely than not that some or all of a deferred tax asset may not be realized. The Company considers future taxable income and feasible tax planning strategies in assessing the need for a valuation allowance. In the event the Company determines that it will not be able to realize all or part of its deferred income tax assets in the future, an adjustment to the deferred income tax assets would be charged to income in the period in which such determination is made. In addition, if the Company subsequently assesses that the valuation allowance is no longer needed, a benefit would be recorded to income in the period in which such determination is made. See note 15, "Income Taxes" for additional information.

The Company recognizes a tax benefit where it concludes that it is more likely than not that the tax benefit will be sustained on audit by the taxing authority based solely on the technical merits of the associated tax position. If the recognition threshold is met, the Company recognizes a tax benefit measured at the largest amount of the tax benefit that, in the Company's judgment, is greater than 50% likely to be realized. The Company records interest and penalties related to unrecognized tax benefits in the provision for income taxes.

(n) Share-Based Payment Arrangements

The Company applies a fair value based measurement method in accounting for its share-based payment arrangements with eligible employees and directors. Compensation expense is estimated based on the fair value of the award at the grant date and is recognized in net income over the requisite service period with a corresponding increase in shareholders' equity. No value is attributed to awards that employees forfeit because they fail to satisfy vesting conditions. The Company's (i) time-based awards generally vest over a three year period with one-third vesting on the first, second and third anniversaries of the grant date and (ii) performance-based awards cliff vest after each three

year performance period based on achievement of the specified performance criteria. The share-based compensation expense associated with awards that have graded vesting features and vest based on service conditions only is calculated on a straight-line basis over the requisite service period for the entire award. Compensation expense recognized in connection with performance awards is based on the achievement of the specified performance and service conditions. The final measure of compensation expense recognized over the requisite service period reflects the final performance outcome. During the recognition period compensation expense is accrued based on the performance condition that is probable of achievement. For awards granted to retirement-eligible employees where no service is required for the employee to retain the award, the grant date fair value is immediately recognized as compensation expense at the grant date because the employee is able to retain the award without continuing to provide service. For employees near retirement eligibility, attribution of compensation cost is over the period from the grant date to the retirement eligibility date. These charges had no impact on the Company's cash flows or total shareholders' equity. See note 22, "Share-Based Compensation" for information relating to the Company's share-based payment awards.

(o) Guaranty Fund and Other Related Assessments

Liabilities for guaranty fund and other related assessments in the Company's insurance and reinsurance operations are accrued when the Company receives notice that an amount is payable, or earlier if a reasonable estimate of the assessment can be made.

(p) Treasury Shares

Treasury shares are common shares purchased by the Company and not subsequently canceled. These shares are recorded at cost and result in a reduction of the Company's shareholders' equity in its Consolidated Balance Sheets.

(q) Goodwill and Intangible Assets

Goodwill represents the excess of the purchase price of an acquisition over the fair value of the net assets acquired and is assigned to the applicable reporting unit at acquisition. Goodwill is evaluated for impairment on an annual basis. Impairment tests may be performed more frequently if the facts and circumstances indicate a possible impairment. In performing impairment tests, the Company may first assess qualitative factors to determine whether it is more likely than not (that is, more than a 50% probability) that the fair value of a reporting unit exceeds its carrying amount as a basis for determining whether it is necessary to perform goodwill impairment test described in the accounting guidance.

Indefinite-lived intangible assets, such as insurance licenses are evaluated for impairment similar to goodwill. Finite-lived intangible assets and liabilities include the value of acquired insurance and reinsurance contracts, which are estimated based on the present value of future expected cash flows and amortized in proportion to the estimated profits expected to be realized. Other finite-lived intangible assets, including customer lists, trade name and IT platforms, are amortized over their useful lives. Finite-lived intangible assets and liabilities are periodically reviewed for indicators of impairment. An impairment is recognized when the carrying amount is not recoverable from its undiscounted cash flows and is measured as the difference between the carrying amount and fair value.

If goodwill or intangible assets are impaired, such assets are written down to their fair values with the related expense recorded in the Company's results of operations.

(r) Investment in Operating Affiliates

Investment in operating affiliates primarily represent the Company's investments in which it has significant influence and which are accounted for under the equity method of accounting. In applying the equity method of accounting, investments in operating affiliates are initially recorded at cost and are subsequently adjusted based on the Company's proportionate share of net income or loss of the operating affiliate. The Company records its proportionate share of other comprehensive income or loss of the operating affiliate as a component of other comprehensive income. Adjustments are based on the most recently available financial information from the operating affiliate. Changes in the carrying value of these investments are recorded in income (loss) from operating affiliates.

(s) Recent Accounting Pronouncements

Recently Issued Accounting Standards Adopted

The Company adopted ASU 2019-12, "Simplifying the Accounting for Income Taxes." This ASU eliminates certain exceptions for recognizing deferred taxes for investments, performing intraperiod tax allocations and calculating income taxes in interim periods. The ASU also clarifies the accounting for transactions that result in a step-up in the tax basis of goodwill. The adoption of this guidance did not have a material effect on the Company's consolidated financial statements.

Recently Issued Accounting Standards Not Yet Adopted

ASU 2020-04, "Facilitation of the Effects of Reference Rate Reform on Financial Reporting," was issued in March 2020. This ASU provides optional expedients and exceptions for applying GAAP to investments, derivatives, or other transactions that reference the London Interbank Offered Rate (LIBOR) or another reference rate expected to be

discontinued because of reference rate reform. Along with the optional expedients, the amendments include a general principle that permits an entity to consider contract modifications due to reference reform to be an event that does not require contract re-measurement at the modification date or reassessment of a previous accounting determination. This standard may be elected over time through December 31, 2022 as reference rate reform activities occur. The Company is currently evaluating the impact of the new guidance on its consolidated financial statements and does not expect this guidance to have a material effect on the Company's consolidated financial statements.

4. Segment Information

The Company classifies its businesses into three underwriting segments– insurance, reinsurance and mortgage– and two operating segments– corporate and 'other.' 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 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 of Arch Capital, Chief Financial Officer and Treasurer of Arch Capital and the President and Chief Underwriting Officer of Arch Capital. The chief operating decision makers 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 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:* primary and excess casualty coverages to middle and large accounts in the construction industry and a wide range of products for middle and large national accounts, specializing in loss sensitive primary casualty insurance programs (including large deductible, self-insured retention and retrospectively rated programs).
- *Excess and surplus casualty:* primary and excess casualty insurance coverages, including middle market energy business, and contract binding, which primarily provides casualty coverage through a network of appointed agents to small and medium risks.
- *Lenders products:* 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.
- *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 and medical professional and general liability insurance coverages for the healthcare industry. The business is predominately written on a claims-made basis.
- *Programs:* primarily package policies, underwriting workers' compensation and umbrella liability business in support of desirable package programs, targeting program managers with unique expertise and niche products offering general liability, commercial automobile, inland marine and property business with minimal catastrophe exposure.
- *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, war, specie and liability. Aviation and stand-alone terrorism are also offered.
- *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.
- *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 and commercial surety coverages, including contract bonds (payment and performance bonds) primarily for medium and large contractors and commercial surety bonds for Fortune 1000 companies and smaller transaction business programs.

The reinsurance segment consists of the Company's reinsurance underwriting units which offer specialty product lines on a worldwide basis. Product lines include:

- *Casualty:* provides coverage to ceding company clients on third party liability and workers' compensation exposures from ceding company clients, primarily on a treaty basis. Exposures include, among others, executive assurance, professional liability, workers' compensation, excess and umbrella liability, excess motor and healthcare business.
- *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 to ceding company clients for proportional motor and other lines including surety, accident and health, workers' compensation catastrophe, agriculture, trade credit and political risk.
- *Property catastrophe:* provides protection for most catastrophic losses that are covered in the underlying policies written by reinsureds, including hurricane, earthquake, flood, tornado, hail and fire, and coverage for other perils on a case-by-case basis. Property catastrophe reinsurance provides coverage on an excess of loss basis when aggregate losses and loss adjustment expense from a single occurrence of a covered peril exceed the retention specified in the contract.
- *Property excluding property catastrophe:* provides coverage for both personal lines and 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 both a proportional and excess of loss basis. In addition, facultative business is written which focuses on commercial property risks on an excess of loss basis.
- *Other.* includes life reinsurance business on both a proportional and non-proportional basis, casualty clash business and, in limited instances, non-traditional business which is intended to provide insurers with risk management solutions that complement traditional reinsurance.

The mortgage segment includes the Company's U.S. primary mortgage insurance, U.S. credit risk transfer ("CRT") which are predominately with government sponsored enterprises ("GSE") and international mortgage insurance and reinsurance operations. AMIC and UGRIC (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. Such amounts exclude the results of the 'other' segment.

The 'other' segment included the results of Somers through June 30, 2021. In July 2021, the Company completed the previously disclosed acquisition of Somers by Greysbridge. Based on the governing documents of Greysbridge, the Company concluded that, while it retains significant influence over Somers, Somers no longer constitutes a variable interest entity. Accordingly, effective July 1, 2021, Arch no longer consolidates the results of Somers in its consolidated financial statements (see note 12, "Variable Interest Entity and Noncontrolling Interests").

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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, summary information regarding net premiums written and earned by major line of business and net premiums written by location:

	Year Ended December 31, 2021					
	Insurance	Reinsurance	Mortgage	Sub-Total	Other	Total
Gross premiums written (1)	$ 5,867,734	$ 5,093,930	$ 1,507,825	$ 12,463,788	$ 457,465	$ 12,752,487
Premiums ceded	(1,719,541)	(1,839,556)	(246,757)	(3,800,153)	(102,763)	(3,734,150)
Net premiums written	4,148,193	3,254,374	1,261,068	8,663,635	354,702	9,018,337
Change in unearned premiums	(521,725)	(413,931)	22,351	(913,305)	(22,734)	(936,039)
Net premiums earned	3,626,468	2,840,443	1,283,419	7,750,330	331,968	8,082,298
Other underwriting income (loss)	—	3,669	17,665	21,334	739	22,073
Losses and loss adjustment expenses	(2,344,365)	(1,924,719)	(56,677)	(4,325,761)	(259,042)	(4,584,803)
Acquisition expenses	(606,265)	(536,754)	(97,418)	(1,240,437)	(62,741)	(1,303,178)
Other operating expenses	(558,906)	(212,810)	(194,010)	(965,726)	(32,869)	(998,595)
Underwriting income (loss)	$ 116,932	$ 169,829	$ 952,979	1,239,740	(21,945)	1,217,795
Net investment income				346,808	42,310	389,118
Net realized gains (losses)				299,207	80,638	379,845
Equity in net income (loss) of investments accounted for using the equity method				366,402	—	366,402
Other income (loss)				10,244	—	10,244
Corporate expenses				(77,119)	—	(77,119)
Transaction costs and other				(1,103)	(935)	(2,038)
Amortization of intangible assets				(82,057)	(898)	(82,955)
Interest expense				(131,060)	(8,410)	(139,470)
Net foreign exchange gains (losses)				42,854	(1,325)	41,529
Income (loss) before income taxes and income (loss) from operating affiliates				2,013,916	89,435	2,103,351
Income tax expense				(128,348)	(234)	(128,582)
Income (loss) from operating affiliates				264,693	—	264,693
Net income (loss)				2,150,261	89,201	2,239,462
Amounts attributable to redeemable noncontrolling interests				(2,346)	(1,953)	(4,299)
Amounts attributable to nonredeemable noncontrolling interests				—	(78,314)	(78,314)
Net income (loss) available to Arch				2,147,915	8,934	2,156,849
Preferred dividends				(48,343)	—	(48,343)
Loss on redemption of preferred shares				(15,101)	—	(15,101)
Net income (loss) available to Arch common shareholders				$ 2,084,471	$ 8,934	$ 2,093,405
Underwriting Ratios						
Loss ratio	64.6%	67.8%	4.4%	55.8%	78.0%	56.7%
Acquisition expense ratio	16.7%	18.9%	7.6%	16.0%	18.9%	16.1%
Other operating expense ratio	15.4%	7.5%	15.1%	12.5%	9.9%	12.4%
Combined ratio	96.7%	94.2%	27.1%	84.3%	106.8%	85.2%
Goodwill and intangible assets	$ 256,434	$ 183,523	$ 505,026	$ 944,983	$ —	$ 944,983
Total investable assets				$ 27,442,153	$ —	$ 27,442,153
Total assets				45,100,945	—	45,100,945
Total liabilities				31,545,816	—	31,545,816

(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.

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	Year Ended December 31, 2020					
	Insurance	Reinsurance	Mortgage	Sub-Total	Other	Total
Gross premiums written (1)	$ 4,688,562	$ 3,472,086	$ 1,473,999	$ 9,632,691	$ 728,546	$ 10,088,068
Premiums ceded	(1,525,655)	(1,014,716)	(194,149)	(2,732,564)	(190,957)	(2,650,352)
Net premiums written	3,162,907	2,457,370	1,279,850	6,900,127	537,589	7,437,716
Change in unearned premiums	(291,487)	(295,141)	118,085	(468,543)	22,762	(445,781)
Net premiums earned	2,871,420	2,162,229	1,397,935	6,431,584	560,351	6,991,935
Other underwriting income	(31)	4,454	20,316	24,739	2,045	26,784
Losses and loss adjustment expenses	(2,092,453)	(1,628,320)	(528,344)	(4,249,117)	(440,482)	(4,689,599)
Acquisition expenses, net	(418,483)	(354,048)	(134,240)	(906,771)	(98,071)	(1,004,842)
Other operating expenses	(489,153)	(168,011)	(162,202)	(819,366)	(55,810)	(875,176)
Underwriting income (loss)	$ (128,700)	$ 16,304	$ 593,465	481,069	(31,967)	449,102
Net investment income				401,908	117,700	519,608
Net realized gains (losses)				813,781	9,679	823,460
Equity in net income (loss) of investments accounted for using the equity method				146,693	—	146,693
Other income (loss)				29	—	29
Corporate expenses				(68,492)	—	(68,492)
Transaction costs and other				(9,456)	(4,040)	(13,496)
Amortization of intangible assets				(69,031)	—	(69,031)
Interest expense				(120,214)	(23,242)	(143,456)
Net foreign exchange gains (losses)				(80,161)	(3,473)	(83,634)
Income (loss) before income taxes and income (loss) from operating affiliates				1,496,126	64,657	1,560,783
Income tax (expense) benefit				(111,812)	(26)	(111,838)
Income (loss) from operating affiliates				16,766	—	16,766
Net income (loss)				1,401,080	64,631	1,465,711
Amounts attributable to redeemable noncontrolling interests				(2,997)	(4,117)	(7,114)
Amounts attributable to nonredeemable noncontrolling interests				—	(53,076)	(53,076)
Net income (loss) available to Arch				1,398,083	7,438	1,405,521
Preferred dividends				(41,612)	—	(41,612)
Net income (loss) available to Arch common shareholders				$ 1,356,471	$ 7,438	$ 1,363,909
Underwriting Ratios						
Loss ratio	72.9%	75.3%	37.8%	66.1%	78.6 %	67.1%
Acquisition expense ratio	14.6%	16.4%	9.6%	14.1%	17.5 %	14.4%
Other operating expense ratio	17.0%	7.8%	11.6%	12.7%	10.0 %	12.5%
Combined ratio	104.5%	99.5%	59.0%	92.9%	106.1 %	94.0%
Goodwill and intangible assets	$ 280,978	$ 18,963	$ 385,272	$ 685,213	$ 7,650	$ 692,863
Total investable assets				$ 26,856,295	$ 2,657,612	$ 29,513,907
Total assets				39,791,983	3,490,314	43,282,297
Total liabilities				26,789,149	2,505,707	29,294,856

(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.

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	Year Ended December 31, 2019					
	Insurance	**Reinsurance**	**Mortgage**	**Sub-Total**	**Other**	**Total**
Gross premiums written (1)	$ 3,907,993	$ 2,323,223	$ 1,466,265	$ 7,695,645	$ 754,881	$ 8,138,960
Premiums ceded	(1,266,267)	(720,500)	(204,509)	(2,189,440)	(222,019)	(2,099,893)
Net premiums written	2,641,726	1,602,723	1,261,756	5,506,205	532,862	6,039,067
Change in unearned premiums	(244,646)	(136,334)	104,584	(276,396)	23,827	(252,569)
Net premiums earned	2,397,080	1,466,389	1,366,340	5,229,809	556,689	5,786,498
Other underwriting income	—	6,444	16,005	22,449	2,412	24,861
Losses and loss adjustment expenses	(1,615,475)	(1,011,329)	(53,513)	(2,680,317)	(453,135)	(3,133,452)
Acquisition expenses, net	(361,614)	(239,032)	(134,319)	(734,965)	(105,980)	(840,945)
Other operating expenses	(454,770)	(141,484)	(153,092)	(749,346)	(51,651)	(800,997)
Underwriting income (loss)	$ (34,779)	$ 80,988	$ 1,041,421	1,087,630	(51,665)	1,035,965
Net investment income				491,067	136,671	627,738
Net realized gains (losses)				348,037	15,161	363,198
Equity in net income (loss) of investments accounted for using the equity method				123,672	—	123,672
Corporate expenses				(65,667)	—	(65,667)
Transaction costs and other				(14,444)	—	(14,444)
Amortization of intangible assets				(82,104)	—	(82,104)
Interest expense				(93,735)	(27,137)	(120,872)
Net foreign exchange gains (losses)				(9,252)	(11,357)	(20,609)
Income (loss) before income taxes and income (loss) from operating affiliates				1,785,204	61,673	1,846,877
Income tax benefit				(155,790)	(20)	(155,810)
Income (loss) from operating affiliates				2,233	—	2,233
Net income				1,631,647	61,653	1,693,300
Amounts attributable to redeemable noncontrolling interests				—	(16,909)	(16,909)
Amounts attributable to nonredeemable noncontrolling interests				—	(40,072)	(40,072)
Net income (loss) available to Arch				1,631,647	4,672	1,636,319
Preferred dividends				(41,612)	—	(41,612)
Net income (loss) available to Arch common shareholders				$ 1,590,035	$ 4,672	$ 1,594,707
Underwriting Ratios						
Loss ratio	67.4%	69.0%	3.9%	51.3%	81.4 %	54.2%
Acquisition expense ratio	15.1%	16.3%	9.8%	14.1%	19.0 %	14.5%
Other operating expense ratio	19.0%	9.6%	11.2%	14.3%	9.3 %	13.8%
Combined ratio	101.5%	94.9%	24.9%	79.7%	109.7 %	82.5%
Goodwill and intangible assets	$ 289,021	$ 2,516	$ 438,896	$ 730,433	$ 7,650	$ 738,083
Total investable assets				$ 22,285,676	$ 2,704,589	$ 24,990,265
Total assets				34,374,468	3,510,893	37,885,361
Total liabilities				22,977,636	2,592,173	25,569,809

(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.

The following tables provide summary information regarding net premiums earned by major line of business and net premiums written by underwriting location:

INSURANCE SEGMENT	Year Ended December 31, 2021	2020	2019
Net premiums earned (1)			
Professional Lines (2)	$ 942,817	$ 655,872	$ 499,224
Property, energy, marine and aviation	702,693	517,247	298,966
Programs	506,867	432,854	414,103
Construction and national accounts	381,306	387,934	325,687
Excess and surplus casualty (3)	318,027	270,620	200,615
Travel, accident and health	255,590	190,944	305,085
Lenders products	153,958	114,687	66,079
Other (4)	365,210	301,262	287,321
Total	$ 3,626,468	$ 2,871,420	$ 2,397,080
Net premiums written by underwriting location (1)			
United States	$ 2,813,039	$ 2,158,415	$ 1,983,476
Europe	1,125,192	856,572	559,214
Other	209,962	147,920	99,036
Total	$ 4,148,193	$ 3,162,907	$ 2,641,726

(1) Insurance segment results include premiums assumed through intersegment transactions and exclude premiums ceded through intersegment transactions.
(2) Includes professional liability, executive assurance and healthcare business.
(3) Includes casualty and contract binding business.
(4) Includes alternative markets, excess workers' compensation and surety business.

REINSURANCE SEGMENT	Year Ended December 31, 2021	2020	2019
Net premiums earned (1)			
Property excluding property catastrophe	$ 836,573	$ 562,208	$ 362,841
Other Specialty (2)	818,801	626,409	478,517
Casualty (3)	666,754	549,056	429,288
Property catastrophe	280,738	237,736	90,934
Marine and aviation	152,955	109,624	48,274
Other (4)	84,622	77,196	56,535
Total	$ 2,840,443	$ 2,162,229	$ 1,466,389
Net premiums written by underwriting location (1)			
United States	$ 828,504	$ 687,622	$ 529,943
Bermuda	1,557,294	1,001,990	578,618
Europe and other	868,576	767,758	494,162
Total	$ 3,254,374	$ 2,457,370	$ 1,602,723

(1) Reinsurance segment results include premiums assumed through intersegment transactions and exclude premiums ceded through intersegment transactions.
(2) Includes proportional motor, surety, accident and health, workers' compensation catastrophe, agriculture, trade credit and other.
(3) Includes executive assurance, professional liability, workers' compensation, excess motor, healthcare and other.
(4) Includes life, casualty clash and other.

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MORTGAGE SEGMENT	Year Ended December 31, 2021	2020	2019
Net premiums earned by underwriting location			
United States	$ 970,507	$ 1,158,563	$ 1,134,849
Other	312,912	239,372	231,491
Total	$ 1,283,419	$ 1,397,935	$ 1,366,340
Net premiums written by underwriting location			
United States	$ 914,477	$ 1,021,950	$ 1,032,868
Other	346,591	257,900	228,888
Total	$ 1,261,068	$ 1,279,850	$ 1,261,756

OTHER SEGMENT	Year Ended December 31, 2021	2020	2019
Net premiums earned (1)			
Casualty (2)	$ 138,551	$ 245,272	$ 246,894
Other specialty (3)	118,356	186,717	185,547
Property catastrophe	15,235	23,037	13,399
Property excluding property catastrophe	6,578	1,130	3,503
Marine and aviation	190	429	—
Other (4)	53,058	103,766	107,346
Total	$ 331,968	$ 560,351	$ 556,689
Net premiums written by underwriting location (1)			
United States	$ 63,403	$ 115,471	$ 127,176
Europe	91,499	$ 97,753	$ 52,065
Bermuda	199,800	$ 324,365	$ 353,621
Total	$ 354,702	$ 537,589	$ 532,862

(1) Other segment results include premiums assumed through intersegment transactions and exclude premiums ceded through intersegment transactions.
(2) Includes professional liability, excess motor, programs and other.
(3) Includes proportional motor and other.
(4) Includes mortgage, US programs and other.

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:

	Year Ended December 31,		
	2021	2020	2019
Reserve for losses and loss adjustment expenses at beginning of year	$ 16,513,929	$ 13,891,842	$ 11,853,297
Unpaid losses and loss adjustment expenses recoverable	4,314,855	4,082,650	2,814,291
Net reserve for losses and loss adjustment expenses at beginning of year	12,199,074	9,809,192	9,039,006
Net incurred losses and loss adjustment expenses relating to losses occurring in:			
Current year	4,940,987	4,851,051	3,297,037
Prior years	(356,184)	(161,452)	(163,585)
Total net incurred losses and loss adjustment expenses	4,584,803	4,689,599	3,133,452
Net losses and loss adjustment expense reserves of acquired business (1)	104,176	—	209,486
Retroactive reinsurance transactions (2)	(444,147)	182,210	(225,500)
Impact of deconsolidation of Somers (3)	(1,460,611)	—	—
Foreign exchange (gains) losses and other	1,181	179,190	36,003
Net paid losses and loss adjustment expenses relating to losses occurring in:			
Current year	(734,846)	(661,529)	(621,202)
Prior years	(2,091,705)	(1,999,588)	(1,762,053)
Total net paid losses and loss adjustment expenses	(2,826,551)	(2,661,117)	(2,383,255)
Net reserve for losses and loss adjustment expenses at end of year	12,157,925	12,199,074	9,809,192
Unpaid losses and loss adjustment expenses recoverable	5,599,231	4,314,855	4,082,650
Reserve for losses and loss adjustment expenses at end of year	$ 17,757,156	$ 16,513,929	$ 13,891,842

(1) Represents activity related to the Company's acquisitions in the 2021 and the 2019 period. See Note 2.
(2) See 'Retroactive Reinsurance Transactions' section.
(3) See note 12.

Development on Prior Year Loss Reserves

Year Ended December 31, 2021

During 2021, the Company recorded estimated net favorable development on prior year loss reserves of $356.2 million, which consisted of net favorable development of $16.2 million from the insurance segment, $178.8 million from the reinsurance segment, $169.6 million from the mortgage segment, partially offset by $8.4 million of adverse development from the 'other' segment (activity prior to the deconsolidation of Somers).

The insurance segment's net favorable development of $16.2 million, or 0.4 points of net earned premium, consisted of $109.8 million of net favorable development in short-tailed and long-tailed lines mostly offset by $93.5 million of net adverse development from medium-tailed lines. Net favorable development of $81.7 million in short-tailed lines reflected $38.9 million of favorable development from property (excluding marine), primarily from the 2018 to 2020 accident years (*i.e.*, the year in which a loss occurred), $26.7 million of favorable development in lenders products, primarily from the 2020 accident year, and $16.2 million of favorable development on travel and accident, primarily from the 2016 to 2020 accident years. Net favorable development of $28.1 million in long-tailed lines reflected favorable development in construction, national accounts and alternative markets, primarily from the 2016 to 2019 accident years, partially offset by adverse development in executive assurance, primarily from the 2015, 2017 and 2018 accident years. Net adverse development in medium-tailed lines reflected $57.6 million of adverse development in contract binding, primarily from the 2013 to 2019 accident years and $30.8 million of adverse development in professional liability, primarily from the 2018 to 2020 accident years.

The reinsurance segment's net favorable development of $178.8 million, or 6.3 points of net earned premium, consisted of $184.1 million of net favorable development

from short-tailed and medium-tailed lines, partially offset by $5.3 million of net adverse development from long-tailed lines. Net favorable development of $175.5 million in short-tailed lines reflected $123.3 million from other specialty lines, primarily from the 2014 to 2019 underwriting years (*i.e.*, losses attributable to contracts having an inception or renewal date within the given twelve-month period), and $88.6 million of favorable development from property other than property catastrophe business, primarily from the 2015 to 2020 underwriting years. Such amounts were partially offset by adverse development of $36.4 million from property catastrophe, primarily from the 2020 underwriting year. Adverse development in long-tailed lines reflected an increase in casualty reserves, primarily from the 2018 underwriting year.

The mortgage segment's net favorable development of $169.6 million, or 13.2 points of net earned premium. Approximately a third of this development came from the U.S. first lien portfolio, which benefited from improving economic conditions and rising home prices, resulting in reduced claim rate assumptions primarily associated with pre-pandemic delinquencies. Various vintage CRT contracts also experienced similar effects and contributed to the favorable development, including the effect of contracts called by the GSEs. Subrogation recoveries on second lien and student loan business and international business also contributed to the favorable development.

Year Ended December 31, 2020

During 2020, the Company recorded estimated net favorable development on prior year loss reserves of $161.5 million, which consisted of net favorable development of $7.8 million from the insurance segment, $134.0 million from the reinsurance segment, $19.0 million from the mortgage segment, and $0.7 million from the 'other' segment.

The insurance segment's net favorable development of $7.8 million, or 0.3 points of net earned premium, consisted of $83.0 million of net favorable development in short-tailed and long-tailed lines partially offset by $75.2 million of net adverse development from medium-tailed lines. Net favorable development of $33.6 million in short-tailed lines reflected $21.6 million of favorable development from property (excluding marine), primarily from the 2015 to 2018 accident years, and $8.4 million of favorable development on travel and accident, primarily from the 2019 accident year. Net favorable development of $49.4 million in long-tailed lines included $38.8 million of favorable development related to other business, including alternative markets and excess workers' compensation, across all accident years, and $9.3 million of favorable development related to construction business. Net adverse development in medium-tailed lines reflected $37.9 million of adverse development in surety business, primarily from the 2019 accident year, $23.1 million in contract binding business, primarily from the 2016 to 2019 accident years, and $16.0 million in program business, primarily from the 2016 to 2019 accident years.

The reinsurance segment's net favorable development of $134.0 million, or 6.2 points of net earned premium, consisted of $155.9 million of net favorable development from short-tailed and medium-tailed lines, partially offset by $21.9 million of net adverse development from long-tailed lines. Net favorable development of $144.0 million in short-tailed lines reflected $87.7 million related to property catastrophe and property other than property catastrophe business, primarily from the 2015 to 2019 underwriting years, and $53.6 million from other specialty lines, across most underwriting years. The net reduction of loss estimates for the reinsurance segment's short-tailed lines primarily resulted from varying levels of reported and paid claims activity than previously anticipated which led to decreases in certain loss ratio selections during 2020. Adverse development in long-tailed lines reflected an increase in casualty reserves, primarily from the 2012 to 2015 underwriting years.

The mortgage segment's net favorable development of $19.0 million, or 1.4 points of net earned premium, included $16.2 million of favorable development on U.S. primary mortgage insurance business. Such development was primarily driven by subrogation recoveries on second lien business and student loan business.

Year Ended December 31, 2019

During 2019, the Company recorded estimated net favorable development on prior year loss reserves of $163.6 million, which consisted of net favorable development of $15.8 million from the insurance segment, $46.4 million from the reinsurance segment and $125.2 million from the mortgage segment, partially offset by $23.8 million of net adverse development from the 'other' segment.

The insurance segment's net favorable development of $15.8 million, or 0.7 points of net earned premium, consisted of $54.9 million of net favorable development from short-tailed lines and $39.1 million of net adverse development from medium-tailed and long-tailed lines. Net favorable development in short-tailed lines primarily resulted from lenders products and property (including special risk other than marine) reserves across all accident years, partially offset by net adverse development in travel business, primarily from the 2018 accident year. Net adverse development in medium-tailed and long-tailed lines of $39.1 million was primarily due to net adverse development of $33.6 million in contract binding business, primarily from the 2013 to 2017 accident years, and $30.1 million in programs, primarily from the 2014 and 2018 accident years. Such amounts were partially offset by net favorable

development of $19.3 million in professional liability business, primarily from the 2013 to 2016 accident years, and $15.8 million in surety business, primarily from the 2014 to 2016 accident years.

The reinsurance segment's net favorable development of $46.4 million, or 3.2 points of net earned premium, consisted of $70.5 million of net favorable development from short-tailed lines and $16.0 million of net favorable development from medium-tailed lines, partially offset by $40.1 million of net adverse development from long-tailed lines. Favorable development in short-tailed lines included $33.7 million from property catastrophe and property other than property catastrophe reserves, primarily from the 2017 and 2018 underwriting years and $40.8 million in other specialty, primarily from 2016 to 2018 underwriting years. The net reduction of loss estimates for the reinsurance segment's short-tailed lines primarily resulted from varying levels of reported and paid claims activity than previously anticipated which led to decreases in certain loss ratio selections during 2019. Net favorable development of $16.0 million in medium-tailed lines included reductions in marine and aviation reserves, primarily from the 2011 to 2017 underwriting years. Net adverse development in long-tailed lines of $40.1 million was primarily due to net adverse development of $44.5 million in casualty business, primarily from the 2013 to 2018 underwriting years.

The mortgage segment's net favorable development of $125.2 million, or 9.2 points of net earned premium, included $117.1 million of favorable development on U.S. primary mortgage insurance business. Such development was primarily driven by lower than expected claim rates on first lien business and subrogation recoveries on second lien business.

Retroactive Reinsurance Transactions

In 2021, the Company entered into a retroactive reinsurance transaction with third party reinsurer to reinsure run-off liabilities associated with certain U.S. insurance exposures.

In 2021, the Company entered into a reinsurance to close with the related party, in connection with the 2018 and prior years of account for certain London syndicate business. See Note 16.

In 2020, the Company entered into a reinsurance-to-close agreement related to a third party arrangement covering the 2017 and prior years of account for certain London syndicate business.

In 2019, the Company entered into a retroactive reinsurance transaction with third party reinsurer to reinsure run-off liabilities associated with certain U.S. insurance exposures, which was commuted in 2020.

6. Short Duration Contracts

The Company's reserves for losses and loss adjustment expenses primarily relate to short-duration contracts with various characteristics (*e.g.*, type of coverage, geography, claims duration). The Company considered such information in determining the level of disaggregation for disclosures related to its short-duration contracts, as detailed in the table below:

Reportable segment	Level of disaggregation	Included lines of business
Insurance	Property energy, marine and aviation	Property energy, marine and aviation
	Third party occurrence business	Excess and surplus casualty (excluding contract binding); construction and national accounts; and other (including alternative market risks, excess workers' compensation and employer's liability insurance coverages)
	Third party claims-made business	Professional lines
	Multi-line and other specialty	Programs; contract binding (part of excess and surplus casualty); travel, accident and health; lenders products; and other (contract and commercial surety coverages)
Reinsurance	Casualty	Casualty
	Property catastrophe	Property catastrophe
	Property excluding property catastrophe	Property excluding property catastrophe
	Marine and aviation	Marine and aviation
	Other specialty	Other specialty
Mortgage	Direct mortgage insurance in the U.S.	Mortgage insurance on U.S. primary exposures

The Company determined the following to be insignificant for disclosure purposes: (i) certain mortgage business, including non-U.S. primary business, second lien and student loan exposures, global mortgage reinsurance and participation in various GSE credit risk-sharing products, (ii) certain reinsurance business, including casualty clash and non-traditional lines and (iii) amounts associated with Southern Rock Holdings Limited. See Note 2. Such amounts are included as reconciling items.

The Company is required to establish reserves for losses and loss adjustment expenses ("Loss Reserves") that arise from the business the Company underwrites. Loss Reserves for the insurance, reinsurance and mortgage segments represent estimates of future amounts required to pay losses and loss adjustment expenses for insured or reinsured events which have occurred at or before the balance sheet date. Loss Reserves do not reflect contingency reserve allowances to account for future loss occurrences. Losses arising from

future events will be estimated and recognized at the time the losses are incurred and could be substantial.

Insurance Segment

Loss Reserves for the insurance segment are comprised of estimated amounts for (1) reported losses ("case reserves") and (2) incurred but not reported losses ("IBNR reserves"). Generally, claims personnel determine whether to establish a case reserve for the estimated amount of the ultimate settlement of individual claims. The estimate reflects the judgment of claims personnel based on general corporate reserving practices, the experience and knowledge of such personnel regarding the nature and value of the specific type of claim and, where appropriate, advice of counsel. The Company also contracts with a number of outside third party administrators in the claims process who, in certain cases, have limited authority to establish case reserves. The work of such administrators is reviewed and monitored by our claims personnel. Loss Reserves are also established to provide for loss adjustment expenses and represent the estimated expense of settling claims, including legal and other fees and the general expenses of administering the claims adjustment process. Periodically, adjustments to the case reserves may be made as additional information is reported or payments are made. IBNR reserves are established to provide for incurred claims which have not yet been reported at the balance sheet date as well as to adjust for any projected variance in case reserving. Actuaries estimate ultimate losses and loss adjustment expenses using various generally accepted actuarial methods applied to known losses and other relevant information. Like case reserves, IBNR reserves are adjusted as additional information becomes known or payments are made. The process of estimating reserves involves a considerable degree of judgment by management and, as of any given date, is inherently uncertain.

Ultimate losses and loss adjustment expenses are generally determined by projection of claim emergence and settlement patterns observed in the past that can reasonably be expected to persist into the future. In forecasting ultimate losses and loss adjustment expenses with respect to any line of business, past experience with respect to that line of business is the primary resource, developed through both industry and company experience, but cannot be relied upon in isolation. Uncertainties in estimating ultimate losses and loss adjustment expenses are magnified by the length of the time lag between when a claim actually occurs and when it is reported and settled. This time lag is sometimes referred to as the "claim-tail." During this period additional facts regarding coverages written in prior accident years, as well as about actual claims and trends, may become known and, as a result, may lead to adjustments of the related Loss Reserves. If the Company determines that an adjustment is appropriate, the adjustment is recorded in the accounting period in which such determination is made. Accordingly, should Loss Reserves need to be increased or decreased in the future from amounts currently established, future results of operations would be negatively or positively impacted respectively. The Company authorizes managing general agents, general agents and other producers to write program business on the Company's behalf within prescribed underwriting authorities. This delegated authority process introduces additional complexity to the actuarial determination of unpaid future losses and loss adjustment expenses. In order to monitor adherence to the underwriting guidelines given to such parties, the Company periodically performs underwriting and claims due diligence reviews.

In determining ultimate losses and loss adjustment expenses, the cost to indemnify claimants, provide needed legal defense and other services for insureds and administer the investigation and adjustment of claims are considered. These claim costs are influenced by many factors that change over time, such as expanded coverage definitions as a result of new court decisions, inflation in costs to repair or replace damaged property, inflation in the cost of medical services and legislated changes in statutory benefits, as well as by the particular, unique facts that pertain to each claim. As a result, the rate at which claims arose in the past and the costs to settle them may not always be representative of what will occur in the future. The factors influencing changes in claim costs are often difficult to isolate or quantify and developments in paid and incurred losses from historical trends are frequently subject to multiple and conflicting interpretations. Changes in coverage terms or claims handling practices may also cause future experience and/or development patterns to vary from the past. A key objective of actuaries in developing estimates of ultimate losses and loss adjustment expenses, and resulting IBNR reserves, is to identify aberrations and systemic changes occurring within historical experience and adjust for them so that the future can be projected more reliably. Because of the factors previously discussed, this process requires the substantial use of informed judgment and is inherently uncertain.

Although Loss Reserves are initially determined based on underwriting and pricing analyses, the Company's insurance segment applies several generally accepted actuarial methods, as discussed below, on a quarterly basis to evaluate the Loss Reserves, in addition to the expected loss method, in particular for Loss Reserves from more mature accident years (the year in which a loss occurred). Each quarter, as part of the reserving process, the segments' actuaries reaffirm that the assumptions used in the reserving process continue to form a sound basis for the projection of liabilities. If actual loss activity differs substantially from expectations based on historical information, an adjustment to Loss Reserves may be supported. The Company places more or less reliance on a particular actuarial method based on the facts and circumstances at the time the estimates of Loss Reserves are made.

These methods generally fall into one of the following categories or are hybrids of one or more of the following categories:

- *Expected loss methods* - these methods are based on the assumption that ultimate losses vary proportionately with premiums. Expected loss and loss adjustment expense ratios are typically developed based upon the information derived by underwriters and actuaries during the initial pricing of the business, supplemented by industry data available from organizations, such as statistical bureaus and consulting firms, where appropriate. These ratios consider, among other things, rate increases and changes in terms and conditions that have been observed in the market. Expected loss methods are useful for estimating ultimate losses and loss adjustment expenses in the early years of long-tailed lines of business, when little or no paid or incurred loss information is available, and is commonly applied when limited loss experience exists for a company.

- *Historical incurred loss development methods* - these methods assume that the ratio of losses in one period to losses in an earlier period will remain constant in the future. These methods use incurred losses (*i.e.*, the sum of cumulative historical loss payments plus outstanding case reserves) over discrete periods of time to estimate future losses. Historical incurred loss development methods may be preferable to historical paid loss development methods because they explicitly take into account open cases and the claims adjusters' evaluations of the cost to settle all known claims. However, historical incurred loss development methods necessarily assume that case reserving practices are consistently applied over time. Therefore, when there have been significant changes in how case reserves are established, using incurred loss data to project ultimate losses may be less reliable than other methods.

- *Historical paid loss development methods* - these methods, like historical incurred loss development methods, assume that the ratio of losses in one period to losses in an earlier period will remain constant. These methods use historical loss payments over discrete periods of time to estimate future losses and necessarily assume that factors that have affected paid losses in the past, such as inflation or the effects of litigation, will remain constant in the future. Because historical paid loss development methods do not use incurred losses to estimate ultimate losses, they may be more reliable than the other methods that use incurred losses in situations where there are significant changes in how incurred losses are established by a company's claims adjusters. However, historical paid loss development methods are more leveraged (meaning that small changes in payments have a larger impact on estimates of ultimate losses) than actuarial methods that use incurred losses because cumulative loss payments take much longer to equal the expected ultimate losses than cumulative incurred amounts. In addition, and for similar reasons, historical paid loss development methods are often slow to react to situations when new or different factors arise than those that have affected paid losses in the past.

- *Adjusted historical paid and incurred loss development methods* - these methods take traditional historical paid and incurred loss development methods and adjust them for the estimated impact of changes from the past in factors such as inflation, the speed of claim payments or the adequacy of case reserves. Adjusted historical paid and incurred loss development methods are often more reliable methods of predicting ultimate losses in periods of significant change, provided the actuaries can develop methods to reasonably quantify the impact of changes. As such, these methods utilize more judgment than historical paid and incurred loss development methods.

- *Bornhuetter-Ferguson ("B-F") paid and incurred loss methods* - these methods utilize actual paid and incurred losses and expected patterns of paid and incurred losses, taking the initial expected ultimate losses into account to determine an estimate of expected ultimate losses. The B-F paid and incurred loss methods are useful when there are few reported claims and a relatively less stable pattern of reported losses.

- *Frequency-Severity methods* - These methods utilize actual paid and incurred claim experience, but break the data down into its component pieces: claim counts, often expressed as a ratio to exposure or premium (frequency), and average claim size (severity). The component pieces are projected to an ultimate level and multiplied together to result in an estimate of ultimate loss. These methods are especially useful when the severity of claims can be confined to a relatively stable range of estimated ultimate average claim value.

- *Additional analyses* - other methodologies are often used in the reserving process for specific types of claims or events, such as catastrophic or other specific major events. These include vendor catastrophe models, which are typically used in the estimation of Loss Reserves at the early stage of known catastrophic events before information has been reported to an insurer or reinsurer.

In the initial reserving process for short-tail insurance lines (consisting of property, energy, marine and aviation and other exposures including travel, accident and health and lenders products), the Company relies on a combination of the reserving methods discussed above. For catastrophe-exposed business, the reserving process also includes the usage of catastrophe models for known events and a heavy

reliance on analysis of individual catastrophic events and management judgment. The development of losses on short-tail business can be unstable, especially for policies characterized by high severity, low frequency losses. As time passes, for a given accident year, additional weight is given to the paid and incurred B-F loss development methods and eventually to the historical paid and incurred loss development methods in the reserving process. The Company makes a number of key assumptions in their reserving process, including that historical paid and reported development patterns are stable, catastrophe models provide useful information about our exposure to catastrophic events that have occurred and underwriters' judgment as to potential loss exposures can be relied on. The expected loss ratios used in the initial reserving process for short-tail business have varied over time due to changes in pricing, reinsurance structure, estimates of catastrophe losses, policy changes (such as attachment points, class and limits) and geographical distribution. As losses in short-tail lines are reported relatively quickly, expected loss ratios are selected for the current accident year based upon actual attritional loss ratios for earlier accident years, adjusted for rate changes, inflation, changes in reinsurance programs and expected attritional losses based on modeling. Furthermore, ultimate losses for short-tail business are known in a reasonably short period of time.

In the initial reserving process for medium-tail and long-tail insurance lines (consisting of third party occurrence business, third party claims made business, and other exposures including surety, programs and contract binding exposures), the Company primarily relies on the expected loss method. The development of the Company's medium-tail and long-tail business may be unstable, especially if there are high severity major events, as a portion of the Company's casualty business is in high excess layers. As time passes, for a given accident year, additional weight is given to the paid and incurred B-F loss development methods and historical paid and incurred loss development methods in the reserving process. The Company makes a number of key assumptions in reserving for medium-tail and long-tail lines, including that the pricing loss ratio is the best estimate of the ultimate loss ratio at the time the policy is entered into, that the loss development patterns, which are based on a combination of company and industry loss development patterns and adjusted to reflect differences in the insurance segment's mix of business, are reasonable and that claims personnel and underwriters analyses of our exposure to major events are assumed to be the best estimate of exposure to the known claims on those events. The expected loss ratios used in the initial reserving process for medium-tail and long-tail business for recent accident years have varied over time, in some cases significantly, from earlier accident years. As the credibility of historical experience for earlier accident years increases, the experience from these accident years will be given a greater weighting in the actuarial analysis to determine future accident year expected loss ratios, adjusted for changes in pricing, loss trends, terms and conditions and reinsurance structure.

In 2021 and 2018, the Company entered into loss portfolio transfer and adverse development cover reinsurance agreements accounted for as retroactive reinsurance. The agreements transfers Loss Reserves and future favorable or adverse development on certain runoff programs and certain third party occurrence business, within multi-line and other specialty business (the "Covered Lines"). As incurred losses and allocated loss adjustment expenses for the Covered Lines are ceded to the reinsurer, the Company is not exposed to changes in the amount, timing and uncertainty of cash flows arising from the Covered Lines. To avoid distortion, the incurred losses and allocated loss adjustment expenses and cumulative paid losses and loss adjustment expenses for the Covered Lines are excluded entirely from the tables below. Unpaid loss and loss adjustment expenses recoverable at December 31, 2021 included $390.1 million related to such reinsurance agreements.

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The following tables present information on the insurance segment’s short-duration insurance contracts:

Property, energy, marine and aviation ($000’s except claim count)

	Incurred losses and allocated loss adjustment expenses, net of reinsurance										December 31, 2021	
	Year ended December 31,											
Accident year	2012 unaudited	2013 unaudited	2014 unaudited	2015 unaudited	2016 unaudited	2017 unaudited	2018 unaudited	2019 unaudited	2020 unaudited	2021	Total of IBNR liabilities plus expected development on reported claims	Cumulative number of reported claims
2012	$ 233,149	$ 232,498	$ 205,776	$ 199,469	$ 197,005	$ 192,993	$ 190,770	$ 178,616	$ 178,250	$ 178,343	$ 627	4,245
2013		159,102	156,785	149,199	143,400	134,952	133,869	128,624	127,290	126,276	25	4,243
2014			148,368	145,957	147,465	136,201	132,307	134,329	135,032	134,942	3,098	3,884
2015				112,409	109,865	103,995	102,515	97,852	91,830	91,892	3,804	4,536
2016					104,449	101,306	105,657	100,471	96,437	92,553	874	6,160
2017						280,715	246,291	235,951	230,439	231,228	8,248	6,426
2018							180,981	186,030	173,693	170,057	9,136	5,020
2019								179,056	178,564	165,477	6,667	5,080
2020									359,394	329,362	66,698	4,186
2021										426,870	158,163	2,951
									Total	$1,947,000		

	Cumulative paid losses and allocated loss adjustment expenses, net of reinsurance									
2012	$ 20,638	$ 93,394	$ 138,977	$ 161,831	$ 167,540	$ 179,945	$ 181,307	$ 173,184	$ 174,032	$ 174,384
2013		32,292	84,936	110,808	120,111	122,244	125,475	123,356	124,688	124,841
2014			25,881	53,751	77,892	84,195	87,812	98,553	115,383	122,296
2015				23,580	64,953	76,338	86,253	87,926	86,246	87,316
2016					24,828	83,552	98,683	97,506	95,002	91,241
2017						30,228	139,867	195,532	211,708	215,895
2018							30,026	102,285	134,858	142,838
2019								26,130	105,380	133,911
2020									55,619	194,487
2021										90,423
									Total	1,377,632
							All outstanding liabilities before 2012, net of reinsurance			17,517
							Liabilities for losses and loss adjustment expenses, net of reinsurance			$ 586,885

Third party occurrence business ($000’s except claim count)

	Incurred losses and allocated loss adjustment expenses, net of reinsurance										December 31, 2021	
	Year ended December 31,											
Accident year	2012 unaudited	2013 unaudited	2014 unaudited	2015 unaudited	2016 unaudited	2017 unaudited	2018 unaudited	2019 unaudited	2020 unaudited	2021	Total of IBNR liabilities plus expected development on reported claims	Cumulative number of reported claims
2012	$ 241,368	$ 263,451	$ 269,204	$ 272,004	$ 258,371	$ 253,758	$ 243,863	$ 244,448	$ 242,332	$ 239,075	$ 43,924	65,731
2013		283,228	297,225	307,152	302,165	282,122	274,717	272,849	269,754	270,558	54,640	67,113
2014			330,015	336,019	338,890	343,113	339,701	344,197	342,934	343,569	66,498	75,904
2015				359,058	391,884	398,908	392,143	391,455	382,722	386,801	91,081	78,785
2016					389,832	394,485	406,082	399,571	374,896	367,818	115,303	79,005
2017						417,377	417,941	422,624	412,512	407,115	145,130	84,692
2018							430,415	453,190	450,937	451,459	189,965	77,700
2019								456,353	487,547	481,045	253,849	84,895
2020									607,249	616,910	428,750	89,560
2021										622,713	543,386	65,477
									Total	$4,187,063		

	Cumulative paid losses and allocated loss adjustment expenses, net of reinsurance									
2012	$ 6,984	$ 30,915	$ 58,650	$ 83,637	$ 108,660	$ 130,098	$ 143,885	$ 155,085	$ 163,016	$ 168,119
2013		6,857	29,265	71,449	101,293	122,288	149,292	164,403	174,946	184,800
2014			9,228	40,346	71,624	112,702	162,123	191,305	211,643	224,101
2015				11,139	44,605	88,515	139,492	181,704	211,715	227,697
2016					11,709	41,979	87,616	136,870	164,662	194,773
2017						13,408	52,356	99,874	135,111	165,606
2018							17,025	63,848	115,137	154,248
2019								18,431	73,222	121,859
2020									24,509	76,743
2021										26,301
									Total	1,544,247
							All outstanding liabilities before 2012, net of reinsurance			242,741
							Liabilities for losses and loss adjustment expenses, net of reinsurance			$2,885,557

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

Third party claims-made business ($000's except claim count)

	Incurred losses and allocated loss adjustment expenses, net of reinsurance										December 31, 2021	
	Year ended December 31,											
Accident year	2012 unaudited	2013 unaudited	2014 unaudited	2015 unaudited	2016 unaudited	2017 unaudited	2018 unaudited	2019 unaudited	2020 unaudited	2021	Total of IBNR liabilities plus expected development on reported claims	Cumulative number of reported claims
2012	$ 317,654	$ 320,207	$ 318,453	$ 313,907	$ 291,316	$ 275,665	$ 277,683	$ 285,163	$ 285,527	$ 286,118	$ 11,570	15,576
2013		301,956	320,659	324,442	320,524	294,674	291,205	281,996	271,501	273,948	11,739	15,696
2014			264,537	279,846	299,104	279,043	282,058	298,017	292,247	288,318	22,336	15,676
2015				258,989	277,615	276,492	260,063	255,432	252,478	267,925	20,617	14,724
2016					275,394	291,645	308,453	314,747	322,042	327,230	42,509	15,749
2017						271,088	286,565	312,554	308,917	323,854	60,718	16,404
2018							273,521	315,085	320,653	337,083	85,411	15,854
2019								290,217	318,469	318,498	119,673	12,982
2020									384,852	414,580	240,888	10,049
2021										516,420	435,910	8,550
									Total	$3,353,974		

	Cumulative paid losses and allocated loss adjustment expenses, net of reinsurance									
2012	$ 17,718	$ 69,069	$ 121,211	$ 164,724	$ 190,395	$ 209,295	$ 227,389	$ 251,313	$ 255,337	$ 260,173
2013		19,032	87,458	137,963	179,395	198,008	217,132	238,951	245,687	247,078
2014			13,817	63,312	129,712	173,089	208,074	229,958	243,791	249,960
2015				9,066	52,046	100,089	126,499	174,161	193,186	216,986
2016					10,568	68,226	127,286	158,230	205,596	242,431
2017						9,306	67,669	113,208	143,340	196,125
2018							12,287	68,424	118,361	158,709
2019								12,418	65,477	122,362
2020									17,161	87,547
2021										23,349
									Total	1,804,720
	All outstanding liabilities before 2012, net of reinsurance									64,171
	Liabilities for losses and loss adjustment expenses, net of reinsurance									$1,613,425

Multi-line and other specialty ($000's except claim count)

	Incurred losses and allocated loss adjustment expenses, net of reinsurance										December 31, 2021	
	Year ended December 31,											
Accident year	2012 unaudited	2013 unaudited	2014 unaudited	2015 unaudited	2016 unaudited	2017 unaudited	2018 unaudited	2019 unaudited	2020 unaudited	2021	Total of IBNR liabilities plus expected development on reported claims	Cumulative number of reported claims
2012	$ 254,684	$ 265,479	$ 259,582	$ 257,240	$ 256,379	$ 248,066	$ 248,310	$ 245,205	$ 245,260	$ 243,849	$ 2,057	55,219
2013		266,089	274,285	265,594	265,672	253,554	254,916	250,252	247,443	246,682	3,461	71,613
2014			303,053	327,098	319,706	319,418	318,297	314,300	311,097	310,097	5,770	109,575
2015				335,250	358,587	357,364	365,362	357,123	349,895	347,669	7,201	148,924
2016					409,367	431,760	428,579	416,724	410,610	408,621	11,032	175,261
2017						483,414	502,068	492,166	501,753	505,135	16,867	219,810
2018							513,466	565,717	563,969	566,283	32,467	247,052
2019								568,337	613,673	641,832	63,880	235,824
2020									622,241	572,265	192,056	149,004
2021										637,258	361,237	75,250
									Total	$4,479,691		

	Cumulative paid losses and allocated loss adjustment expenses, net of reinsurance									
2012	$ 78,523	$ 166,414	$ 190,754	$ 209,916	$ 223,798	$ 232,640	$ 233,862	$ 237,221	$ 240,191	$ 239,928
2013		86,911	151,897	181,721	214,941	226,769	235,801	237,863	238,792	239,831
2014			108,003	197,609	235,079	267,959	282,104	292,638	294,049	295,551
2015				138,393	236,516	278,265	306,313	321,395	327,082	330,872
2016					176,238	305,250	342,345	363,392	379,885	385,890
2017						181,454	343,049	381,419	424,219	446,749
2018							212,316	390,009	443,644	480,852
2019								212,629	386,894	488,094
2020									173,123	311,112
2021										157,346
									Total	3,376,225
	All outstanding liabilities before 2012, net of reinsurance									22,375
	Liabilities for losses and loss adjustment expenses, net of reinsurance									$1,125,841

The following table presents the average annual percentage payout of incurred losses and allocated loss adjustment expenses by age, net of reinsurance, as of December 31, 2021:

	Average annual percentage payout of incurred losses and allocated loss adjustment expenses by age, net of reinsurance									
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Property, energy, marine and aviation	19.3 %	43.5 %	19.1 %	6.6 %	1.4 %	2.3 %	3.2 %	0.5 %	0.3 %	0.2 %
Third party occurrence business	3.3 %	9.3 %	11.6 %	11.0 %	9.8 %	8.7 %	5.4 %	4.1 %	3.5 %	2.1 %
Third party claims-made business	4.4 %	18.0 %	17.8 %	12.3 %	12.7 %	7.9 %	7.0 %	4.3 %	1.0 %	1.7 %
Multi-line and other specialty	34.7 %	29.5 %	11.0 %	8.6 %	4.6 %	2.8 %	0.7 %	0.7 %	0.8 %	(0.1)%

Reinsurance Segment

Loss Reserves for the Company’s reinsurance segment are comprised of (1) case reserves, (2) additional case reserves (“ACRs”) and (3) IBNR reserves. The Company receives reports of claims notices from ceding companies and records case reserves based upon the amount of reserves recommended by the ceding company. Case reserves may be supplemented by ACRs, which may be estimated by the Company’s claims personnel ahead of official notification from the ceding company, or when judgment regarding the size or severity of the known event differs from the ceding company. In certain instances, the Company establishes ACRs even when the ceding company does not report any liability on a known event. In addition, specific claim information reported by ceding companies or obtained through claim audits can alert the Company to emerging trends such as changing legal interpretations of coverage and liability, claims from unexpected sources or classes of business, and significant changes in the frequency or severity of individual claims. Such information is often used in the process of estimating IBNR reserves. IBNR reserves are established to provide for incurred claims which have not yet been reported at the balance sheet date as well as to adjust for any projected variance in case reserving. Actuaries estimate ultimate losses and loss adjustment expenses using various generally accepted actuarial methods applied to known losses and other relevant information. Like case reserves, IBNR reserves are adjusted as additional information becomes known or payments are made. The process of estimating Loss Reserves involves a considerable degree of judgment by management and, as of any given date, is inherently uncertain.

The estimation of Loss Reserves for the reinsurance segment is subject to the same risk factors as the estimation of Loss Reserves for the insurance segment. In addition, the inherent uncertainties of estimating such reserves are even greater for reinsurers, due primarily to the following factors: (1) the claim-tail for reinsurers is generally longer because claims are first reported to the ceding company and then to the reinsurer through one or more intermediaries, (2) the reliance on premium estimates, where reports have not been received from the ceding company, in the reserving process, (3) the potential for writing a number of reinsurance contracts with different ceding companies with the same exposure to a single loss event, (4) the diversity of loss development patterns among different types of reinsurance contracts, (5) the necessary reliance on the ceding companies for information regarding reported claims and (6) the differing reserving practices among ceding companies.

Ultimate losses and loss adjustment expenses are generally determined by projection of claim emergence and settlement patterns observed in the past that can reasonably be expected to persist into the future. As with the insurance segment, the process of estimating Loss Reserves for the reinsurance segment involves a considerable degree of judgment by management and, as of any given date, is inherently uncertain. As discussed above, such uncertainty is greater for reinsurers compared to insurers. As a result, our reinsurance operations obtain information from numerous sources to assist in the process. Pricing actuaries from the reinsurance segment devote considerable effort to understanding and analyzing a ceding company’s operations and loss history during the underwriting of the business, using a combination of ceding company and industry statistics. Such statistics normally include historical premium and loss data by class of business, individual claim information for larger claims, distributions of insurance limits provided, loss reporting and payment patterns, and rate change history. This analysis is used to project expected loss ratios for each treaty during the upcoming contract period.

As mentioned above, there can be a considerable time lag from the time a claim is reported to a ceding company to the time it is reported to the reinsurer. The lag can be several years in some cases and may be attributed to a number of reasons, including the time it takes to investigate a claim, delays associated with the litigation process, the deterioration in a claimant’s physical condition many years after an accident occurs, the case reserving approach of the ceding company, etc. In the reserving process, the Company assumes that such lags are predictable, on average, over time and therefore the lags are contemplated in the loss reporting patterns used in their actuarial methods. This means that the reinsurance segment must rely on estimates for a longer period of time than does an insurance company. Backlogs in the recording of assumed reinsurance can also complicate the accuracy of loss reserve estimation. As of December 31, 2021 there were no significant backlogs related to the processing of assumed reinsurance information at our reinsurance operations.

The reinsurance segment relies heavily on information reported by ceding companies, as discussed above. In order to determine the accuracy and completeness of such information, underwriters, actuaries, and claims personnel often perform audits of ceding companies and regularly review information received from ceding companies for unusual or unexpected results. Material findings are usually discussed with the ceding companies. The Company sometimes encounters situations where they determine that a claim presentation from a ceding company is not in accordance with contract terms. In these situations, the Company attempts to resolve the dispute with the ceding company. Most situations are resolved amicably and without the need for litigation or arbitration. However, in the infrequent situations where a resolution is not possible, the Company will vigorously defend its position in such disputes.

Although Loss Reserves are initially determined based on underwriting and pricing analysis, the Company applies several generally accepted actuarial methods, as discussed above, on a quarterly basis to evaluate its Loss Reserves in addition to the expected loss method, in particular for reserves from more mature underwriting years (the year in which business is underwritten). Each quarter, as part of the reserving process, the Company's actuaries reaffirm that the assumptions used in the reserving process continue to form a sound basis for projection of liabilities. If actual loss activity differs substantially from expectations based on historical information, an adjustment to Loss Reserves may be supported. Estimated Loss Reserves for more mature underwriting years are now based more on actual loss activity and historical patterns than on the initial assumptions based on pricing indications. More recent underwriting years rely more heavily on internal pricing assumptions. The Company places more or less reliance on a particular actuarial method based on the facts and circumstances at the time the estimates of Loss Reserves are made.

In the initial reserving process for short-tail reinsurance lines (consisting of property excluding property catastrophe and property catastrophe exposures), the Company relies on a combination of the reserving methods discussed above. For known catastrophic events, the reserving process also includes the usage of catastrophe models and a heavy reliance on analysis which includes ceding company inquiries and management judgment. The development of property losses may be unstable, especially where there is high catastrophic exposure, may be characterized by high severity, low frequency losses for excess and catastrophe-exposed business and may be highly correlated across contracts. As time passes, for a given underwriting year, additional weight is given to the paid and incurred B-F loss development methods and historical paid and incurred loss development methods in the reserving process. The Company makes a number of key assumptions in reserving for short-tail lines, including that historical paid and reported development patterns are stable, catastrophe models provide useful information about our exposure to catastrophic events that have occurred and our underwriters' judgment and guidance received from ceding companies as to potential loss exposures may be relied on. The expected loss ratios used in the initial reserving process for property exposures have varied over time due to changes in pricing, reinsurance structure, estimates of catastrophe losses, terms and conditions and geographical distribution. As losses in property lines are reported relatively quickly, expected loss ratios are selected for the current underwriting year incorporating the experience for earlier underwriting years, adjusted for rate changes, inflation, changes in reinsurance programs, expectations about present and future market conditions and expected attritional losses based on modeling. Due to the short-tail nature of property business, reported loss experience emerges quickly and ultimate losses are known in a reasonably short period of time.

In the initial reserving process for medium-tail and long-tail reinsurance lines (consisting of casualty, other specialty, marine and aviation and other exposures), the Company primarily relies on the expected loss method. The development of medium-tail and long-tail business may be unstable, especially if there are high severity major events, with business written on an excess of loss basis typically having a longer tail than business written on a pro rata basis. As time passes, for a given underwriting year, additional weight is given to the paid and incurred B-F loss development methods and eventually to the historical paid and incurred loss development methods in the reserving process. Our reinsurance operations make a number of key assumptions in reserving for medium-tail and long-tail lines, including that the pricing loss ratio is the best estimate of the ultimate loss ratio at the time the contract is entered into, historical paid and reported development patterns are stable and claims personnel and underwriters' analyses of our exposure to major events are our best estimate of our exposure to the known claims on those events. The expected loss ratios used in our reinsurance operations' initial reserving process for medium-tail and long-tail contracts have varied over time due to changes in pricing, terms and conditions and reinsurance structure. As the credibility of historical experience for earlier underwriting years increases, the experience from these underwriting years is used in the actuarial analysis to determine future underwriting year expected loss ratios, adjusted for changes in pricing, loss trends, terms and conditions and reinsurance structure.

The following tables present information on the reinsurance segment's short-duration insurance contracts:

Casualty ($000's)

	Incurred losses and allocated loss adjustment expenses, net of reinsurance										December 31, 2021	
	Year ended December 31,											
Accident year	2012 unaudited	2013 unaudited	2014 unaudited	2015 unaudited	2016 unaudited	2017 unaudited	2018 unaudited	2019 unaudited	2020 unaudited	2021	Total of IBNR liabilities plus expected development on reported claims	Cumulative number of reported claims
2012	$ 143,029	$ 141,202	$ 137,049	$ 125,104	$ 115,131	$ 109,788	$ 118,457	$ 121,721	$ 120,260	$ 119,222	$ 24,441	N/A
2013		166,016	159,257	155,066	148,784	136,717	135,155	131,475	135,762	135,959	30,873	N/A
2014			216,882	222,109	219,355	233,552	230,019	239,765	240,067	236,378	41,077	N/A
2015				223,208	221,922	230,830	238,126	242,180	249,029	252,809	57,345	N/A
2016					215,222	227,534	251,415	266,254	273,266	272,689	54,087	N/A
2017						270,728	257,088	273,166	301,616	313,605	66,450	N/A
2018							281,141	294,820	285,646	290,955	66,572	N/A
2019								336,062	348,015	374,002	120,045	N/A
2020									386,684	374,912	234,251	N/A
2021										445,047	392,885	N/A
									Total	$2,815,578		

	Cumulative paid losses and allocated loss adjustment expenses, net of reinsurance									
2012	$ 1,306	$ 8,486	$ 14,690	$ 25,523	$ 36,562	$ 47,807	$ 59,511	$ 69,877	$ 75,833	$ 79,364
2013		2,480	9,930	23,044	43,069	54,567	63,136	70,803	76,703	81,856
2014			3,920	16,061	40,804	63,441	91,098	114,456	134,529	145,376
2015				4,463	20,275	47,288	71,098	96,835	120,566	138,035
2016					5,739	25,649	51,684	86,798	113,835	132,814
2017						6,429	30,360	64,075	113,307	137,921
2018							7,580	31,218	106,571	129,196
2019								15,815	57,643	96,935
2020									17,730	50,603
2021										14,794
									Total	1,006,894
							All outstanding liabilities before 2012, net of reinsurance			297,823
							Liabilities for losses and loss adjustment expenses, net of reinsurance			$2,106,507

Property catastrophe ($000's)

	Incurred losses and allocated loss adjustment expenses, net of reinsurance										December 31, 2021	
	Year ended December 31,											
Accident year	2012 unaudited	2013 unaudited	2014 unaudited	2015 unaudited	2016 unaudited	2017 unaudited	2018 unaudited	2019 unaudited	2020 unaudited	2021	Total of IBNR liabilities plus expected development on reported claims	Cumulative number of reported claims
2012	$ 149,957	$ 122,942	$ 108,590	$ 102,114	$ 99,885	$ 99,071	$ 97,037	$ 97,145	$ 96,531	$ 96,447	$ 105	N/A
2013		67,257	47,780	36,401	31,902	29,345	28,617	27,727	27,865	27,657	(138)	N/A
2014			45,159	30,877	25,296	22,412	20,652	19,945	19,841	19,615	(10)	N/A
2015				33,579	18,075	11,580	5,585	3,775	3,130	2,920	67	N/A
2016					25,641	18,719	14,575	10,772	8,362	7,426	881	N/A
2017						87,504	54,768	50,553	36,846	25,121	(712)	N/A
2018							77,868	60,418	41,642	27,657	4,783	N/A
2019								38,570	24,808	23,534	4,576	N/A
2020									267,750	334,185	40,561	N/A
2021										316,197	61,821	N/A
									Total	$ 880,759		

	Cumulative paid losses and allocated loss adjustment expenses, net of reinsurance									
2012	$ 25,850	$ 70,832	$ 83,822	$ 90,727	$ 92,886	$ 94,015	$ 94,625	$ 95,312	$ 95,414	$ 95,606
2013		12,200	19,201	24,038	25,894	27,652	27,891	27,892	28,597	28,346
2014			13,622	19,939	18,402	19,231	18,821	19,013	19,154	19,241
2015				(3,152)	(2,518)	1,786	2,050	1,616	1,705	1,781
2016					(6,722)	2,521	2,796	4,082	3,312	3,668
2017						30,704	32,228	37,791	27,797	14,969
2018							27,497	12,506	24,259	(4,612)
2019								3,834	12,680	18,134
2020									53,275	155,063
2021										64,764
									Total	396,960
							All outstanding liabilities before 2012, net of reinsurance			2,449
							Liabilities for losses and loss adjustment expenses, net of reinsurance			$ 486,248

Property excluding property catastrophe ($000's)

	Incurred losses and allocated loss adjustment expenses, net of reinsurance										December 31, 2021	
	Year ended December 31,											
Accident year	2012 unaudited	2013 unaudited	2014 unaudited	2015 unaudited	2016 unaudited	2017 unaudited	2018 unaudited	2019 unaudited	2020 unaudited	2021	Total of IBNR liabilities plus expected development on reported claims	Cumulative number of reported claims
2012	$ 156,162	$ 121,808	$ 123,689	$ 119,124	$ 114,699	$ 112,477	$ 111,001	$ 108,436	$ 102,994	$ 103,367	$ 508	N/A
2013		115,473	76,905	70,558	66,208	64,486	63,702	62,504	63,269	62,782	384	N/A
2014			143,464	117,448	99,328	90,710	88,438	84,130	82,408	80,940	923	N/A
2015				215,095	189,109	184,774	189,045	188,343	177,281	173,659	8,482	N/A
2016					177,039	146,307	138,375	136,868	140,681	137,579	12,700	N/A
2017						271,713	253,859	240,749	233,153	216,358	13,045	N/A
2018							225,638	242,069	238,052	214,942	11,593	N/A
2019								216,653	206,997	196,840	17,777	N/A
2020									371,752	343,078	51,075	N/A
2021										552,066	255,343	N/A
									Total	$2,081,611		

	Cumulative paid losses and allocated loss adjustment expenses, net of reinsurance									
Accident year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2012	$ 26,153	$ 78,080	$ 93,198	$ 101,868	$ 102,844	$ 103,480	$ 102,658	$ 102,598	$ 102,504	$ 102,525
2013		25,993	42,737	49,816	52,997	53,796	55,676	61,183	62,113	62,139
2014			23,496	62,800	71,692	76,634	78,274	78,657	78,567	78,268
2015				75,622	119,237	149,814	160,848	166,025	159,675	159,925
2016					33,400	95,616	99,428	104,984	112,838	115,102
2017						27,569	125,768	158,066	166,087	181,628
2018							30,047	108,863	153,944	169,054
2019								43,230	124,222	150,931
2020									101,969	208,888
2021										136,712
									Total	1,365,172
									All outstanding liabilities before 2012, net of reinsurance	7,595
									Liabilities for losses and loss adjustment expenses, net of reinsurance	$ 724,034

Marine and aviation ($000's)

	Incurred losses and allocated loss adjustment expenses, net of reinsurance										December 31, 2021	
	Year ended December 31,											
Accident year	2012 unaudited	2013 unaudited	2014 unaudited	2015 unaudited	2016 unaudited	2017 unaudited	2018 unaudited	2019 unaudited	2020 unaudited	2021	Total of IBNR liabilities plus expected development on reported claims	Cumulative number of reported claims
2012	$ 58,992	$ 58,868	$ 55,053	$ 52,286	$ 51,079	$ 49,727	$ 46,046	$ 43,028	$ 41,182	$ 40,016	$ 1,005	N/A
2013		38,881	37,668	36,653	35,251	35,157	34,415	33,970	30,316	27,605	2,394	N/A
2014			30,958	29,159	27,373	25,674	23,677	23,310	22,031	21,984	4,909	N/A
2015				33,646	37,505	31,790	31,736	30,789	28,464	27,680	3,867	N/A
2016					27,351	22,747	23,567	19,273	16,969	15,019	6,708	N/A
2017						28,800	26,346	23,830	20,827	19,903	6,387	N/A
2018							28,017	26,084	24,615	24,756	6,452	N/A
2019								48,929	55,307	60,983	15,112	N/A
2020									83,457	76,598	36,671	N/A
2021										111,046	89,459	N/A
									Total	$ 425,590		

	Cumulative paid losses and allocated loss adjustment expenses, net of reinsurance									
Accident year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2012	$ 2,658	$ 11,433	$ 27,528	$ 33,313	$ 35,055	$ 36,257	$ 37,746	$ 38,038	$ 38,131	$ 38,116
2013		4,945	13,731	18,415	21,388	22,398	23,672	24,049	23,786	23,753
2014			4,177	7,985	11,590	12,469	14,645	15,080	15,956	16,036
2015				7	13,418	19,023	20,861	22,629	22,306	22,445
2016					(7,333)	(1,687)	521	3,261	5,864	6,767
2017						1,660	6,541	9,367	11,030	11,632
2018							2,005	6,968	11,236	13,585
2019								10,756	21,580	29,068
2020									9,220	26,519
2021										8,643
									Total	196,564
									All outstanding liabilities before 2012, net of reinsurance	16,855
									Liabilities for losses and loss adjustment expenses, net of reinsurance	$ 245,881

Other specialty ($000's)

	Incurred losses and allocated loss adjustment expenses, net of reinsurance										December 31, 2021	
	Year ended December 31,											
Accident year	2012 unaudited	2013 unaudited	2014 unaudited	2015 unaudited	2016 unaudited	2017 unaudited	2018 unaudited	2019 unaudited	2020 unaudited	2021	Total of IBNR liabilities plus expected development on reported claims	Cumulative number of reported claims
2012	$ 222,558	$ 211,839	$ 202,046	$ 196,138	$ 193,882	$ 196,539	$ 194,726	$ 189,193	$ 181,246	$ 179,364	$ 2,392	N/A
2013		252,744	226,032	216,250	212,721	213,614	211,261	210,825	204,894	201,830	6,409	N/A
2014			274,826	256,332	258,114	251,474	246,393	248,083	243,652	237,478	7,857	N/A
2015				209,764	201,057	199,468	196,521	196,840	193,626	182,162	8,549	N/A
2016					223,191	220,661	215,078	209,564	215,614	210,344	13,182	N/A
2017						269,254	258,419	247,203	245,505	241,598	30,855	N/A
2018							320,538	316,231	308,190	324,536	40,807	N/A
2019								360,854	341,409	326,168	51,165	N/A
2020									533,861	460,084	102,130	N/A
2021										582,446	300,667	N/A
									Total	$2,946,010		

	Cumulative paid losses and allocated loss adjustment expenses, net of reinsurance									
2012	$ 45,663	$ 121,679	$ 144,429	$ 155,445	$ 163,160	$ 167,164	$ 171,519	$ 173,305	$ 173,606	$ 173,494
2013		57,317	119,445	145,521	161,608	171,189	176,483	183,772	184,111	186,956
2014			68,869	146,652	182,184	195,433	201,974	212,991	215,597	219,060
2015				54,359	114,382	138,350	145,419	154,369	162,314	164,471
2016					65,055	138,648	162,661	174,403	186,247	189,411
2017						73,366	164,829	192,274	199,051	205,998
2018							71,167	201,732	231,358	245,330
2019								79,718	158,132	216,647
2020									97,617	243,980
2021										126,635
									Total	1,971,982
						All outstanding liabilities before 2012, net of reinsurance				7,777
						Liabilities for losses and loss adjustment expenses, net of reinsurance				$ 981,805

The following table presents the average annual percentage payout of incurred losses and allocated loss adjustment expenses by age, net of reinsurance, as of December 31, 2021:

	Average annual percentage payout of incurred losses and allocated loss adjustment expenses by age, net of reinsurance									
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Casualty	2.5 %	7.3 %	11.6 %	11.3 %	9.6 %	8.4 %	7.7 %	5.9 %	4.4 %	3.0 %
Property catastrophe	21.6 %	30.0 %	32.8 %	(14.2)%	(11.6)%	2.2 %	1.0 %	1.2 %	(0.4)%	0.2 %
Property excluding property catastrophe	26.7 %	38.9 %	13.3 %	5.8 %	3.4 %	0.4 %	2.0 %	0.4 %	— %	— %
Marine and aviation	4.9 %	26.9 %	19.0 %	10.3 %	7.4 %	2.9 %	2.4 %	— %	0.1 %	— %
Other specialty	26.3 %	34.2 %	12.9 %	5.2 %	4.2 %	3.1 %	2.1 %	0.9 %	0.8 %	(0.1)%

Mortgage Segment

The Company's mortgage segment includes (1) U.S. primary mortgage insurance (2) U.S. credit risk transfer and other, and (3) international mortgage insurance and reinsurance. The latter two categories along with second lien and student loan exposures are excluded on the basis of insignificance for the purposes of presenting disclosures related to short duration contracts.

For primary mortgage insurance business, the Company establishes case reserves for loans that have been reported as delinquent by loan servicers as well as those that are delinquent but not reported (IBNR reserves). The Company also reserves for the expenses of adjusting claims related to these delinquencies. The trigger that creates a case reserve estimate is that an insured loan is reported to us as being two payments in arrears. The actuarial reviews and documentation created in the reserving process are completed in accordance with generally accepted actuarial standards. The selected assumptions reflect actuarial judgment based on the analysis of historical data and experience combined with information concerning current underwriting, economic, judicial, regulatory and other influences on ultimate claim settlements.

Because the reserving process requires the Company to forecast future conditions, it is inherently uncertain and requires significant judgment and estimation. The use of different estimates would result in the establishment of different reserve levels. Additionally, changes in estimates are likely to occur from period to period as economic conditions change, and the ultimate liability may vary significantly from the estimates used. Major risk factors include (but are not limited to) changes in home prices and borrower equity, which can limit the borrower's ability to sell the property and satisfy the outstanding loan balance, and changes in unemployment, which can affect the borrower's income and ability to make mortgage payments. The unique nature of the COVID-19 pandemic, with no historical

precedent, adds further uncertainty to current reserve estimates.

The lead actuarial methodology used by the Company is a frequency-severity method based on the inventory of pending delinquencies. Each month the loan servicers report the delinquency status of each insured loan. Using the frequency-severity method allows the Company to take advantage of its knowledge of the number of delinquent loans and the coverage provided ("risk size") on those loans by directly relating the reserves to these amounts. The delinquencies are grouped into homogeneous cohorts for analysis, reflecting product type and age of delinquency. A claim rate is then developed for each cohort which represents the frequency with which the delinquencies become claims. The claim frequency rates are based on an analysis of the patterns of emerging cure counts and claim counts, the foreclosure status of the pending delinquencies, the product and geographical mix of the delinquencies and our view of future economic and claim conditions, which include trends in home prices and unemployment. Claim rates can vary materially by age of delinquency, depending on the mix of delinquencies and economic conditions.

Claim size severity estimates are determined by examining the risk sizes on the delinquent loans and estimating the portion of risk that will be paid, as well as any expenses. This is done based on a review of historical development patterns, an assessment of economic conditions and the level of equity the borrowers may have in their homes, as well as considering economic conditions and loss mitigation opportunities. Mortgage insurance is generally not subject to large claim sizes, as with some other lines of insurance. A claim size over $250,000 is rare, and this helps reduce the volatility of claim size estimates.

The claim rate and claim size assumptions generate case reserves for the population of reported delinquencies. The reserve for unreported delinquencies (included in IBNR reserves) is estimated by looking at historical patterns of reporting. Claim rates and claim sizes can then be assigned to estimated unreported delinquencies using assumptions made in the establishment of case reserves.

Mortgage insurance Loss Reserves are short-tail, in the sense that the vast majority of delinquencies are resolved within two years of being reported. Due to the forbearances and foreclosure moratoriums associated with COVID-19, settlement timelines may be extended. While reserves are initially analyzed by reserve cohort, as described above, they are also rolled up by underwriting year to ensure that reserve assumptions are consistent with the performance of the underwriting year. The accuracy of prior reserve assumptions is also checked in hindsight to determine if adjustments to the assumptions are needed.

Loss Reserves for the Company's mortgage reinsurance business and GSE credit risk sharing transactions are comprised of case reserves and IBNR reserves. The Company's mortgage reinsurance operations receive reports of delinquent loans and claims notices from ceding companies and record case reserves based upon the amount of reserves recommended by the ceding company. In addition, specific claim and delinquency information reported by ceding companies is used in the process of estimating IBNR reserves.

The following table presents information on the mortgage segment's short-duration insurance contracts:

U.S. primary mortgage insurance ($000's except claim count)

Incurred losses and allocated loss adjustment expenses, net of reinsurance

	Year ended December 31,										December 31, 2021	
Accident year	2012 unaudited	2013 unaudited	2014 unaudited	2015 unaudited	2016 unaudited	2017 unaudited	2018 unaudited	2019 unaudited	2020 unaudited	2021	Total of IBNR liabilities plus expected development on reported claims	Cumulative number of paid claims
2012	$ 520,835	$ 480,592	$ 475,317	$ 469,238	$ 467,296	$ 459,467	$ 458,065	$ 456,286	$ 456,331	$ 456,362	1	15,080
2013		469,311	419,668	411,793	405,809	395,693	393,149	390,987	391,062	391,324	1	9,468
2014			316,095	297,151	279,434	266,027	265,992	261,091	262,682	262,829	4	6,299
2015				222,790	197,238	198,001	194,677	189,235	190,913	190,560	1	4,554
2016					183,556	170,532	148,715	140,608	142,392	141,657	1	3,424
2017						179,376	132,220	107,255	108,181	109,242	1	2,474
2018							132,318	96,357	89,120	87,962	60	1,635
2019								108,424	119,253	110,362	181	851
2020									420,003	373,533	2,686	189
2021										144,375	2,246	11
								Total		$2,268,206		

Cumulative paid losses and allocated loss adjustment expenses, net of reinsurance

Accident year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2012	(106,065)	186,605	327,605	395,695	426,024	441,577	448,151	452,348	453,587	453,986
2013		41,447	203,957	308,956	353,189	373,909	382,200	386,853	387,894	387,879
2014			20,099	129,159	201,925	233,879	247,038	254,175	256,285	256,875
2015				16,159	92,431	151,222	171,337	180,321	183,472	184,025
2016					11,462	72,201	113,357	127,286	131,161	131,717
2017						8,622	48,112	78,650	87,317	89,756
2018							3,966	31,478	50,135	55,853
2019								2,899	20,105	29,102
2020									1,040	4,144
2021										469
										1,593,806
							All outstanding liabilities before 2012, net of reinsurance			14,288
							Liabilities for losses and loss adjustment expenses, net of reinsurance			$ 688,688

The following table presents the average annual percentage payout of incurred losses and allocated loss adjustment expenses by age, net of reinsurance, as of December 31, 2021:

Average annual percentage payout of incurred losses and allocated loss adjustment expenses by age, net of reinsurance

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
U.S. Primary	2.7 %	34.9 %	25.3 %	10.5 %	4.4 %	2.1 %	0.9 %	0.5 %	0.1 %	0.1 %

The following table represents a reconciliation of the disclosures of net incurred and paid loss development tables to the reserve for losses and loss adjustment expenses at December 31, 2021:

	December 31, 2021
Net outstanding liabilities	
Insurance	
Property, energy, marine and aviation	$ 586,885
Third party occurrence business	2,885,557
Third party claims-made business	1,613,425
Multi-line and other specialty	1,125,841
Reinsurance	
Casualty	2,106,507
Property catastrophe	486,248
Property excluding property catastrophe	724,034
Marine and aviation	245,881
Other specialty	981,805
Mortgage	
U.S. primary	688,688
Other short duration lines not included in disclosures	441,459
Total for short duration lines	**11,886,330**
Unpaid losses and loss adjustment expenses recoverable	
Insurance	
Property, energy, marine and aviation	354,432
Third party occurrence business	1,537,549
Third party claims-made business	921,086
Multi-line and other specialty	199,485
Reinsurance	
Casualty	592,879
Property catastrophe	484,598
Property excluding property catastrophe	118,939
Marine and aviation	111,298
Other specialty	373,292
Mortgage	
U.S. primary	48,259
Other short duration lines not included in disclosures (1)	887,457
Intercompany eliminations	(4,146)
Total for short duration lines	**5,625,128**
Lines other than short duration	76,240
Discounting	(55,575)
Unallocated claims adjustment expenses	225,033
	245,698
Total gross reserves for losses and loss adjustment expenses	**$ 17,757,156**

(1) Includes unpaid loss and loss adjustment expenses recoverable of $390.1 million related to the loss portfolio transfer reinsurance agreements.

7. 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:

Year Ended December 31, 2021	Premium Receivables, Net of Allowance	Allowance for Expected Credit Losses
Balance at beginning of period	$ 2,064,586	$ 37,781
Change for provision of expected credit losses (2)		2,177
Balance at end of period	$ 2,633,280	$ 39,958
Year Ended December 31, 2020		
Balance at beginning of period	$ 1,778,717	$ 21,003
Cumulative effect of accounting change (1)		6,539
Change for provision of expected credit losses (2)		10,239
Balance at end of period	$ 2,064,586	$ 37,781

(1) Adoption of ASU 2016-13, "Financial Instruments - Credit Losses (Topic 326)".

(2) Amounts deemed uncollectible are written-off in operating expenses. For the 2021 and 2020 periods, amounts written off totaled $3.8 million and $2.8 million, respectively.

Reinsurance Recoverables

The Company monitors the financial condition of its reinsurers and attempts to place coverages only with substantial, financially sound carriers. Although the Company has not experienced any material credit losses to date, an inability of its reinsurers or retrocessionaires to meet their obligations to it over the relevant exposure periods for any reason could have a material adverse effect on its financial condition and results of operations.

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

Year Ended December 31, 2021	Reinsurance Recoverables, Net of Allowance	Allowance for Expected Credit Losses
Balance at beginning of period	$ 4,500,802	$ 11,636
Change for provision of expected credit losses		1,594
Balance at end of period	$ 5,880,735	$ 13,230
Year Ended December 31, 2020		
Balance at beginning of period	$ 4,346,816	$ 1,364
Cumulative effect of accounting change (1)		12,010
Change for provision of expected credit losses		(1,738)
Balance at end of period	4,500,802	$ 11,636

(1) Adoption of ASU 2016-13, "Financial Instruments - Credit Losses (Topic 326)".

The following table summarizes the Company's reinsurance recoverables on paid and unpaid losses (not including ceded unearned premiums) at December 31, 2021 and 2020:

	December 31,	
	2021	2020
Reinsurance recoverable on unpaid and paid losses and loss adjustment expenses	$ 5,880,735	$ 4,500,802
% due from carriers with A.M. Best rating of "A-" or better	69.7 %	63.9 %
% due from all other rated carriers	0.1 %	0.1 %
% due from all other carriers with no A.M. Best rating (1)	30.2 %	36.0 %
Largest balance due from any one carrier as % of total shareholders' equity (2)	6.7 %	1.8 %

(1) At December 31, 2021 and 2020 period, over 91% and 94% of such amount is collateralized through reinsurance trusts, funds withheld arrangements, letters of credit or other, respectively.

(2) The 2021 period included impact of deconsolidation of Somers. See note 12.

Contractholder Receivables

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

Year Ended December 31, 2021	Contractholder Receivables, Net of Allowance	Allowance for Expected Credit Losses
Balance at beginning of period	$ 1,986,924	$ 8,638
Change for provision of expected credit losses		(5,201)
Balance at end of period	$ 1,828,691	$ 3,437
Year Ended December 31, 2020		
Balance at beginning of period	$ 2,119,460	$ —
Cumulative effect of accounting change (1)		6,663
Change for provision of expected credit losses		1,975
Balance at end of period	1,986,924	$ 8,638

(1) Adoption of ASU 2016-13, "Financial Instruments - Credit Losses (Topic 326)".

8. Reinsurance

In the normal course of business, the Company's insurance subsidiaries cede a portion of their premium through pro rata and excess of loss reinsurance agreements on a treaty or facultative basis. The Company's reinsurance subsidiaries participate in "common account" retrocessional arrangements for certain pro rata treaties. Such arrangements reduce the effect of individual or aggregate losses to all companies participating on such treaties, including the reinsurers, such as the Company's reinsurance subsidiaries, and the ceding company. In addition, the Company's reinsurance subsidiaries may purchase retrocessional coverage as part of their risk management program. The Company's mortgage subsidiaries cede a portion of their premium through quota share arrangements and enter into various aggregate excess of loss mortgage reinsurance agreements with various special purpose reinsurance companies. Reinsurance recoverables are recorded as assets, predicated on the reinsurers' ability to meet their obligations under the reinsurance agreements. If the reinsurers are unable to satisfy their obligations under the agreements, the Company's insurance or reinsurance subsidiaries would be liable for such defaulted amounts.

The effects of reinsurance on the Company's written and earned premiums and losses and loss adjustment expenses with unaffiliated reinsurers were as follows:

	Year Ended December 31,		
	2021	2020	2019
Premiums Written			
Direct	$ 7,706,832	$ 6,553,910	$ 5,681,523
Assumed	5,045,655	3,534,158	2,457,437
Ceded	(3,734,150)	(2,650,352)	(2,099,893)
Net	$ 9,018,337	$ 7,437,716	$ 6,039,067
Premiums Earned			
Direct	$ 7,149,794	$ 6,361,451	$ 5,447,829
Assumed	4,333,873	3,213,873	2,337,950
Ceded	(3,401,369)	(2,583,389)	(1,999,281)
Net	$ 8,082,298	$ 6,991,935	$ 5,786,498
Losses and Loss Adjustment Expenses			
Direct	$ 4,266,758	$ 4,392,392	$ 2,953,072
Assumed	2,826,820	2,204,323	1,602,528
Ceded	(2,508,775)	(1,907,116)	(1,422,148)
Net	$ 4,584,803	$ 4,689,599	$ 3,133,452

Bellemeade Re

The Company has entered into various aggregate excess of loss mortgage reinsurance agreements with various special purpose reinsurance companies domiciled in Bermuda (the "Bellemeade Agreements"). For the respective coverage periods, the Company 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. The Company will then retain losses in excess of the outstanding coverage limit. The aggregate excess of loss reinsurance coverage decreases over a ten-year period as the underlying covered mortgages amortize. See Note 12, "Variable Interest Entity and Noncontrolling Interests."

The following table summarizes the respective coverages and retentions at December 31, 2021:

		December 31, 2021	
	Initial Coverage at Issuance	Current Coverage	Remaining Retention, Net
Bellemeade 2017-1 Ltd. (1)	$ 368,114	$ 108,368	$ 125,926
Bellemeade 2018-1 Ltd. (2)	374,460	181,136	122,118
Bellemeade 2018-3 Ltd. (3)	506,110	302,563	128,020
Bellemeade 2019-1 Ltd. (4)	341,790	181,324	97,845
Bellemeade 2019-2 Ltd. (5)	621,022	398,316	156,419
Bellemeade 2019-3 Ltd. (6)	700,920	409,859	181,583
Bellemeade 2019-4 Ltd. (7)	577,267	411,954	116,292
Bellemeade 2020-2 Ltd. (8)	449,167	218,877	222,567
Bellemeade 2020-3 Ltd. (9)	451,816	365,141	154,732
Bellemeade 2020-4 Ltd. (10)	337,013	186,065	129,824
Bellemeade 2021-1 Ltd. (11)	643,577	630,163	149,189
Bellemeade 2021-2 Ltd. (12)	616,017	616,017	139,763
Bellemeade 2021-3 Ltd. (13)	639,391	639,391	140,545
Total	$ 6,626,664	$ 4,649,174	$ 1,864,823

(1) Issued in October 2017, covering in-force policies issued between January 1, 2017 and June 30, 2017.
(2) Issued in April 2018, covering in-force policies issued between July 1, 2017 and December 31, 2017.
(3) Issued in October 2018, covering in-force policies issued between January 1, 2018 and June 30, 2018.
(4) Issued in March 2019, covering in-force policies primarily issued between 2005 to 2008 under United Guaranty Residential Insurance Company ("UGRIC"); as well as policies issued through 2015 under both UGRIC and Arch Mortgage Insurance Company.
(5) Issued in April 2019, covering in-force policies issued between July 1, 2018 and December 31, 2018.
(6) Issued in July 2019, covering in-force policies issued in 2016.
(7) Issued in October 2019, covering in-force policies issued between January 1, 2019 and June 30, 2019.
(8) 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.
(9) 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.
(10) 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.
(11) 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.
(12) 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.
(13) 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.

9. 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 (2)	Cost or Amortized Cost
December 31, 2021					
Fixed maturities:					
Corporate bonds	$ 6,553,333	$ 104,170	$ (69,194)	$ (2,037)	$ 6,520,394
Mortgage backed securities	408,477	2,825	(5,410)	(48)	411,110
Municipal bonds	404,666	18,724	(1,409)	(2)	387,353
Commercial mortgage backed securities	1,046,484	1,740	(3,117)	(6)	1,047,867
U.S. government and government agencies	4,772,764	10,076	(45,967)	—	4,808,655
Non-U.S. government securities	2,120,294	54,048	(34,749)	(82)	2,101,077
Asset backed securities	2,692,091	6,540	(11,108)	(708)	2,697,367
Total	17,998,109	198,123	(170,954)	(2,883)	17,973,823
Short-term investments	1,734,716	568	(590)	—	1,734,738
Total	$ 19,732,825	$ 198,691	$ (171,544)	$ (2,883)	$ 19,708,561
December 31, 2020					
Fixed maturities (1):					
Corporate bonds	$ 7,856,571	$ 414,247	$ (34,388)	$ (896)	$ 7,477,608
Mortgage backed securities	630,001	8,939	(5,028)	(278)	626,368
Municipal bonds	494,522	27,291	(3,835)	(11)	471,077
Commercial mortgage backed securities	389,900	8,722	(2,954)	(122)	384,254
U.S. government and government agencies	5,557,077	22,612	(12,611)	—	5,547,076
Non-U.S. government securities	2,433,733	153,891	(8,060)	—	2,287,902
Asset backed securities	1,634,804	19,225	(10,715)	(1,090)	1,627,384
Total	18,996,608	654,927	(77,591)	(2,397)	18,421,669
Short-term investments	1,924,922	2,693	(2,063)	—	1,924,292
Total	$ 20,921,530	$ 657,620	$ (79,654)	$ (2,397)	$ 20,345,961

(1) In securities lending transactions, the Company receives collateral in excess of the fair value of the fixed maturities pledged. For purposes of this table, the Company has excluded the collateral received under securities lending, at fair value and included the securities pledged under securities lending, at fair value. See "—Securities Lending Agreements." In 2021, the Company terminated its securities lending program and no longer enters into securities lending agreements with financial institutions.

(2) Effective January 1, 2020, the Company adopted ASU 2016-13 and as a result any credit impairment losses on the Company's available-for-sale investments are recorded as an allowance, subject to reversal.

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
December 31, 2021						
Fixed maturities:						
Corporate bonds	$ 3,639,582	$ (63,938)	$ 98,867	$ (5,256)	$ 3,738,449	$ (69,194)
Mortgage backed securities	222,176	(3,545)	46,809	(1,865)	268,985	(5,410)
Municipal bonds	26,665	(385)	16,361	(1,024)	43,026	(1,409)
Commercial mortgage backed securities	675,603	(2,805)	5,908	(312)	681,511	(3,117)
U.S. government and government agencies	4,211,621	(44,180)	33,373	(1,787)	4,244,994	(45,967)
Non-U.S. government securities	1,511,301	(31,983)	62,957	(2,766)	1,574,258	(34,749)
Asset backed securities	1,667,002	(9,853)	33,082	(1,255)	1,700,084	(11,108)
Total	11,953,950	(156,689)	297,357	(14,265)	12,251,307	(170,954)
Short-term investments	284,733	(590)	—	—	284,733	(590)
Total	$ 12,238,683	$ (157,279)	$ 297,357	$ (14,265)	$ 12,536,040	$ (171,544)
December 31, 2020						
Fixed maturities (1):						
Corporate bonds	$ 747,442	$ (33,086)	$ 3,934	$ (1,302)	$ 751,376	$ (34,388)
Mortgage backed securities	284,619	(4,788)	3,637	(240)	288,256	(5,028)
Municipal bonds	67,937	(3,835)	—	—	67,937	(3,835)
Commercial mortgage backed securities	126,624	(2,916)	2,655	(38)	129,279	(2,954)
U.S. government and government agencies	1,285,907	(12,611)	—	—	1,285,907	(12,611)
Non-U.S. government securities	543,844	(7,658)	2,441	(402)	546,285	(8,060)
Asset backed securities	634,470	(9,110)	57,737	(1,605)	692,207	(10,715)
Total	3,690,843	(74,004)	70,404	(3,587)	3,761,247	(77,591)
Short-term investments	97,920	(2,063)	—	—	97,920	(2,063)
Total	$ 3,788,763	$ (76,067)	$ 70,404	$ (3,587)	$ 3,859,167	$ (79,654)

(1) In securities lending transactions, the Company receives collateral in excess of the fair value of the fixed maturities pledged. For purposes of this table, the Company has excluded the collateral received and reinvested and included the fixed maturities pledged. See "—Securities Lending Agreements." In 2021, the Company terminated its securities lending program and no longer enters into securities lending agreements with financial institutions.

At December 31, 2021, on a lot level basis, approximately 4,700 security lots out of a total of approximately 10,240 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 $1.1 million. The Company believes that such securities were temporarily impaired at December 31, 2021. At December 31, 2020, on a lot level basis, approximately 2,320 security lots out of a total of approximately 11,180 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 $0.9 million.

The contractual maturities of the Company’s fixed maturities and fixed maturities pledged under securities lending agreements 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.

	December 31, 2021		December 31, 2020	
Maturity	**Estimated Fair Value**	**Amortized Cost**	**Estimated Fair Value**	**Amortized Cost**
Due in one year or less	$ 300,889	$ 299,772	$ 348,200	$ 339,951
Due after one year through five years	8,355,255	8,339,387	10,629,959	10,340,819
Due after five years through 10 years	4,689,155	4,684,393	4,881,564	4,654,754
Due after 10 years	505,758	493,927	482,180	448,139
	13,851,057	13,817,479	16,341,903	15,783,663
Mortgage backed securities	408,477	411,110	630,001	626,368
Commercial mortgage backed securities	1,046,484	1,047,867	389,900	384,254
Asset backed securities	2,692,091	2,697,367	1,634,804	1,627,384
Total (1)	$ 17,998,109	$ 17,973,823	$ 18,996,608	$ 18,421,669

(1) In securities lending transactions, the Company receives collateral in excess of the fair value of the fixed maturities pledged. For purposes of this table, the Company has excluded the collateral received and reinvested and included the fixed maturities pledged. See “—Securities Lending Agreements.” In 2021, the Company terminated its securities lending program and no longer enters into securities lending agreements with financial institutions.

Securities Lending Agreements

In 2021, the Company terminated its securities lending program and no longer enters into securities lending agreements with financial institutions to enhance investment income. Prior to the termination of this program, the Company loaned certain of its securities to third parties, primarily major brokerage firms, for short periods of time through a lending agent. The Company maintained legal control over the securities it lent (shown as ‘Securities pledged under securities lending, at fair value’ on the Company’s balance sheet), retained the earnings and cash flows associated with the loaned securities and received a fee from the borrower for the temporary use of the securities. An indemnification agreement with the lending agent protected the Company in the event a borrower became insolvent or failed to return any of the securities on loan from the Company.

The Company receives collateral (shown as ‘Collateral received under securities lending, at fair value’ on the Company’s balance sheet) in the form of cash or U.S. government and government agency securities. At December 31, 2021, the Company had no cash collateral or security collateral due to the termination of the program. At December 31, 2020, the fair value of the cash collateral received on securities lending was nil and the fair value of security collateral received was $301.1 million.

The carrying value of collateral held under the Company’s securities lending transactions by significant investment category and remaining contractual maturity of the underlying agreements was as follows at December 31, 2020 (no balances at December 31, 2021 due to the termination of the program):

	Remaining Contractual Maturity of the Agreements				
	Overnight and Continuous	**Less than 30 Days**	**30-90 Days**	**90 Days or More**	**Total**
December 31, 2020					
U.S. government and government agencies	$ 142,317	$ —	$ 139,290	$ —	$ 281,607
Corporate bonds	3,021	—	—	—	3,021
Equity securities	16,461	—	—	—	16,461
Total	$ 161,799	$ —	$ 139,290	$ —	$ 301,089
Gross amount of recognized liabilities for securities lending in offsetting disclosure in Note 11					—
Amounts related to securities lending not included in offsetting disclosure in Note 11					$ 301,089

Equity Securities, at Fair Value

At December 31, 2021, the Company held $1.8 billion of equity securities, at fair value, compared to $1.4 billion at December 31, 2020.

Net Investment Income

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

	Year Ended December 31,		
	2021	2020	2019
Fixed maturities	$ 330,061	$ 412,481	$ 505,399
Term loans	34,843	84,149	98,949
Equity securities	42,396	28,958	15,857
Short-term investments	6,928	10,840	15,820
Other (1)	62,895	72,395	80,618
Gross investment income	477,123	608,823	716,643
Investment expenses	(88,005)	(89,215)	(88,905)
Net investment income	$ 389,118	$ 519,608	$ 627,738

(1) Includes income distributions from investment funds and other items

Net Realized Gains (Losses)

Net realized gains (losses) were as follows:

	Year Ended December 31,		
	2021	2020	2019
Available for sale securities:			
Gross gains on investment sales	$ 313,886	$ 595,941	$ 235,655
Gross losses on investment sales	(156,791)	(117,282)	(104,612)
Change in fair value of assets and liabilities accounted for using the fair value option:			
Fixed maturities	7,953	15,881	41,910
Other investments	116,781	13,656	(35,734)
Equity securities	13,028	14,629	15,869
Short-term investments	601	2,279	3,801
Equity securities, at fair value :			
Net realized gains (losses) on securities sold	122,606	26,849	11,313
Net unrealized gains (losses) on equity securities still held at reporting date	48,746	102,394	97,768
Allowance for credit losses:			
Investments related	(2,100)	(3,597)	—
Underwriting related	1,062	(10,007)	—
Net impairment losses	—	(533)	(3,165)
Derivative instruments (1)	(32,390)	179,675	119,741
Other (2)	(53,537)	3,575	(19,348)
Net realized gains (losses)	$ 379,845	$ 823,460	$ 363,198

(1) See Note 11 for information on the Company's derivative instruments.
(2) 2021 periods reflected $33.1 million of losses related to the Company's deconsolidation of Somers.

Other Investments

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

	December 31,	
	2021	2020
Fixed maturities	$ 416,698	$ 843,354
Other investments	1,432,553	2,331,885
Short-term investments	97,806	557,008
Equity securities	26,493	92,549
Investments accounted for using the fair value option	1,973,550	3,824,796
Other investable assets (1)	—	500,000
Total other investments	$ 1,973,550	$ 4,324,796

(1) Participation interests in a receivable of a reverse repurchase agreement.

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

	December 31,	
	2021	2020
Lending	536,345	572,636
Term loan investments	484,950	1,231,731
Investment grade fixed income	147,810	138,646
Private equity	91,126	48,750
Energy	81,692	65,813
Credit related funds	70,278	90,780
Infrastructure	20,352	165,516
Real estate	—	18,013
Total	$ 1,432,553	$ 2,331,885

Investments Accounted For Using the Equity Method

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

	December 31,	
	2021	2020
Credit related funds	$ 1,022,334	$ 740,060
Private equity	436,042	235,289
Real estate	396,395	258,518
Equities	395,090	343,058
Lending	376,649	179,629
Infrastructure	230,070	175,882
Energy	119,141	115,453
Fixed income	101,890	—
Total	$ 3,077,611	$ 2,047,889

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 fair 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.

Equity in Net Income (Loss) of Investments Accounted For Using the Equity Method

The Company recorded equity in net income related to investments accounted for using the equity method of $366.4 million for 2021, compared to $146.7 million for 2020 and $123.7 million for 2019. 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).

A summary of financial information for the Company's investment funds and operating affiliates accounted for using the equity method is as follows:

	December 31,	
	2021	2020
Invested assets	$ 58,508,009	$ 44,131,377
Total assets	69,648,905	49,078,464
Total liabilities	17,944,325	6,054,189
Net assets	$ 51,704,580	$ 43,024,275

	Year Ended December 31,		
	2021	2020	2019
Total revenues	$ 11,785,949	$ 5,762,098	$ 164,669
Total expenses	3,238,606	1,656,029	528,762
Net income (loss)	$ 8,547,343	$ 4,106,069	$ (364,093)

Certain of the Company's other investments and investments accounted for using the equity method 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 determined that these limited partnership interests represented variable interests in the funds because the general partner did not have a significant interest in 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 item:

	December 31,	
	2021	2020
Investments accounted for using the equity method (1)	$ 3,077,611	$ 2,047,889
Investments accounted for using the fair value option (2)	170,595	184,720
Total	$ 3,248,206	$ 2,232,609

(1) Aggregate unfunded commitments were $2.6 billion at December 31, 2021, compared to $1.8 billion at December 31, 2020.
(2) Aggregate unfunded commitments were $18.8 million at December 31, 2021, compared to $35.6 million at December 31, 2020.

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 and Premia. Investments in Coface and Premia are generally recorded on a three month lag, while the Company's investment in Greysbridge is not recorded on a lag.

In 2021, the Company completed the share purchase agreement with Natixis to purchase 29.5% of the common equity of Coface, a France-based leader in the global trade credit insurance market. The consideration paid was €9.95 per share, or an aggregate €453 million (approximately $546 million) including related fees. Income (loss) from operating affiliates reflected a one-time gain of $74.5 million realized from the acquisition. As a result of equity method accounting rules, approximately $36 million of additional gain was deferred and will generally be recognized over the next five years. As of December 31, 2021, the Company owned approximately 29.86% of the issued shares of Coface,

or 30.10% excluding treasury shares, with a carrying value of $630.5 million.

In July 2021, the Company announced the completion of the previously disclosed acquisition of Somers by Greysbridge for a cash purchase price of $35.00 per common share. Effective July 1, 2021, Somers is wholly owned by Greysbridge, and Greysbridge is owned 40% by the Company, 30% by certain investment funds managed by Kelso and 30% by certain investment funds managed by Warburg. At December 31, 2021 the Company's carrying value in Greysbridge was $375.7 million, which reflected the Company's aggregate purchase price of $278.9 million along with income (loss) from operating affiliates, which included a one-time gain of $95.7 million recognized from the acquisition. In addition, the 'net realized gains (losses)' line on the Company's consolidated statements of income included a $33.1 million loss as a result of deconsolidation of Somers in the Company's financial statements following the close of the transaction. See note 12.

The Company recorded income from operating affiliates of $264.7 million for 2021, compared to income of $16.8 million for 2020 and $2.2 million for 2019. The income from operating affiliates for the 2021 period, primarily related to the Company's recent investments in Coface and Greysbridge.

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:

Year Ended December 31, 2021	Structured Securities (1)	Municipal Bonds	Corporate Bonds	Total
Balance at beginning of period	$ 1,490	$ 11	$ 896	$ 2,397
Additions for current-period provision for expected credit losses	602	—	2,858	3,460
Additions (reductions) for previously recognized expected credit losses	(847)	(9)	(320)	(1,176)
Reductions due to disposals (3)	(443)	—	(1,355)	(1,798)
Balance at end of period	$ 802	$ 2	$ 2,079	$ 2,883
Year Ended December 31, 2020				
Balance at beginning of period	$ —	$ —	$ —	$ —
Cumulative effect of accounting change (2)	517	—	117	634
Additions for current-period provision for expected credit losses	2,942	67	7,644	10,653
Additions (reductions) for previously recognized expected credit losses	(1,398)	6	(5,638)	(7,030)
Reductions due to disposals	(571)	(62)	(1,227)	(1,860)
Balance at end of period	$ 1,490	$ 11	$ 896	$ 2,397

(1) Includes asset backed securities, mortgage backed securities and commercial mortgage backed securities.
(2) Adoption of ASU 2016-13, "Financial Instruments - Credit Losses (Topic 326)".
(3) Reduction for the 2021 periods primarily related to the Company's deconsolidation of Somers.

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

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

	December 31,	
	2021	2020
Assets used for collateral or guarantees:		
Affiliated transactions	$ 4,223,955	$ 4,643,334
Third party agreements	2,721,160	3,083,324
Deposits with U.S. regulatory authorities	798,100	827,552
Deposits with non-U.S. regulatory authorities	506,517	179,099
Total restricted assets (1)	$ 8,249,732	$ 8,733,309

(1) 2020 balances included $1.036 billion related to Somers. See note 12.

Reconciliation of Cash and Restricted Cash

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

	December 31,		
	2021	2020	2019
Cash	$ 858,668	$ 906,448	$ 726,230
Restricted cash (included in 'other assets')	456,103	384,096	177,468
Cash and restricted cash	$ 1,314,771	$ 1,290,544	$ 903,698

10. 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 *identical* assets or liabilities in *active markets*

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 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 review, the Company will challenge any prices for a security or portfolio which are considered not to be representative of fair value.

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. Of the $23.8 billion of financial assets and liabilities measured at fair value at December 31, 2021, approximately $7.7 million, or 0.0%, were priced using non-binding broker-dealer quotes. Of the $26.5 billion of financial assets and liabilities measured at fair value at December 31, 2020, approximately $150.1 million, or 0.6%, were priced using non-binding broker-dealer quotes.

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.

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.

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.

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. As the significant inputs used in the pricing process for commercial mortgage-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. 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. 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.

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. Other equity securities are included in Level 2 of the valuation hierarchy. A small number of 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 determined that exchange-traded investments would be included in Level 1 as their fair values are based on quoted market prices in active markets. Other investments also 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. 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.

Contingent consideration liabilities

Contingent consideration liabilities (included in 'other liabilities' in the consolidated balance sheets) include amounts related to the Company's acquisitions. Such amounts 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 future payments using an income approach based on modeled inputs which include a weighted average cost of capital. The Company determined that contingent consideration liabilities would be included within Level 3.

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

The following table presents the Company’s financial assets and liabilities measured at fair value by level at December 31, 2021:

		Fair Value Measurement Using:		
	Estimated Fair Value	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets measured at fair value:				
Available for sale securities:				
Fixed maturities:				
Corporate bonds	$ 6,553,333	$ —	$ 6,553,320	$ 13
Mortgage backed securities	408,477	—	408,477	—
Municipal bonds	404,666	—	404,666	—
Commercial mortgage backed securities	1,046,484	—	1,046,484	—
U.S. government and government agencies	4,772,764	4,744,517	28,247	—
Non-U.S. government securities	2,120,294	—	2,120,294	—
Asset backed securities	2,692,091	—	2,688,744	3,347
Total	17,998,109	4,744,517	13,250,232	3,360
Short-term investments	1,734,716	1,052,822	681,894	—
Equity securities, at fair value	1,804,170	1,762,864	38,388	2,918
Derivative instruments (3)	127,121	—	127,121	—
Residential mortgage loans	49,847	—	49,847	—
Fair value option:				
Corporate bonds	388,546	—	388,546	—
Non-U.S. government bonds	23,785	—	23,785	—
Asset backed securities	4,367	—	4,367	—
Short-term investments	97,806	528	97,278	—
Equity securities	26,493	21,745	—	4,748
Other investments	310,798	20,352	262,465	27,981
Other investments measured at net asset value (1)	1,121,755			
Total	1,973,550	42,625	776,441	32,729
Total assets measured at fair value	$ 23,687,513	$ 7,602,828	$ 14,923,923	$ 39,007
Liabilities measured at fair value:				
Contingent consideration liabilities	$ (16,960)	$ —	$ —	$ (16,960)
Securities sold but not yet purchased (2)	—	—	—	—
Derivative instruments (3)	(54,224)	—	(54,224)	—
Total liabilities measured at fair value	$ (71,184)	$ —	$ (54,224)	$ (16,960)

(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) Represents the Company’s obligations to deliver securities that it did not own at the time of sale. Such amounts are included in “other liabilities” on the Company’s consolidated balance sheets.

(3) See Note 11.

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

The following table presents the Company's financial assets and liabilities measured at fair value by level at December 31, 2020:

		Fair Value Measurement Using:		
	Estimated Fair Value	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets measured at fair value (1):				
Available for sale securities:				
Fixed maturities:				
Corporate bonds	$ 7,856,571	$ —	$ 7,856,558	$ 13
Mortgage backed securities	630,001	—	630,001	—
Municipal bonds	494,522	—	494,522	—
Commercial mortgage backed securities	389,900	—	389,900	—
U.S. government and government agencies	5,557,077	5,463,356	93,721	—
Non-U.S. government securities	2,433,733	—	2,433,733	—
Asset backed securities	1,634,804	—	1,631,378	3,426
Total	18,996,608	5,463,356	13,529,813	3,439
Equity securities, at fair value	1,460,959	1,401,653	17,291	42,015
Short-term investments	1,924,922	1,920,565	4,357	—
Derivative instruments (4)	177,383	—	177,383	—
Fair value option:				
Corporate bonds	651,294	—	650,309	985
Non-U.S. government bonds	35,263	—	35,263	—
Mortgage backed securities	3,282	—	3,282	—
Commercial mortgage backed securities	1,090	—	1,090	—
Asset backed securities	152,151	—	152,151	—
U.S. government and government agencies	274	164	110	—
Short-term investments	557,008	420,131	136,877	—
Equity securities	92,549	23,373	188	68,988
Other investments	1,134,229	51,149	1,015,977	67,103
Other investments measured at net asset value (2)	1,197,656			
Total	3,824,796	494,817	1,995,247	137,076
Total assets measured at fair value	$ 26,384,668	$ 9,280,391	$ 15,724,091	$ 182,530
Liabilities measured at fair value:				
Contingent consideration liabilities	$ (461)	$ —	$ —	$ (461)
Securities sold but not yet purchased (3)	(21,679)	—	(21,679)	—
Derivative instruments (4)	(108,705)	—	(108,705)	—
Total liabilities measured at fair value	$ (130,845)	$ —	$ (130,384)	$ (461)

(1) In securities lending transactions, the Company receives collateral in excess of the fair value of the securities pledged. For purposes of this table, the Company has excluded the collateral received under securities lending, at fair value and included the securities pledged under securities lending, at fair value. See Note 9.
(2) 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.
(3) Represents the Company's obligations to deliver securities that it did not own at the time of sale. Such amounts are included in "other liabilities" on the Company's consolidated balance sheets.
(4) See Note 11.

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 for 2021 and 2020:

	Assets						Liabilities
	Available For Sale		Fair Value Option			Fair Value	
	Structured Securities (1)	Corporate Bonds	Corporate Bonds	Other Investments	Equity Securities	Equity Securities	Contingent Consideration Liabilities
Year Ended December 31, 2021							
Balance at beginning of year	$ 3,426	$ 13	$ 985	$ 67,103	$ 68,988	$ 42,015	$ (461)
Total gains or (losses) (realized/unrealized)							
Included in earnings (2)	(135)	—	13	868	4,941	1,958	—
Included in other comprehensive income	133	—	—	—	—	—	—
Purchases, issuances, sales and settlements							
Purchases	—	—	—	13,213	—	5,718	(16,494)
Issuances	—	—	—	—	—	—	—
Sales (3)	—	—	(998)	(53,203)	(69,181)	(46,773)	—
Settlements	(77)	—	—	—	—	—	(5)
Transfers in and/or out of Level 3	—	—	—	—	—	—	—
Balance at end of year	$ 3,347	$ 13	$ —	$ 27,981	$ 4,748	$ 2,918	$ (16,960)
Year Ended December 31, 2020							
Balance at beginning of year	$ 5,216	$ 8,851	$ 932	$ 68,817	$ 58,094	$ 55,889	$ (7,998)
Total gains or (losses) (realized/unrealized)							
Included in earnings (2)	—	(5,865)	(13)	(314)	10,894	8,214	(72)
Included in other comprehensive income	(169)	397	—	—	—	—	—
Purchases, issuances, sales and settlements							
Purchases	—	—	66	52,449	—	4,030	—
Issuances	—	—	—	—	—	—	—
Sales	—	—	—	(56,833)	—	(26,118)	—
Settlements	(1,413)	(1,462)	—	—	—	—	7,609
Transfers in and/or out of Level 3	(208)	(1,908)	—	2,984	—	—	—
Balance at end of year	$ 3,426	$ 13	$ 985	$ 67,103	$ 68,988	$ 42,015	$ (461)

(1) Includes asset backed securities, mortgage backed securities and commercial mortgage backed securities.
(2) Gains or losses were included in net realized gains (losses).
(3) Sales for the 2021 period primarily relates to the Company's deconsolidation of Somers.

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 December 31, 2021, due to their respective short maturities. As these financial instruments are not actively traded, their respective fair values are classified within Level 2.

At December 31, 2021, 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 $3.3 billion. At December 31, 2020, the Company's senior notes were carried at their cost, net of debt issuance costs, of $2.9 billion and had a fair value of $3.7 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 value of the senior notes is classified within Level 2.

Fair Value Measurements on a Non-Recurring Basis

The Company measures the fair value of certain assets on a non-recurring basis, generally quarterly, annually, or when events or changes in circumstances indicate that the carrying amount of the assets may not be recoverable. These assets include investments accounted for using the equity method, certain other investments, goodwill and intangible assets, and long-lived assets. The Company uses a variety of techniques to measure the fair value of these assets when appropriate, as described below:

Investments accounted for using the equity method. When the Company determines that the carrying value of these assets may not be recoverable, the Company records the assets at fair value with the loss recognized in income. In such cases, the Company measures the fair value of these assets using the techniques discussed above in "—Fair Value Measurements on a Recurring Basis."

Goodwill and Intangible Assets. The Company tests goodwill and intangible assets annually for impairment whenever events or changes in circumstances indicate the carrying amount may not be recoverable. When the Company determines goodwill and intangible assets may be impaired, the Company uses techniques including discounted expected future cash flows, to measure fair value.

Long-Lived Assets. The Company tests its long-lived assets for impairment whenever events or changes in circumstances indicate the carrying amount of a long-lived asset may not be recoverable.

11. 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.

In addition, 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 Derivatives	Notional Value (1)
December 31, 2021			
Futures contracts (2)	$ 34,999	$ (9,808)	$ 2,826,564
Foreign currency forward contracts (2)	7,734	(11,390)	915,962
TBAs	11,227	—	11,227
Other (2)	73,161	(33,026)	3,736,773
Total	$ 127,121	$ (54,224)	
December 31, 2020			
Futures contracts (2)	$ 11,046	$ (4,496)	$ 3,099,796
Foreign currency forward contracts (2)	52,716	(6,202)	1,656,729
TBAs	—	—	—
Other (2)	113,621	(98,007)	5,763,919
Total	$ 177,383	$ (108,705)	

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

The Company did not hold any derivatives which were designated as hedging instruments at December 31, 2021 or 2020.

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.

At December 31, 2021, $122.3 million and $53.9 million, respectively, of asset derivatives and liability derivatives were subject to a master netting agreement compared to $138.8 million and $93.0 million, respectively, at December 31, 2020. The remaining derivatives included in the table above 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	Year Ended December 31, 2021	2020	2019
Net realized gains (losses):			
Futures contracts	$ (15,262)	$ 114,987	$ 114,123
Foreign currency forward contracts	(39,755)	49,974	(9,499)
TBAs	(233)	1,129	463
Other	22,860	13,585	14,654
Total	$ (32,390)	$ 179,675	$ 119,741

12. Variable Interest Entity and Noncontrolling Interests

Somers Holdings Ltd.

In March 2014, the Company invested $100.0 million and acquired 2,500,000 common shares of Somers. Somers was considered a VIE and the Company concluded that it was the primary beneficiary of Somers, through June 30, 2021. As such, the results of Somers were included in the Company's consolidated financial statements as of and for the periods ended June 30, 2021.

In the 2020 fourth quarter, Arch Capital, Somers and Greysbridge, a wholly-owned subsidiary of Arch Capital, entered into an Agreement and Plan of Merger (as amended, the "Merger Agreement"). The merger and the related Greysbridge equity financing closed on July 1, 2021. Effective July 1, 2021, Somers is wholly owned by Greysbridge, and Greysbridge is owned 40% by the Company, 30% by certain investment funds managed by Kelso and 30% by certain investment funds managed by Warburg. Based on the governing documents of Greysbridge, the Company concluded that, while it retains significant influence over Somers, Somers no longer constitutes a variable interest entity. Accordingly, effective July 1, 2021, the Company no longer consolidates the results of Somers in its consolidated financial statements and footnotes. Beginning in the 2021 third quarter, the Company classifies its investment as 'investments in operating affiliates' on the Company's balance sheets and is accounted for under the equity method.

The following table provides the carrying amount and balance sheet caption in which the assets and liabilities of Somers were reported:

	December 31, 2020
Assets	
Investments accounted for using the fair value option (1)	$ 1,790,385
Fixed maturities available for sale, at fair value	655,249
Equity securities, at fair value	52,410
Cash	211,451
Accrued investment income	14,679
Premiums receivable	224,377
Reinsurance recoverable on unpaid and paid losses and LAE	286,590
Ceded unearned premiums	122,339
Deferred acquisition costs, net	53,705
Receivable for securities sold	37,423
Goodwill and intangible assets	7,650
Other assets	75,801
Total assets of consolidated VIE	$ 3,532,059
Liabilities	
Reserves for losses and loss adjustment expenses	$ 1,519,583
Unearned premiums	407,714
Reinsurance balances payable	63,269
Revolving credit agreement borrowings	155,687
Senior notes	172,689
Payable for securities purchased	25,881
Other liabilities	193,494
Total liabilities of consolidated VIE	$ 2,538,317
Redeemable noncontrolling interests	$ 52,398

(1) Included in "other investments" on the Company's balance sheet.

The following table summarizes Somers' cash flow from operating, investing and financing activities.

	Year Ended December 31, 2021	2020	2019
Total cash provided by (used for):			
Operating activities	46,991	181,736	239,284
Investing activities	96,325	258,589	(140,620)
Financing activities	(2,042)	(335,776)	(61,433)

Non-redeemable noncontrolling interests

Through June 30, 2021, the Company accounted for the portion of Somers' common equity attributable to third party investors in the shareholders' equity section of its consolidated balance sheets. The non-controlling ownership in Somers common shares was approximately 87% at December 31, 2020. The portion of Somers' income or loss attributable to third party investors was recorded in the consolidated statements of income in 'net (income) loss attributable to noncontrolling interests.'

The following table sets forth activity in the non-redeemable noncontrolling interests:

	December 31,	
	2021	2020
Balance, beginning of year	$ 823,007	$ 762,777
Impact of deconsolidation of Somers	(918,874)	—
Additional paid in capital attributable to noncontrolling interests	22,113	1,334
Repurchases attributable to non-redeemable noncontrolling interests	—	(2,867)
Amounts attributable to noncontrolling interests	78,314	53,076
Other amounts attributable to noncontrolling interests	—	(375)
Other comprehensive (income) loss attributable to noncontrolling interests	(4,560)	9,062
Balance, end of year	$ —	$ 823,007

Redeemable noncontrolling interests

Through June 30, 2021, the Company accounted for redeemable noncontrolling interests in the mezzanine section of its consolidated balance sheets in accordance with applicable accounting guidance. Such redeemable noncontrolling interests primarily related to the Somers Preference Shares issued in late March 2014 with a par value of $0.01 per share and a liquidation preference of $25.00 per share. The Somers Preference Shares were issued at a discounted amount of $24.50 per share. Because the redemption features are not solely within the control of Somers, the Company accounted for the redeemable noncontrolling interests in the Somers Preference Shares in the mezzanine section of its consolidated balance sheets.

On August 1, 2019, Somers redeemed 6,919,998 of its 9,065,200 issued and outstanding preference shares ("Somers Preference Shares") at a total redemption price of $25.19748 per share, inclusive of all declared and unpaid dividends. The Company received $11.5 million pursuant to the redemption of Somers Preference Shares.

Preferred dividends on the Somers Preference Shares, including the accretion of the discount and issuance costs, was $2.1 million for 2021, compared to $4.4 million for 2020 and $17.8 million for 2019.

The following table sets forth activity in the redeemable noncontrolling interests:

	December 31,		
	2021	2020	2019
Balance, beginning of year	$ 58,548	$ 55,404	$ 206,292
Impact of deconsolidation of Somers	(48,919)	—	—
Redemption of noncontrolling interests	—	—	(157,709)
Accretion of preference share issuance costs	—	93	244
Other	(396)	3,051	6,577
Balance, end of year	$ 9,233	$ 58,548	$ 55,404

The portion of income or loss attributable to third party investors is recorded in the consolidated statements of income in 'net (income) loss attributable to noncontrolling interests' as summarized in the table below:

	December 31,		
	2021	2020	2019
Amounts attributable to non-redeemable noncontrolling interests	$ (78,314)	$ (53,076)	$ (40,072)
Amounts attributable to redeemable noncontrolling interests	(4,299)	(7,114)	(16,909)
Net (income) loss attributable to noncontrolling interests	$ (82,613)	$ (60,190)	$ (56,981)

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 following table presents the total assets of the Bellemeade entities, as well as the Company's maximum exposure to loss associated with these VIEs, 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 2021 agreements benchmark index 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.

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	Dec 31, 2021				Dec 31, 2020			
		Maximum Exposure to Loss				Maximum Exposure to Loss		
Bellemeade Entities (Issue Date)	**Total VIE Assets**	**On-Balance Sheet (Asset) Liability**	**Off-Balance Sheet**	**Total**	**Total VIE Assets**	**On-Balance Sheet (Asset) Liability**	**Off-Balance Sheet**	**Total**
Bellemeade 2017-1 Ltd. (Oct-17)	$ 108,368	$ (159)	$ 424	$ 265	$ 145,573	$ (245)	$ 844	$ 599
Bellemeade 2018-1 Ltd. (Apr-18)	181,136	(528)	1,268	740	250,095	(903)	2,245	1,342
Bellemeade 2018-2 Ltd. (Aug-18)	—	—	—	—	108,395	(138)	280	142
Bellemeade 2018-3 Ltd. (Oct-18)	302,563	(1,018)	2,496	1,478	302,563	(1,320)	3,262	1,942
Bellemeade 2019-1 Ltd. (Mar-19)	181,324	(380)	5,807	5,427	219,256	(1,361)	8,461	7,100
Bellemeade 2019-2 Ltd. (Apr-19)	398,316	(515)	3,998	3,483	398,316	(730)	5,201	4,471
Bellemeade 2019-3 Ltd. (Jul-19)	409,859	(584)	3,190	2,606	528,084	(861)	5,079	4,218
Bellemeade 2019-4 Ltd. (Oct-19)	411,954	(462)	4,759	4,297	468,737	(890)	6,676	5,786
Bellemeade 2020-1 Ltd. (Jun-20)	—	—	—	—	275,068	(178)	1,012	834
Bellemeade 2020-2 Ltd. (Sep-20) (1)	217,766	(177)	1,984	1,807	423,420	(556)	6,839	6,283
Bellemeade 2020-3 Ltd. (Nov-20) (2)	348,818	(128)	5,793	5,665	418,158	(631)	9,605	8,974
Bellemeade 2020-4 Ltd. (Dec-20) (3)	176,826	(50)	1,630	1,580	321,393	(156)	6,816	6,660
Bellemeade 2021-1 Ltd. (Mar-21) (4)	568,986	(303)	3,283	2,980	—	—	—	—
Bellemeade 2021-2 Ltd. (Jun-21) (5)	522,807	281	4,124	4,405	—	—	—	—
Bellemeade 2021-3 Ltd. (Sep-21) (6)	507,873	(411)	3,446	3,035	—	—	—	—
Total	$ 4,336,596	$ (4,434)	$ 42,202	$ 37,768	$ 3,859,058	$ (7,969)	$ 56,320	$ 48,351

(1) At December 31, 2021, $1 million of coverage from a separate panel of reinsurers is remaining (not reflected in this table).
(2) At December 31, 2021, $16 million of coverage from a separate panel of reinsurers is remaining (not reflected in this table).
(3) At December 31, 2021, $9 million of coverage from a separate panel of reinsurers is remaining (not reflected in this table).
(4) At December 31, 2021, $61 million of coverage from a separate panel of reinsurers is remaining (not reflected in this table).
(5) At December 31, 2021, $93 million of coverage from a separate panel of reinsurers is remaining (not reflected in this table).
(6) At December 31, 2021, $131 million of coverage from a separate panel of reinsurers is remaining (not reflected in this table).

13. Other Comprehensive Income (Loss)

The following table presents the changes in each component of AOCI, net of noncontrolling interests:

	Unrealized Appreciation on Available-For-Sale Investments	Foreign Currency Translation Adjustments	Total
Year Ended December 31, 2021			
Beginning balance	$ 501,295	$ (12,400)	$ 488,895
Other comprehensive income (loss) before reclassifications	(371,741)	(65,686)	(437,427)
Amounts reclassified from accumulated other comprehensive income	(116,068)	—	(116,068)
Net current period other comprehensive income (loss)	(487,809)	(65,686)	(553,495)
Ending balance	$ 13,486	$ (78,086)	$ (64,600)
Year Ended December 31, 2020			
Beginning balance	$ 258,486	$ (46,395)	$ 212,091
Other comprehensive income (loss) before reclassifications	668,996	33,995	702,991
Amounts reclassified from accumulated other comprehensive income	(426,187)	—	(426,187)
Net current period other comprehensive income (loss)	242,809	33,995	276,804
Ending balance	$ 501,295	$ (12,400)	$ 488,895
Year Ended December 31, 2019			
Beginning balance	$ (114,178)	$ (64,542)	$ (178,720)
Other comprehensive income (loss) before reclassifications	491,605	18,147	509,752
Amounts reclassified from accumulated other comprehensive income	(118,941)	—	(118,941)
Net current period other comprehensive income (loss)	372,664	18,147	390,811
Ending balance	$ 258,486	$ (46,395)	$ 212,091

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):

Details About AOCI Components	Consolidated Statement of Income Line Item That Includes Reclassification	Amounts Reclassified from AOCI		
		Year Ended December 31,		
		2021	2020	2019
Unrealized appreciation on available-for-sale investments				
	Net realized gains (losses)	$ 157,095	$ 478,659	$ 131,043
	Provision for credit losses	(2,099)	(3,597)	—
	Other-than-temporary impairment losses	—	(533)	(3,165)
	Total before tax	154,996	474,529	127,878
	Income tax (expense) benefit	(38,928)	(48,342)	(8,937)
	Net of tax	$ 116,068	$ 426,187	$ 118,941

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Following are the related tax effects allocated to each component of other comprehensive income (loss):

	Before Tax Amount	Tax Expense (Benefit)	Net of Tax Amount
Year Ended December 31, 2021			
Unrealized appreciation (decline) in value of investments:			
Unrealized holding gains (losses) arising during period	$ (406,774)	$ (19,845)	$ (386,929)
Less reclassification of net realized gains (losses) included in net income	154,996	38,928	116,068
Foreign currency translation adjustments	(64,423)	59	(64,482)
Other comprehensive income (loss)	$ (626,193)	$ (58,714)	$ (567,479)
Year Ended December 31, 2020			
Unrealized appreciation (decline) in value of investments:			
Unrealized holding gains (losses) arising during period	$ 754,572	$ 75,855	$ 678,717
Less reclassification of net realized gains (losses) included in net income	474,529	48,342	426,187
Foreign currency translation adjustments	33,706	370	33,336
Other comprehensive income (loss)	$ 313,749	$ 27,883	$ 285,866
Year Ended December 31, 2019			
Unrealized appreciation (decline) in value of investments:			
Unrealized holding gains (losses) arising during period	$ 562,576	$ 61,805	$ 500,771
Less reclassification of net realized gains (losses) included in net income	127,878	8,937	118,941
Foreign currency translation adjustments	18,463	353	18,110
Other comprehensive income (loss)	$ 453,161	$ 53,221	$ 399,940

14. Earnings Per Common Share

The calculation of basic earnings per common share is computed by dividing income available to Arch common shareholders by the weighted average number of Common Shares and common share equivalents outstanding. The following table sets forth the computation of basic and diluted earnings per common share:

	Year Ended December 31,		
	2021	2020	2019
Numerator:			
Net income	$ 2,239,462	$ 1,465,711	$ 1,693,300
Amounts attributable to noncontrolling interests	(82,613)	(60,190)	(56,981)
Net income available to Arch	2,156,849	1,405,521	1,636,319
Preferred dividends	(48,343)	(41,612)	(41,612)
Loss on redemption of preferred shares	(15,101)	—	—
Net income available to Arch common shareholders	$ 2,093,405	$ 1,363,909	$ 1,594,707
Denominator:			
Weighted average common shares outstanding	391,748,715	403,062,179	401,802,815
Effect of dilutive common share equivalents:			
Nonvested restricted shares	1,996,524	1,682,309	1,673,770
Stock options (1)	6,600,697	5,514,967	8,132,893
Weighted average common shares and common share equivalents outstanding – diluted	400,345,936	410,259,455	411,609,478
Earnings per common share:			
Basic	$ 5.34	$ 3.38	$ 3.97
Diluted	$ 5.23	$ 3.32	$ 3.87

(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 2021, 2020 and 2019, the number of stock options excluded were 2,398,608, 2,249,821 and 1,302,017, respectively.

15. Income Taxes

Arch Capital is incorporated under the laws of Bermuda and, under current Bermuda law, is not obligated to pay any taxes in Bermuda based upon income or capital gains. The Company has received a written undertaking from the Minister of Finance in Bermuda under the Exempted Undertakings Tax Protection Act 1966 that, in the event that any legislation is enacted in Bermuda imposing any tax computed on profits, income, gain or appreciation on any capital asset, or any tax in the nature of estate duty or inheritance tax, such tax will not be applicable to Arch Capital or any of its operations until March 31, 2035. This undertaking does not, however, prevent the imposition of taxes on any person ordinarily resident in Bermuda or any company in respect of its ownership of real property or leasehold interests in Bermuda.

Arch Capital and its non-U.S. subsidiaries will be subject to U.S. federal income tax only to the extent that they derive U.S. source income that is subject to U.S. withholding tax or income that is effectively connected with the conduct of a trade or business within the U.S. and is not exempt from U.S. tax under an applicable income tax treaty with the U.S. Arch Capital and its non-U.S. subsidiaries will be subject to a withholding tax on dividends from U.S. investments and interest from certain U.S. payors (subject to reduction by any applicable income tax treaty). Arch Capital and its non-U.S. subsidiaries intend to conduct their operations in a manner that will not cause them to be treated as engaged in a trade or business in the United States and, therefore, will not be required to pay U.S. federal income taxes (other than U.S. excise taxes on insurance and reinsurance premium and withholding taxes on dividends and certain other U.S. source investment income). However, because there is uncertainty as to the activities which constitute being engaged in a trade or business within the United States, there can be no assurances that the U.S. Internal Revenue Service will not contend successfully that Arch Capital or its non-U.S. subsidiaries are engaged in a trade or business in the United States. If Arch Capital or any of its non-U.S. subsidiaries were subject to U.S. income tax, Arch Capital's shareholders' equity and earnings could be materially adversely affected. Arch Capital has subsidiaries and branches that operate in various jurisdictions around the world that are subject to tax in the jurisdictions in which they operate. The significant jurisdictions in which Arch Capital's subsidiaries and branches are subject to tax are the United States, United

Kingdom, Ireland, Canada, Switzerland, Australia and Denmark.

The components of income taxes attributable to operations were as follows:

	Year Ended December 31,		
	2021	2020	2019
Current expense (benefit):			
United States	$ 284,274	$ 181,571	$ 139,407
Non-U.S.	11,259	16,091	4,954
	295,533	197,662	144,361
Deferred expense (benefit):			
United States	(123,261)	(89,170)	11,849
Non-U.S.	(43,690)	3,346	(400)
	(166,951)	(85,824)	11,449
Income tax expense	$ 128,582	$ 111,838	$ 155,810

The Company's income or loss before income taxes was earned in the following jurisdictions:

	Year Ended December 31,		
	2021	2020	2019
Income (Loss) Before Income Taxes:			
Bermuda	$ 1,518,616	$ 1,114,117	$ 1,122,952
United States	643,239	409,893	701,480
Other	206,187	53,539	24,678
Total	$ 2,368,042	$ 1,577,549	$ 1,849,110

The expected tax provision computed on pre-tax income or loss at the weighted average tax rate has been calculated as the sum of the pre-tax income in each jurisdiction multiplied by that jurisdiction's applicable statutory tax rate. The 2021 applicable statutory tax rates by jurisdiction were as follows: Bermuda (0.0%), United States (21.0%), United Kingdom (19.0%), Ireland (12.5%), Denmark (22.0%), Canada (26.5%), Gibraltar (12.5%), Australia (30.0%), Hong Kong (16.5%) and the Netherlands (25.0%).

A reconciliation of the difference between the provision for income taxes and the expected tax provision at the weighted average tax rate follows:

	Year Ended December 31,		
	2021	2020	2019
Expected income tax expense (benefit) computed on pre-tax income at weighted average income tax rate	$ 158,269	$ 111,947	$ 149,799
Addition (reduction) in income tax expense (benefit) resulting from:			
Tax-exempt investment income	(23,572)	(1,824)	(3,091)
Meals and entertainment	379	547	1,134
State taxes, net of U.S. federal tax benefit	20,978	5,027	3,314
Foreign branch taxes	1,998	2,094	1,231
Prior year adjustment	(1,432)	3,983	632
Foreign exchange gains & losses	1,190	(1,736)	436
Changes in applicable tax rate	447	—	—
Dividend withholding taxes	12,211	7,105	6,510
Change in valuation allowance	(40,425)	13,190	1,628
Contingent consideration	—	9	190
Share based compensation	(5,339)	(2,533)	(6,592)
Intercompany loan write-off	—	(22,083)	—
Other	3,878	(3,888)	619
Income tax expense (benefit)	$ 128,582	$ 111,838	$ 155,810

The effect of a change in tax laws or rates on deferred tax assets and liabilities is recognized in income in the period in which such change is enacted.

Deferred income tax assets and liabilities reflect temporary differences based on enacted tax rates between the carrying amounts of assets and liabilities for financial reporting and income tax purposes.

Significant components of the Company's deferred income tax assets and liabilities were as follows:

	December 31,	
	2021	2020
Deferred income tax assets:		
Net operating loss	$ 87,960	$ 67,142
Uncrystallized losses	—	2,926
Discounting of net loss reserves	72,001	74,247
Net unearned premium reserve	75,483	66,368
Compensation liabilities	28,062	27,351
Foreign tax credit carryforward	20,058	19,160
Interest expense	755	622
Goodwill and intangible assets	—	14,450
Bad debt reserves	10,252	10,842
Depreciation and amortization	115,041	—
Lease liability	21,453	23,604
Net unrealized foreign exchange gains	166	165
Other, net	—	2,318
Deferred tax assets before valuation allowance	431,231	309,195
Valuation allowance	(43,953)	(88,255)
Deferred tax assets net of valuation allowance	387,278	220,940
Deferred income tax liabilities:		
Depreciation and amortization	—	(495)
Deposit accounting liability	(1,578)	(1,751)
Goodwill and intangibles	(70,549)	—
Lloyds year of account deferral	(12,514)	—
Contingency reserve	(49,486)	(64,593)
Deferred policy acquisition costs	(25,612)	(42,045)
Investment related	(7,492)	(9,571)
Net unrealized appreciation of investments	(8,377)	(66,681)
Right-of-use asset	(17,406)	(19,239)
Other, net	(218)	(843)
Total deferred tax liabilities	(193,232)	(205,218)
Net deferred income tax assets	$ 194,046	$ 15,722

The Company provides a valuation allowance to reduce the net value of certain deferred tax assets to an amount which management expects to more likely than not be realized. As of December 31, 2021, the Company's valuation allowance was $44.0 million, compared to $88.3 million at December 31, 2020. The valuation allowance at December 31, 2021, was primarily attributable to valuation allowances on the Company's U.K., Canadian and Hong Kong operations and certain other deferred tax assets relating to loss carryforwards that have a limited use.

At December 31, 2021, the Company's net operating loss carryforwards and tax credits were as follows:

	Year Ended December 31,	
	2021	Expiration
Operating Loss Carryforwards		
United Kingdom	$ 259,235	No expiration
Ireland	9,032	No expiration
Australia	39,981	No expiration
Hong Kong	23,203	No expiration
United States (1)	29,508	2029 - 2038
Tax Credits		
U.K. foreign tax credits	20,058	No expiration

(1) On January 30, 2014, the Company's U.S. mortgage operations underwent an ownership change for U.S. federal income tax purposes as a result of the Company's acquisition of the CMG Entities. As a result of this ownership change, a limitation has been imposed upon the utilization of approximately $7.6 million of the Company's existing U.S. net operating loss carryforwards. Utilization is limited to approximately $0.6 million per year in accordance with Section 382 of the Internal Revenue Code of 1986 as amended ("the Code").

The Company's U.S. mortgage operations are eligible for a tax deduction, subject to certain limitations, under Section 832(e) of the Code for amounts required by state law or regulation to be set aside in statutory contingency reserves. The deduction is allowed only to the extent that the Company purchases non-interest bearing U.S. Mortgage Guaranty Tax and Loss Bonds ("T&L Bonds") issued by the U.S. Treasury Department in an amount equal to the tax benefit derived from deducting any portion of the statutory contingency reserves. T&L Bonds are reflected in 'other assets' on the Company's balance sheet and totaled approximately $31.6 million at December 31, 2021, compared to $88.1 million at December 31, 2020.

Deferred income tax liabilities have not been accrued with respect to the undistributed earnings of the Company's U.S., U.K. and Ireland subsidiaries as it is the Company's intention that all such earnings will be indefinitely reinvested. If the earnings were to be distributed, as dividends or otherwise, such amounts may be subject to withholding tax in the jurisdiction of the paying entity. The Company no longer intends to indefinitely reinvest earnings from the Company's Canada subsidiary, however, no income or withholding taxes have been accrued as the Canada subsidiary does not have positive cumulative earnings and profits and therefore a distribution from this particular subsidiary would not be subject to income taxes or withholding taxes. Potential tax implications of repatriation from the Company's unremitted earnings that are indefinitely reinvested are driven by facts at the time of distribution. Therefore it is not practicable to estimate the income tax liabilities that might be incurred if such earnings were remitted. Distributions from the U.K. or

Ireland would not be subject to withholding tax and no deferred income tax liability would need to be accrued.

The Company recognizes interest and penalties relating to unrecognized tax benefits in the provision for income taxes. As of December 31, 2021, the Company's total unrecognized tax benefits, including interest and penalties, were $2.0 million. If recognized, the full amount of the unrecognized tax benefit would impact the consolidated effective tax rate. A reconciliation of the beginning and ending amount of unrecognized tax benefits is as follows:

	December 31,	
	2021	2020
Balance at beginning of year	$ 2,008	$ 2,008
Additions based on tax positions related to the current year	—	—
Additions for tax positions of prior years	—	—
Reductions for tax positions of prior years	—	—
Settlements	—	—
Balance at end of year	$ 2,008	$ 2,008

The Company, its subsidiaries and branches file income tax returns in various federal, state and local jurisdictions. The following table details open tax years that are potentially subject to examination by local tax authorities, in the following major jurisdictions:

Jurisdiction	Tax Years
United States	2015-2021
United Kingdom	2020-2021
Ireland	2017-2021
Canada	2017-2021
Switzerland	2018-2021
Denmark	2017-2021
Australia	2017-2021

As of December 31, 2021, the Company's current income tax payable (included in "Other liabilities") was $14.8 million.

16. Transactions with Related Parties

In 2017, the Company acquired approximately 25% of Premia Holdings Ltd. Premia Holdings Ltd. is the parent of Premia Reinsurance Ltd., a multi-line Bermuda reinsurance company (together with Premia Holdings Ltd., "Premia"). Premia's strategy is to reinsure or acquire companies or reserve portfolios in the non-life property and casualty insurance and reinsurance run-off market. Arch Re Bermuda and certain Arch co-investors invested $100.0 million and acquired approximately 25% of Premia as well as warrants to purchase additional common equity. Arch has appointed two directors to serve on the seven person board of directors of Premia. Arch Re Bermuda is providing a 25% quota share reinsurance treaty on certain business written by Premia.

In the 2021 first quarter, as part of the Company's acquisition of Barbican, the Company entered into an agreement with Premia Managing Agency Limited for the reinsurance to close of Syndicate 1955's 2018 underwriting year of account into Premia Syndicate 1884's 2021 underwriting year of account. The reinsurance to close covers legacy business underwritten by Syndicate 1955 on the underwriting 2018 and prior years of account and under the agreement, approximately $380 million of net liabilities was transferred to Syndicate 1884, with an effective date of January 1, 2021. The Company had no reinsurance recoverable on unpaid and paid losses or funds held liability at December 31, 2021, compared to $199.8 million and $149.6 million, respectively, at December 31, 2020.

In July 2021, following consummation of the Merger Agreement and the related Greysbridge equity financing, pursuant to which Somers is wholly owned by Greysbridge, and Greysbridge is owned 40% by the Company, 30% by certain funds managed by Kelso and 30% by certain funds managed by Warburg, the Company entered into certain reinsurance transactions with Somers. For 2021, the Company ceded premiums written related to such transactions of $453.9 million (which includes reinsurance transactions in force as well as those entered into in conjunction with the Merger Agreement). In addition, Somers paid certain acquisition costs and administrative fees to the Company. At December 31, 2021, the Company recorded a reinsurance recoverable on unpaid and paid losses from Somers of $902.8 million and a reinsurance balance payable to Somers of $258.4 million. See note 12, "Variable Interest Entity and Noncontrolling Interests."

The Company has a put/call option that was entered into in connection with the Greysbridge equity financing, whereby beginning January 1, 2024 the Company will have a call right (but not the obligation) and Warburg and Kelso will each have a put right (but not the obligation) to buy/sell one third of their initial shares annually at the tangible book value per share of Greysbridge for the most recently ended fiscal quarter.

As of December 31, 2021, the Company owns $35.0 million in aggregate principal amount of Somers 6.5% senior notes, due July 2, 2029 and approximately 6.6% of Somers' preference shares.

17. Leases

In the ordinary course of business, the Company renews and enters into new leases for office property and equipment. At the lease inception date, the Company determines whether a contract contains a lease and its classification as a finance or operating lease. Primarily all of the Company's leases are classified as operating leases. The Company's operating leases have remaining lease terms of up to 11 years, some of which include options to extend the lease term. The Company considers these options when determining the lease term and measuring its lease liability and right-of-use asset. In addition, the Company's lease agreements do not contain any material residual value guarantees or material restrictive covenants.

Short-term operating leases with an initial term of twelve months or less were excluded on the Company's consolidated balance sheet and represent an inconsequential amount of operating lease expense.

As most leases do not provide an implicit rate, the Company uses its incremental borrowing rate based on the information available at the lease commencement date in determining the present value of lease payments.

Additional information regarding the Company's operating leases is as follows:

	December 31, 2021	December 31, 2020
Operating lease costs	$ 31,691	$ 31,826
Cash payments included in the measurement of lease liabilities reported in operating cash flows	$ 32,094	$ 30,365
Right-of-use assets obtained in exchange for new lease liabilities	$ 22,686	$ 12,060
Right-of-use assets (1)	$ 106,836	$ 115,911
Operating lease liability (1)	$ 126,711	$ 136,015
Weighted average discount rate	3.9 %	3.9 %
Weighted average remaining lease term	5.9 years	5.8 years

(1) The right-of-use assets are included in 'other assets' while the operating lease liability is included in 'other liabilities.'

The following table presents the contractual maturities of the Company's operating lease liabilities at December 31, 2021:

Years Ending December 31,	
2022	$ 31,682
2023	25,288
2024	22,102
2025	16,253
2026	13,430
2027 and thereafter	34,173
Total undiscounted lease liability	142,928
Less: present value adjustment	(16,217)
Operating lease liability	126,711

All of these leases are for the rental of office space, with expiration terms that range from 2022 to 2033. Rental expense was approximately $31.7 million, $31.8 million and $30.5 million for 2021, 2020 and 2019, respectively.

18. Commitments and Contingencies

Concentrations of Credit Risk

The creditworthiness of a counterparty is evaluated by the Company, taking into account credit ratings assigned by independent agencies. The credit approval process involves an assessment of factors, including, among others, the counterparty, country and industry credit exposure limits. Collateral may be required, at the discretion of the Company, on certain transactions based on the creditworthiness of the counterparty.

The areas where significant concentrations of credit risk may exist include unpaid losses and loss adjustment expenses recoverable, contractholder receivables, ceded unearned premiums, paid losses and loss adjustment expenses recoverable net of reinsurance balances payable, investments and cash and cash equivalent balances. A credit exposure exists with respect to reinsurance recoverables as they may become uncollectible. The Company manages its credit risk in its reinsurance relationships by transacting with reinsurers that it considers financially sound and, if necessary, the Company may hold collateral in the form of funds, trust accounts and/or irrevocable letters of credit. This collateral can be drawn on for amounts that remain unpaid beyond specified time periods on an individual reinsurer basis. In addition, certain insurance policies written by the Company's insurance operations feature large deductibles, primarily in its construction and national accounts lines of business. Under such contracts, the Company is obligated to pay the claimant for the full amount of the claim. The Company is subsequently reimbursed by the policyholder for the deductible amount. These amounts are included on a gross basis in the consolidated balance sheet in contractholder payables and contractholder receivables, respectively. In the event that the Company is unable to collect from the

policyholder, the Company would be liable for such defaulted amounts. Collateral, primarily in the form of letters of credit, cash and trusts, is obtained from the policyholder to mitigate the Company's credit risk. In the instances where the company receives collateral in the form of cash, the Company records a related liability in "Collateral held for insured obligations."

In addition, the Company underwrites a significant amount of its business through brokers and a credit risk exists should any of these brokers be unable to fulfill their contractual obligations with respect to the payments of insurance and reinsurance balances owed to the Company. The following table summarizes the percentage of the Company's gross premiums written generated from or placed by the largest brokers:

	Year Ended December 31,		
Broker	**2021**	**2020**	**2019**
Marsh & McLennan Companies and its subsidiaries	18.3 %	13.3 %	9.6 %
Aon Corporation and its subsidiaries	12.2 %	12.0 %	12.2 %

No other broker and no one insured or reinsured accounted for more than 10% of gross premiums written for 2021, 2020 and 2019.

The Company's available for sale investment portfolio is managed in accordance with guidelines that have been tailored to meet specific investment strategies, including standards of diversification, which limit the allowable holdings of any single issue. There were no investments in any entity in excess of 10% of the Company's shareholders' equity at December 31, 2021 other than investments issued or guaranteed by the United States government or its agencies.

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 $3.0 billion and $2.1 billion at December 31, 2021 and 2020, respectively.

Purchase Obligations

The Company has also entered into certain agreements which commit the Company to purchase goods or services, primarily related to software and computerized systems. Such purchase obligations were approximately $114.1 million and $73.0 million at December 31, 2021 and 2020, respectively.

Employment and Other Arrangements

At December 31, 2021, the Company has entered into employment agreements with certain of its executive officers. Such employment arrangements provide for compensation in the form of base salary, annual bonus, share-based awards, participation in the Company's employee benefit programs and the reimbursements of expenses.

19. Debt and Financing Arrangements

The Company's senior notes payable at December 31, 2021 and 2020 were as follows:

	Interest (Fixed)	Principal Amount	Carrying Amount at December 31, 2021	Carrying Amount at December 31, 2020
2034 notes (1)	7.350 %	300,000	297,488	297,367
2043 notes (2)	5.144 %	500,000	495,063	494,944
2026 notes (3)	4.011 %	500,000	497,633	497,211
2046 notes (4)	5.031 %	450,000	445,490	445,402
2050 notes (5)	3.635 %	1,000,000	988,720	988,500
Somers notes (6)				137,689
		$ 2,750,000	$2,724,394	$2,861,113

(1) Senior notes of Arch Capital issued on May 4, 2004 and due May 1, 2034 ("2034 notes").

(2) Senior notes of Arch-U.S., a wholly-owned subsidiary of Arch Capital, issued on December 13, 2013 and due November 1, 2043 ("2043 notes"), fully and unconditionally guaranteed by Arch Capital.

(3) Senior notes of Arch Capital Finance LLC ("Arch Finance"), a wholly-owned finance subsidiary of Arch Capital, issued on December 8, 2016 and due December 15, 2026 ("2026 notes"), fully and unconditionally guaranteed by Arch Capital.

(4) Senior notes of Arch Finance issued on December 8, 2016 and due December 15, 2046 ("2046 notes"), fully and unconditionally guaranteed by Arch Capital

(5) Senior notes of Arch Capital issued on June 30, 2020 and due June 30, 2050 ("2050 notes").

(6) Senior notes of Somers issued on July 2, 2019 and due July 2, 2029 ("Somers Senior Notes"), reflecting the elimination of amounts owned by Arch-U.S. Effective July 1, 2021, the Company no longer consolidates Somers in its financials. See note 12.

The 2034 notes are Arch Capital's senior unsecured obligations and rank equally with all of its existing and future senior unsecured indebtedness. Interest payments on the 2034 notes are due on May 1st and November 1st of each year. Arch Capital may redeem the 2034 notes at any time and from time to time, in whole or in part, at a "make-whole" redemption price.

The 2043 notes are unsecured and unsubordinated obligations of Arch-U.S. and Arch Capital, respectively, and rank equally and ratably with the other unsecured and unsubordinated indebtedness of Arch-U.S. and Arch Capital, respectively. Interest payments on the 2043 notes are due on May 1st and November 1st of each year. Arch-U.S. may

redeem the 2043 notes at any time and from time to time, in whole or in part, at a "make-whole" redemption price.

The 2026 notes are unsecured and unsubordinated obligations of Arch Finance and Arch Capital, respectively, and rank equally and ratably with the other unsecured and unsubordinated indebtedness of Arch Finance and Arch Capital, respectively. Interest payments on the 2026 notes are due on June 15th and December 15th of each year. Arch Finance may redeem the 2026 notes at any time and from time to time, in whole or in part, at a "make-whole" redemption price.

The 2046 notes are unsecured and unsubordinated obligations of Arch Finance and Arch Capital, respectively, and rank equally and ratably with the other unsecured and unsubordinated indebtedness of Arch Finance and Arch Capital, respectively. Interest payments on the 2046 notes are due on June 15th and December 15th of each year. Arch Finance may redeem the 2046 notes at any time and from time to time, in whole or in part, at a "make-whole" redemption price.

The 2050 notes are Arch Capital's senior unsecured obligations and rank equally with all of its existing and future senior unsecured indebtedness. Interest payments on the 2050 notes are due on June 30 and December 30 of each year. Arch Capital may redeem the 2050 notes at any time and from time to time, in whole or in part, at a "make-whole" redemption price.

Interest payments on the Somers Senior Notes due on each January 2 and July 2, commencing January 2, 2020. The Company purchased $35.0 million in aggregate principal amount of the Somers Senior Notes. Effective July 1, 2021, the Company no longer consolidates the results of Somers in its consolidated financial statements and footnotes. See note 12, "Variable Interest Entity and Noncontrolling Interests."

Letter of Credit and Revolving Credit Facilities

In the normal course of its operations, the Company enters into agreements with financial institutions to obtain secured and unsecured credit facilities.

On December 17, 2019, Arch Capital and certain of its subsidiaries entered into a $750.0 million five-year credit facility (the "Credit Facility") with a syndication of lenders. The Credit Facility consists of a $250.0 million secured facility for letters of credit (the "Secured Facility") and a $500.0 million unsecured facility for revolving loans and letters of credit (the "Unsecured Facility"). Obligations of each borrower under the Secured Facility for letters of credit are secured by cash and eligible securities of such borrower held in collateral accounts. Commitments under the Credit Facility may be increased up to, but not exceeding, an aggregate of $1.3 billion. Arch Capital has a one-time option to convert any or all outstanding revolving loans of Arch Capital and/or Arch-U.S. to term loans with the same terms as the revolving loans except that any prepayments may not be re-borrowed. Arch-U.S. guarantees the obligations of Arch Capital, and Arch Capital guarantees the obligations of Arch-U.S. Borrowings of revolving loans may be made at a variable rate based on LIBOR or an alternative base rate at the option of Arch Capital. Arch Capital and its lenders may agree on a LIBOR successor rate at the appropriate time to address the replacement of LIBOR. Secured letters of credit are available for issuance on behalf of certain Arch Capital subsidiaries. The Credit Facility is structured such that each party that requests a letter of credit or borrowing does so only for itself and its own obligations.

The Credit Facility contains certain restrictive covenants customary for facilities of this type, including restrictions on indebtedness, consolidated tangible net worth, minimum shareholders' equity levels and minimum financial strength ratings. Arch Capital and its subsidiaries which are party to the agreement were in compliance with all covenants contained therein at December 31, 2021.

Commitments under the Credit Facility will expire on December 17, 2024, and all loans then outstanding must be repaid. Letters of credit issued under the Unsecured Facility will not have an expiration date later than December 17, 2025.

Under the $250.0 million secured letter of credit facility, Arch Capital's subsidiaries had $240.4 million of letters of credit outstanding and remaining capacity of $9.6 million at December 31, 2021. In addition, certain of Arch Capital's subsidiaries had outstanding secured and unsecured letters of credit of $26.0 million and $290.0 million respectively, which were issued in the normal course of business.

When issued, all secured letters of credit are secured by a portion of the investment portfolio. At December 31, 2021, these letters of credit were secured by investments with a fair value of $348.4 million.

The Company's outstanding revolving credit agreement borrowings were as follows:

	Year Ended December 31,	
	2021	2020
Arch Capital	$ —	$ —
Somers		155,687
Total	$ —	$ 155,687

Federal Home Loan Bank Membership

Certain subsidiaries of the Company are members of Federal Home Loan Banks ("FHLBs"). Members may borrow from the FHLBs at competitive rates subject to certain conditions. Conditions include maintaining sufficient collateral deposits for funding and a requirement to hold stock in the FHLBs related to both membership and outstanding advances. At December 31, 2021 and 2020, the Company had $80.0 million of advances outstanding under the FHLB program, included in 'other liabilities' on the Company's balance sheet, secured by investments with a fair value of $80.2 million.

20. Goodwill and Intangible Assets

The following table shows an analysis of goodwill and intangible assets:

	Goodwill	Intangible assets (indefinite life)	Intangible assets (finite life)	Total
Net balance at Dec. 31, 2019	$ 326,551	$ 85,911	$ 325,621	$ 738,083
Acquisitions	—	—	39,178	39,178
Amortization	—	—	(69,031)	(69,031)
Foreign currency movements and other adjustments	(11,922)	(6,692)	3,247	(15,367)
Net balance at Dec. 31, 2020	314,629	79,219	299,015	692,863
Acquisitions (1)	31,677	—	318,459	350,136
Amortization	—	—	(82,955)	(82,955)
Impact of deconsolidation of Somers (2)	—	(7,650)	—	(7,650)
Foreign currency movements and other adjustments	(1,441)	(212)	(5,758)	(7,411)
Net balance at Dec. 31, 2021	$ 344,865	$ 71,357	$ 528,761	$ 944,983
Gross balance at Dec. 31, 2021	$ 342,842	$ 70,246	$1,102,298	$1,515,386
Accumulated amortization	—	—	(571,839)	(571,839)
Foreign currency movements and other adjustments	2,023	1,111	(1,698)	1,436
Net balance at Dec. 31, 2021	$ 344,865	$ 71,357	$ 528,761	$ 944,983

(1) Certain amounts for the Company's 2021 acquisitions are considered provisional.

(2) See note 12.

The following table presents the components of goodwill and intangible assets:

	Gross Balance	Accumulated Amortization	Foreign Currency Translation Adjustment and Other	Net Balance
Dec. 31, 2021				
Acquired insurance contracts	$ 451,505	$ (409,592)	$ 339	$ 42,252
Operating platform	52,674	(48,838)	56	3,892
Distribution relationships	602,518	(120,302)	(2,207)	480,009
Goodwill	342,842	—	2,023	344,865
Insurance licenses	48,331	—	—	48,331
Syndicate capacity	21,915	—	1,111	23,026
Unfavorable service contract	(9,533)	9,435	—	(98)
Other	5,134	(2,542)	114	2,706
Total	$1,515,386	$ (571,839)	$ 1,436	$ 944,983
Dec. 31, 2020				
Acquired insurance contracts	$ 451,505	$ (381,349)	$ 284	$ 70,440
Operating platform	52,674	(44,347)	60	8,387
Distribution relationships	285,141	(71,383)	3,450	217,208
Goodwill	318,043	—	(3,414)	314,629
Insurance licenses	55,981	—	—	55,981
Syndicate capacity	21,915	—	1,324	23,239
Unfavorable service contract	(9,533)	9,147	—	(386)
Other	5,134	(1,896)	127	3,365
Total	$1,180,860	$ (489,828)	$ 1,831	$ 692,863

The estimated remaining amortization expense for the Company's intangible assets with finite lives is as follows:

2022	$ 109,144
2023	99,620
2024	79,410
2025	44,523
2026	35,252
2027 and thereafter	160,812
Total	$ 528,761

The estimated remaining useful lives of these assets range from one to fifteen years at December 31, 2021.

21. Shareholders' Equity

Authorized and Issued

The authorized share capital of Arch Capital consists of 1.8 billion Common Shares, par value of $0.0011 per share, and 50 million Preferred Shares, par value of $0.01 per share.

Common Shares

The following table presents a roll-forward of changes in Arch Capital's issued and outstanding Common Shares:

	Year Ended December 31,		
	2021	2020	2019
Common Shares:			
Shares issued and outstanding, beginning of year	579,000,841	574,617,195	570,737,283
Shares issued (1)	2,669,229	2,646,164	2,835,994
Restricted shares issued, net of cancellations	1,619,780	1,737,482	1,043,918
Shares issued and outstanding, end of year	583,289,850	579,000,841	574,617,195
Common shares in treasury, end of year	(204,365,956)	(172,280,199)	(168,997,994)
Shares issued and outstanding, end of year	378,923,894	406,720,642	405,619,201

(1) Includes shares issued from the exercise of stock options and stock appreciation rights, the vesting of restricted share units and shares issued from the employee share purchase plan.

Share Repurchase Program

The board of directors of Arch Capital has authorized the investment in Arch Capital's common shares through a share repurchase program. At December 31, 2021, $1.2 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, 2022. 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.

Repurchases of Arch Capital's common shares in connection with the share repurchase plan and other share-based transactions were held in the treasury under the cost method, and the cost of the common shares acquired is included in 'Common shares held in treasury, at cost.' At December 31, 2021, Arch Capital held 204.4 million shares for an aggregate cost of $3.8 billion in treasury, at cost.

The Company's repurchases under the share repurchase program were as follows:

	Year Ended December 31,		
	2021	2020	2019
Aggregate cost of shares repurchased	$ 1,234,294	$ 83,472	$ 2,871
Shares repurchased	31,486,830	2,850,102	110,598
Average price per share repurchased	$ 39.20	$ 29.29	$ 25.96

Since the inception of the share repurchase program through December 31, 2021, Arch Capital has repurchased approximately 420.7 million common shares for an aggregate purchase price of $5.3 billion.

Series G Preferred Shares

In June 2021, Arch Capital completed a $500 million underwritten public offering of 20.0 million depositary shares (the "Depositary Shares"), each of which represents a 1/1,000th interest in a share of its 4.55% Non-Cumulative Preferred Shares, Series G, $0.01 par value and $25,000 liquidation preference per share (equivalent to $25 liquidation preference per Depositary Share) (the "Series G Preferred Shares"). Each Depositary Share, evidenced by a depositary receipt, entitles the holder, through the depositary, to a proportional fractional interest in all rights and preferences of the Series G Preferred Shares represented thereby (including any dividend, liquidation, redemption and voting rights).

Holders of Series G Preferred Shares will be entitled to receive dividend payments only when, as and if declared by the Company's board of directors or a duly authorized committee of the board. Any such dividends will be payable from, and including, the date of original issue on a noncumulative basis, quarterly in arrears on the last day of March, June, September and December of each year, at an annual rate of 4.55%. Dividends on the Series G Preferred Shares are not cumulative. The Company will be restricted from paying dividends on or repurchasing its common shares unless certain dividend payments are made on the Series G Preferred Shares. The Company may not declare or pay a dividend on the Series G Preferred Shares under certain circumstances, including if the Company is or, after giving effect to such payment, would be in breach of applicable individual or group solvency and liquidity requirements or applicable individual or group enhanced capital requirements ("ECR"). The Series G Preferred Shares may not be redeemed at any time if the ECR would be breached immediately before or after giving effect to such redemption, unless the Company replaces the capital represented by preference shares to be redeemed with capital having equal or better capital treatment.

Except in specified circumstances relating to certain tax or corporate events, the Series G Preferred Shares are not redeemable prior to June 11, 2026. On and after that date, the Series G Preferred Shares will be redeemable at the Company's option, in whole or in part, at a redemption price of $25,000 per share of the Series G Preferred Shares (equivalent to $25 per depositary share), plus any declared and unpaid dividends, without accumulation of any undeclared dividends to, but excluding, the redemption date. The Depositary Shares will be redeemed if and to the extent the related Series G Preferred Shares are redeemed by the Company. Neither the Depositary Shares nor the Series G Preferred Shares have a stated maturity, nor will they be subject to any sinking fund or mandatory redemption. The Series G Preferred Shares are not convertible into any other securities. The Series G Preferred Shares do not have voting rights, except under limited circumstances. The net proceeds from the Series G Preferred Share offerings were used to redeem the Company's outstanding 5.25% Series E Non-Cumulative Preferred Shares.

Series F Preferred Shares

In August 2017 and November 2017, Arch Capital completed combined $330 million of underwritten public offerings ($230 million in August 2017 and $100 million in November 2017) of 13.2 million depositary shares (the "Series F Depositary Shares"), each of which represents a 1/1,000th interest in a share of its 5.45% Non-Cumulative Preferred Shares, Series F, with a $0.01 par value and $25,000 liquidation preference per share (equivalent to $25 liquidation preference per Series F Depositary Share) (the "Series F Preferred Shares"). Each Series F Depositary Share, evidenced by a depositary receipt, entitles the holder, through the depositary, to a proportional fractional interest in all rights and preferences of the Series F Preferred Shares represented thereby (including any dividend, liquidation, redemption and voting rights).

Holders of Series F Preferred Shares will be entitled to receive dividend payments only when, as and if declared by our board of directors or a duly authorized committee of the board. Any such dividends will be payable from, and including, the date of original issue on a noncumulative basis, quarterly in arrears on the last day of March, June, September and December of each year, at an annual rate of 5.45%. Dividends on the Series F Preferred Shares are not cumulative. The Company will be restricted from paying dividends on or repurchasing its common shares unless certain dividend payments are made on the Series F Preferred Shares.

Except in specified circumstances relating to certain tax or corporate events, the Series F Preferred Shares are not redeemable prior to August 17, 2022 (the fifth anniversary of the issue date). On and after that date, the Series F Preferred Shares will be redeemable at the Company's option, in whole or in part, at a redemption price of $25,000 per share of the Series F Preferred Shares (equivalent to $25 per depositary share), plus any declared and unpaid dividends, without accumulation of any undeclared dividends to, but excluding, the redemption date. The Series F Depositary Shares will be redeemed if and to the extent the related Series F Preferred Shares are redeemed by the Company. Neither the Series F Depositary Shares nor the Series F Preferred Shares have a stated maturity, nor will they be subject to any sinking fund or mandatory redemption. The Series F Preferred Shares are not convertible into any other securities. The Series F Preferred Shares will not have voting rights, except under limited circumstances. The net proceeds from the Series F Preferred Share offerings were used to redeem the Company's outstanding 6.75% Series C Non-Cumulative Preferred Shares.

Series E Preferred Shares

In September, 2021, Arch Capital redeemed all outstanding 5.25% Series E non-cumulative preferred shares. The preferred shares were redeemed at a redemption price equal to $25 per share, plus all declared and unpaid dividends to (but excluding) the redemption date. In accordance with GAAP, following the redemption, original issuance costs related to such shares have been removed from additional paid-in capital and recorded as a "loss on redemption of preferred shares." Such adjustment had no impact on total shareholders' equity or cash flows.

22. Share-Based Compensation

Long Term Incentive and Share Award Plans

The Company utilizes share-based compensation plans for officers, other employees and directors of Arch Capital and its subsidiaries to provide competitive compensation opportunities, to encourage long-term service, to recognize individual contributions and reward achievement of performance goals and to promote the creation of long-term value for shareholders by aligning the interests of such persons with those of shareholders.

The 2018 Long-Term Incentive and Share Award Plan (the "2018 Plan") became effective as of May 9, 2018 following approval by shareholders of the Company. The 2018 Plan provides for the issuance of restricted stock units, performance units, restricted shares, performance shares, stock options and stock appreciation rights and other equity-based awards to our employees and directors. The 2018 Plan authorizes the issuance of 34,500,000 common shares and will terminate as to future awards on February 28, 2028. At December 31, 2021, 9,909,950 shares are available for future issuance.

The 2015 Long Term Incentive and Share Award Plan (the ("2015 Plan") authorizes the issuance of 12,900,000 common shares and became effective as of May 7, 2015 following approval by shareholders of the Company. The 2015 Plan provides for the issuance of share-based awards to our employees and directors and will terminate as to future awards on February 26, 2025. At December 31, 2021, 606,942 shares are available for future issuance.

The 2012 Long Term Incentive and Share Award Plan (the "2012 Plan") became effective as of May 9, 2012 following approval by shareholders of the Company. The 2012 Plan authorizes the issuance of 22,301,772 common shares and will terminate as to future awards on February 28, 2022. At December 31, 2021, 320,272 shares are available for grant under the 2012 Plan.

Upon shareholder approval on May 6, 2016, the Amended and Restated Arch Capital Group Ltd. 2007 Employee Share Purchase Plan (the "ESPP") became effective and a total of 4,689,777 common shares were reserved for issuance. The purpose of the ESPP is to give employees of Arch Capital and its subsidiaries an opportunity to purchase common shares through payroll deductions, thereby encouraging employees to share in the economic growth and success of Arch Capital and its subsidiaries. The ESPP is designed to qualify as an "employee share purchase plan" under Section 423 of the Code. At December 31, 2021, 1,608,354 shares remain available for issuance.

Stock Options and Stock Appreciation Rights

The Company generally issues stock options and SARs to eligible employees, with exercise prices equal to the fair market values of the Company's Common Shares on the grant dates. Such grants generally vest over a three year period with one-third vesting on the first, second and third anniversaries of the grant date.

The grant date fair value is determined using the Black-Scholes option valuation model. The expected life assumption is based on an expected term analysis, which incorporates the Company's historical exercise experience. Expected volatility is based on the Company's daily historical trading data of its common shares. The table below summarizes the assumptions used.

	Year Ended December 31,		
	2021	2020	2019
Dividend yield	— %	— %	— %
Expected volatility	24.2 %	16.6 %	18.1 %
Risk free interest rate	1.0 %	1.2 %	2.5 %
Expected option life	6.0 years	6.0 years	6.0 years

A summary of stock option and SAR activity under the Company's Long Term Incentive and Share Award Plans during 2021 is presented below:

	Year Ended December 31, 2021			
	Number of Options / SARs	Weighted Average Exercise Price	Weighted Average Contractual Term	Aggregate Intrinsic Value
Outstanding, beginning of year	17,839,333	$ 23.32		
Granted	1,243,984	$ 35.90		
Exercised	(1,931,320)	$ 15.57		
Forfeited or expired	(68,837)	$ 35.39		
Outstanding, end of year	17,083,160	$ 25.06	4.41	$ 331,214
Exercisable, end of year	14,730,147	$ 23.20	3.78	$ 312,966

The aggregate intrinsic value of stock options and SARs exercised represents the difference between the exercise price of the stock options and SARs and the closing market price of the Company's common shares on the exercise dates. During 2021, the Company received proceeds of $10.1 million from the exercise of stock options and recognized a tax benefit of $5.4 million from the exercise of stock options and SARs.

	Year Ended December 31,		
	2021	2020	2019
Weighted average grant date fair value	$ 9.22	$ 8.14	$ 7.90
Aggregate intrinsic value of Options/SARs exercised	$ 47,074	$ 59,723	$ 51,350

Restricted Common Shares and Restricted Units

The Company also issues restricted share and unit awards to eligible employees and directors, for which the fair value is equal to the fair market values of the Company's Common Shares on the grant dates. Restricted share and unit awards generally vest over a three year period with one-third vesting on the first, second and third anniversaries of the grant date.

A summary of restricted share and restricted unit activity under the Company's Long Term Incentive and Share Award Plans for 2021 is presented below:

	Restricted Common Shares	Restricted Unit Awards
Unvested Shares:		
Unvested balance, beginning of year	1,635,845	1,121,719
Granted	1,085,811	175,962
Vested	(549,892)	(555,870)
Forfeited	(100,927)	(41,945)
Unvested balance, end of year	2,070,837	699,866
Weighted Average Grant Date Fair Value:		
Unvested balance, beginning of year	$ 36.34	$ 31.43
Granted	$ 36.14	$ 35.94
Vested	$ 35.94	$ 30.46
Forfeited	$ 36.28	$ 32.23
Unvested balance, end of year	$ 36.35	$ 33.29

The following table presents the weighted average grant date fair value of restricted shares and restricted unit awards granted and the aggregate fair value of restricted shares and unit awards vesting in each year.

	Year Ended December 31,		
	2021	2020	2019
Restricted shares and restricted unit awards granted	1,261,773	1,535,330	1,195,741
Weighted average grant date fair value	$ 36.12	$ 37.55	$ 32.89
Aggregate fair value of vested restricted share and unit awards	$ 65,477	$ 39,703	$ 46,262

The aggregate intrinsic value of restricted units outstanding at December 31, 2021 was $31.1 million.

Performance Awards

The Company also issues performance share and unit awards (“performance awards”) to eligible employees, which are earned based on the achievement of pre-established threshold, target and maximum goals over three-year performance periods. Final payouts depend on the level of achievement along with each employees continued service through the vest date, and can vary between 0% and 200%. The grant date fair value of the performance awards is measured using a Monte Carlo simulation model, which incorporated the assumptions summarized in the table below. Expected volatility is based on the Company’s daily historical trading data of its common shares. The cumulative compensation expense recognized and unrecognized as of any reporting period date represents the adjusted estimate of performance shares and units that will ultimately be awarded, valued at their original grant date fair values.

	Year Ended December 31,		
	2021	2020	2019
Expected volatility	37.5%	18.1%	17.1 %
Risk free interest rate	0.3%	1.1%	2.5 %

	Performance Shares	Performance Units
Unvested Shares:		
Unvested balance, beginning of year	1,851,382	32,065
Granted	674,406	10,698
Performance adjustment (1) (2)	(39,510)	11,447
Vested	(624,518)	(24,440)
Unvested balance, end of year	1,861,760	29,770
Weighted Average Grant Date Fair Value:		
Unvested balance, beginning of year	$ 34.42	$ 33.48
Granted	$ 37.38	$ 37.38
Performance adjustment (1) (2)	24.78	24.71
Vested	$ 24.78	$ 24.71
Unvested balance, end of year	$ 38.93	$ 38.71

(1) The performance adjustment represents the difference between the number of performance shares granted and earned, which vested following the end of the performance period. The performance shares were granted at the maximum level of achievement.

(2) The performance adjustment represents the change in PSUs, which vested following the end of the performance period. The performance units were granted at the target level of achievement.

The following table presents the weighted average grant date fair values of performance awards granted.

	Year Ended December 31,		
	2021	2020	2019
Performance awards	685,104	557,204	696,360
Weighted average grant date fair value	$ 37.38	$ 44.17	$ 36.05

The issuance of share-based awards and amortization thereon has no effect on the Company’s consolidated shareholders’ equity.

Share-Based Compensation Expense

The following tables present pre-tax and after-tax share-based compensation expense recognized as well as the unrecognized compensation cost associated with unvested awards and the weighted average period over which it is expected to be recognized.

	Year Ended December 31,		
	2021	2020	2019
Pre-Tax			
Stock options and SARs	$ 12,316	$ 11,744	$ 12,866
Restricted share and unit awards	46,817	41,284	38,988
Performance awards	23,696	14,729	8,949
ESPP	3,751	2,135	3,045
Total	$ 86,580	$ 69,892	$ 63,848
After-Tax			
Stock options and SARs	$ 10,927	$ 10,388	$ 11,450
Restricted share and unit awards	39,349	34,599	32,999
Performance awards	21,920	13,380	8,295
ESPP	3,471	1,978	2,758
Total	$ 75,667	$ 60,345	$ 55,502

	December 31, 2021		
	Stock Options and SARs	Restricted Common Shares and Units	Performance Common Shares and Units
Unrecognized compensation cost related to unvested awards	$ 8,233	$ 45,936	$ 7,635
Weighted average recognition period (years)	0.91	1.23	0.52

23. Retirement Plans

For purposes of providing employees with retirement benefits, the Company maintains defined contribution retirement plans. Contributions are based on the participants' eligible compensation. For 2021, 2020 and 2019, the Company expensed $60.4 million, $52.0 million and $44.8 million, respectively, related to these retirement plans.

24. 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 December 31, 2021, 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.

25. Statutory Information

The Company's insurance and reinsurance subsidiaries are subject to insurance and/or reinsurance laws and regulations in the jurisdictions in which they operate. These regulations include certain restrictions on the amount of dividends or other distributions available to shareholders without prior approval of the insurance regulatory authorities.

The actual and required statutory capital and surplus for the Company's principal operating subsidiaries at December 31, 2021 and 2020:

	December 31,	
	2021	2020
Actual capital and surplus (1):		
Bermuda	$ 17,528,510	$ 17,390,943
Ireland	958,200	883,337
United States	5,600,652	4,904,840
United Kingdom	902,002	967,440
Canada	70,063	64,286
Australia	283,693	64,507
Required capital and surplus:		
Bermuda	$ 5,661,301	$ 5,234,121
Ireland	794,933	701,161
United States	1,717,646	1,644,324
United Kingdom	563,164	601,662
Canada	42,513	37,441
Australia	214,022	19,370

(1) Such amounts include ownership interests in affiliated insurance and reinsurance subsidiaries.

There were no state-prescribed or permitted regulatory accounting practices for any of the Company's insurance or reinsurance entities that resulted in reported statutory surplus that differed from that which would have been reported under the prescribed practices of the respective regulatory authorities, including the National Association of Insurance Commissioners. The differences between statutory financial statements and statements prepared in accordance with GAAP vary by jurisdiction, however, with the primary differences being that statutory financial statements may not reflect deferred acquisition costs, certain net deferred tax assets, goodwill and intangible assets, unrealized appreciation or depreciation on debt securities and certain unauthorized reinsurance recoverables and include contingency reserves.

The statutory net income (loss) for the Company's principal operating subsidiaries for 2021, 2020 and 2019 was as follows:

	Year Ended December 31,		
	2021	2020	2019
Statutory net income (loss):			
Bermuda	$ 2,370,746	$ 1,579,889	$ 1,801,486
Ireland	25,191	18,397	26,367
United States	345,790	143,271	481,188
United Kingdom	35,286	4,078	(17,423)
Canada	6,985	(1,049)	(1,023)
Australia	11,874	(8,601)	(6,199)

Bermuda

Under the Bermuda Insurance Act 1978 and related regulations, each as amended (the "Insurance Act"), Arch Re Bermuda, the Company's Bermuda reinsurance and insurance subsidiary, is registered as a Class 4 insurer and long-term insurer and is required to maintain minimum statutory capital and surplus equal to the greater of a minimum solvency margin and the enhanced capital requirement ("ECR") as determined by the Bermuda Monetary Authority ("BMA"). The ECR is calculated based on the Bermuda Solvency Capital Requirement model, a risk-based model that takes into account the risk characteristics of different aspects of the company's business. At December 31, 2021 and 2020, the actual and required capital and surplus were based on the economic balance sheet requirements.

Under the Insurance Act, Arch Re Bermuda is restricted with respect to the payment of dividends. Arch Re Bermuda is prohibited from declaring or paying in any financial year dividends of more than 25% of its total statutory capital and surplus (as shown on its previous financial year's statutory balance sheet) unless it files, at least seven days before payment of such dividends, with the BMA an affidavit stating that it will continue to meet the required margins following the declaration of those dividends. Accordingly, Arch Re Bermuda can pay approximately $3.8 billion to Arch Capital during 2022 without providing an affidavit to the BMA.

Ireland

The Company has three Irish subsidiaries: Arch Re Europe, an authorized life and non-life reinsurer, Arch Insurance (EU), an authorized non-life insurer and Arch Underwriting Europe, a registered insurance and reinsurance intermediary. Irish authorized reinsurers and insurers, such as Arch Re Europe, Arch Insurance (EU) and Irish intermediaries, such as Arch Underwriters Europe, are also subject to the general body of Irish laws and regulations including the provisions of the Companies Act 2014. As part of the Company's Brexit plan, Arch Insurance (EU) received approval from the Central Bank of Ireland ("CBOI") to expand the nature of its business in 2019 commenced writing insurance lines in the European Economic Area in 2020, and the Part VII Transfer was completed at the end of December 2020. Arch Re Europe, Arch Insurance (EU) and Arch Underwriters Europe are subject to the supervision of the CBOI and must comply with Irish insurance acts and regulations as well as with directions and guidance issued by the CBOI. Arch Re Europe and Arch Insurance (EU) are required to maintain a minimum level of capital. At December 31, 2021 and 2020, these requirements were met.

The amount of dividends these subsidiaries are permitted to declare is limited to accumulated, realized profits, so far as not previously utilized by distribution or capitalization, less its accumulated, realized losses, so far as not previously written off in a reduction or reorganization of capital duly made. The solvency and capital requirements must still be met following any distribution. Dividends or distributions, if any, made by Arch Re Europe would result in an increase in available capital at Arch Re Bermuda.

United States

The Company's U.S. insurance and reinsurance subsidiaries are subject to insurance laws and regulations in the jurisdictions in which they operate. The ability of the Company's regulated insurance subsidiaries to pay dividends or make distributions is dependent on their ability to meet applicable regulatory standards. These regulations include restrictions that limit the amount of dividends or other distributions, such as loans or cash advances, available to shareholders without prior approval of the insurance regulatory authorities.

Dividends or distributions, if any, made by Arch Re U.S. would result in an increase in available capital at Arch-U.S., the Company's U.S. holding company. Arch Re U.S. can declare a maximum of approximately $217.5 million of dividends during 2022 subject to the approval of the Commissioner of the Delaware Department of Insurance.

AMIC and UGRIC have each been approved as an eligible mortgage insurer by Fannie Mae and Freddie Mac, subject to maintaining certain ongoing requirements ("eligible mortgage insurers"). In April 2015, the GSEs published comprehensive, revised requirements, known as the Private Mortgage Insurer Eligibility Requirements or "PMIERs." As clarified and revised by the Guidance Letters issued by the GSEs in December 2016 and March 2017, the PMIERs apply to the Company's eligible mortgage insurers, but do not apply to Arch Mortgage Guaranty Company, which is not GSE-approved.

The amount of assets required to satisfy the revised financial requirements of the PMIERs at any point in time will be affected by many factors, including macro-economic conditions, the size and composition of our eligible mortgage insurers' mortgage insurance portfolio at the point in time, and the amount of risk ceded to reinsurers that may be deducted in our calculation of "minimum required assets."

The Company's U.S. mortgage insurance subsidiaries are subject to detailed regulation by their domiciliary and primary regulators, the Wisconsin Office of the Commissioner of Insurance ("Wisconsin OCI") for AMIC and Arch Mortgage Guaranty Company, the North Carolina Department of Insurance ("NC DOI") for UGRIC, and by state insurance departments in each state in which they are licensed. As mandated by state insurance laws, mortgage insurers are generally mono-line companies restricted to writing a single type of insurance business, such as mortgage insurance business. Each company is subject to either Wisconsin or North Carolina statutory requirements as to payment of dividends. Generally, both Wisconsin and North Carolina law precludes any dividend before giving at least 30 days' notice to the Wisconsin OCI or NC DOI, as applicable, and prohibits paying any dividend unless it is fair and reasonable to do so. In addition, the state regulators and the GSEs limit or restrict our eligible mortgage insurers' ability to pay stockholder dividends or otherwise return capital to shareholders. Under respective states law, our U.S. mortgage subsidiaries can declare a maximum of approximately $194.1 million of ordinary dividends in 2022, however, dividend capacity is limited by the respective companies unassigned surplus amounts. In certain instances, approval by the GSEs would be required for dividends or other forms of return of capital to shareholders due to the requirements under PMIERs, including the minimum required assets imposed on our eligible mortgage insurers by the GSEs. Such dividend would result in an increase in available capital at Arch U.S. MI Holdings Inc., a subsidiary of Arch-U.S.

Mortgage insurance companies licensed in Wisconsin or North Carolina are required to establish contingency loss reserves for purposes of statutory accounting in an amount equal to at least 50% of net earned premiums. These amounts generally cannot be withdrawn for a period of 10 years and are separate liabilities for statutory accounting purposes, which affects the ability to pay dividends. However, with prior regulatory approval, a mortgage insurance company may make early withdrawals from the contingency reserve when incurred losses exceed 35% of net premiums earned in a calendar year.

Under Wisconsin and North Carolina law, as well as that of 14 other states, a mortgage insurer must maintain a minimum amount of statutory capital relative to its risk in force in order for the mortgage insurer to continue to write new business. While formulations of minimum capital vary in certain jurisdictions, the most common measure applied allows for a maximum risk-to-capital ratio of 25 to 1. Wisconsin and North Carolina both require a mortgage insurer to maintain a "minimum policyholder position" calculated in accordance with their respective regulations. Policyholders' position consists primarily of statutory policyholders' surplus plus the statutory contingency reserve, less ceded reinsurance. While the statutory contingency reserve is reported as a liability on the statutory balance sheet, for risk-to-capital ratio calculations, it is included as capital for purposes of statutory capital.

United Kingdom

The Prudential Regulation Authority ("PRA") and the Financial Conduct Authority ("FCA") regulate insurance and reinsurance companies and the FCA regulates firms carrying on insurance mediation activities operating in the U.K., both under the Financial Services and Markets Act 2000. The Company's U.K. insurance operations are conducted through Arch Insurance (U.K.), Arch Syndicate 2012 and Arch Syndicate 1955. Arch Managing Agency Limited ("AMAL") is the managing agent of Arch Syndicate 2012 and Arch Syndicate 1955. Arch Syndicate 2012 and Arch Syndicate 1955 provide access to Lloyd's extensive distribution network and worldwide licenses. AMAL also acts as managing agent for third party members of Arch Syndicate 1955. All U.K. companies are also subject to a range of statutory provisions, including the laws and regulations of the Companies Acts 2006 (as amended) (the "U.K. Companies Acts").

Arch Insurance (U.K.) and AMAL must maintain a margin of solvency at all times under the Solvency II Directive from the European Insurance and Occupational Pensions Authority. The regulations stipulate that insurers are required to maintain the minimum capital requirement and solvency capital requirement at all times. At December 31, 2021 and 2020, our subsidiaries were in compliance with these requirements.

As corporate members of Lloyd's, AMAL (as managing agent of Arch Syndicate 2012 and Arch Syndicate 1955) and each syndicate's respective corporate members are subject to the oversight of the Council of Lloyd's. The capital required to support a Syndicate's underwriting capacity, or funds at Lloyd's, is assessed annually and is determined by Lloyd's in accordance with the capital adequacy rules established by the PRA. The Company has provided capital to support the underwriting of Arch Syndicate 2012 and Arch Syndicate 1955 in the form of pledged assets and letters of credit provided by Arch Re Bermuda. The amount which the Company provides as funds at Lloyd's is not available for distribution to the Company for the payment of dividends. Lloyd's is supervised by the PRA and required to implement certain rules prescribed by the PRA under the Lloyd's Act of

1982 regarding the operation of the Lloyd's market. With respect to managing agents and corporate members, Lloyd's prescribes certain minimum standards relating to management and control, solvency and other requirements and monitors managing agents' compliance with such standards.

Under U.K. law, all U.K. companies are restricted from declaring a dividend to their shareholders unless they have "profits available for distribution." The calculation as to whether a company has sufficient profits is based on its accumulated realized profits minus its accumulated realized losses. U.K. insurance regulatory laws do not prohibit the payment of dividends, but the PRA or FCA, as applicable, requires that insurance companies and insurance intermediaries maintain certain solvency margins and may restrict the payment of a dividend by Arch Insurance (U.K.) and AMAL.

Canada

Arch Insurance Canada and the Canadian branch of Arch Re U.S. ("Arch Re Canada") are subject to federal, as well as provincial and territorial, regulation in Canada. The Office of the Superintendent of Financial Institutions ("OSFI") is the federal regulatory body that, under the Insurance Companies Act (Canada), regulates federal Canadian and non-Canadian insurance companies operating in Canada. Arch Insurance Canada and Arch Re Canada are subject to regulation in the provinces and territories in which they underwrite insurance/ reinsurance, and the primary goal of insurance/reinsurance regulation at the provincial and territorial levels is to govern the market conduct of insurance/reinsurance companies. Arch Insurance Canada is licensed to carry on insurance business by OSFI and in each province and territory. Arch Re Canada is licensed to carry-on reinsurance business by OSFI and in the provinces of Ontario and Quebec.

Under the Insurance Companies Act (Canada), Arch Insurance Canada is required to maintain an adequate amount of capital in Canada, calculated in accordance with a test promulgated by OSFI called the Minimum Capital Test ("MCT"), and Arch Re Canada is required to maintain an adequate margin of assets over liabilities in Canada, calculated in accordance with a test promulgated by OSFI called the Branch Adequacy of Assets Test. Dividends or distributions, if any, made by Arch Insurance Canada would result in an increase in available capital at Arch Insurance Company (see "—United States" section).

Australia

The Australian Prudential Regulation Authority ("APRA") is an independent statutory authority responsible for prudential supervision of institutions across banking, insurance and superannuation and promotes financial stability in Australia. Arch Indemnity has been authorized to conduct monoline lenders' mortgage insurance business in Australia since June 2002 and was acquired by Arch Capital on August 30, 2021. Arch LMI Pty Ltd. ("Arch LMI") was authorized by APRA in January 2019 to conduct monoline lenders' mortgage insurance business in Australia. Major regulatory requirements that are applicable to Arch LMI and Arch Indemnity as general as an insurance providers in Australia include requirements on minimum capital levels and compliance with corporate governance standards, including the risk management strategy for our Australian mortgage insurance business. At December 31, 2021 and 2020, these requirements were met.

Arch Capital also conducts property and casualty insurance business in Australia through the Company's Lloyd's platform. This insurance business is managed by and distributed through local coverholders and is subject to Lloyd's Supervision. In addition, the business is subject to local Australian prudential regulatory oversight by APRA, and additional separate financial services market conduct regulation by the Australian Securities and Investments Commission.

26. Subsequent Events

Bellemeade Re 2022-1 Ltd.

In January 2022, the Company announced that it has obtained over $315 million of indemnity reinsurance on a pool representing approximately $6.3 billion of mortgages from Bellemeade Re 2022-1 Ltd., a special purpose reinsurer. The coverage was obtained by issuing approximately $283.5 million in bonds and $33 million in direct reinsurance. This transaction largely covers a portfolio of policies issued from July through November 2021.

Share Repurchases

From January 1 to February 25, 2022, the Company repurchased 890,180 common shares for an aggregate purchase price of $41.5 million. At February 25, 2022 approximately $1.14 billion of repurchases were available under the share repurchase program.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None.

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

In connection with the filing of this Form 10-K, our management, including the Chief Executive Officer and Chief Financial Officer, conducted an evaluation, as of December 31, 2021, 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 are effective.

We continue to enhance our operating procedures and internal controls (including information technology initiatives and controls over financial reporting) 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.

Management's Annual Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. Our management assessed the effectiveness of our internal control over financial reporting as of December 31, 2021. In making this assessment, management used the criteria set forth by the Committee of Sponsoring Organizations (COSO) of the Treadway Commission in *Internal Control-Integrated Framework (2013)*.

Based on our assessment, management determined that, as of December 31, 2021, our internal control over financial reporting was effective. The effectiveness of our internal control over financial reporting as of December 31, 2021 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report included in Item 8.

Changes in Internal Control Over Financial Reporting

There have been no changes in internal control over financial reporting that occurred in connection with our evaluation required pursuant to Rules 13a-15 and 15d-15 under the Exchange Act during the fiscal quarter ended December 31, 2021 that have materially affected, or are reasonably likely to materially affect, internal control over financial reporting.

ITEM 9B. OTHER INFORMATION

None.

ITEM 9C. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS

Not applicable.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information required by this item is incorporated by reference from the information to be included in our definitive proxy statement ("Proxy Statement") for our annual meeting of shareholders to be held in 2021, which we intend to file with the SEC pursuant to Regulation 14A no later than 120 days after the end of the Company's fiscal year which ended on December 31, 2021. Copies of our code of ethics applicable to our chief executive officer, chief financial officer and principal accounting officer or controller are available free of charge to investors upon written request addressed to the attention of Arch Capital's corporate secretary, Waterloo House, 100 Pitts Bay Road, Pembroke HM 08, Bermuda. In addition, our code of ethics and certain other basic corporate documents, including the charters of our audit committee, compensation committee and nominating committee are posted on our website located at www.archgroup.com.

If any substantive amendments are made to the code of ethics or if there is a grant of a waiver, including any implicit waiver, we will disclose the nature of such amendment or waiver on our website or in a report on Form 8-K, to the extent required by applicable law or the rules and regulations of any exchange applicable to us. Our website address is intended to be an inactive, textual reference only and none of the material on our website is incorporated by reference into this report.

ITEM 11. EXECUTIVE COMPENSATION

The information required by this item is incorporated by reference from the information to be included in the Proxy Statement which we intend to file pursuant to Regulation 14A with the SEC no later than 120 days after the end of the Company's fiscal year ended on December 31, 2021, which Proxy Statement is incorporated by reference.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

Other than the information set forth below, the information required by this item is incorporated by reference from the information to be included in the Proxy Statement which we intend to file pursuant to Regulation 14A with the SEC no later than 120 days after the end of the Company's fiscal year ended on December 31, 2021, which Proxy Statement is incorporated by reference.

The following information is as of December 31, 2021:

Plan Category	Column A Number of Securities to be Issued Upon Exercise of Outstanding Stock Options(1), Warrants and Rights	Column B Weighted-Average Exercise Price of Outstanding Stock Options(1), Warrants and Rights ($)	Column C Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans (Excluding Securities Reflected in Column A)
Equity compensation plans approved by security holders	17,812,796	$ 25.06	12,445,518
Equity compensation plans not approved by security holders	—	—	—
Total	17,812,796	$ 25.06	12,445,518 (2)

(1) Includes all vested and unvested stock options outstanding of 17,083,160 and restricted stock and performance units outstanding of 729,636. The weighted average exercise price does not take into account restricted stock units. In addition, the weighted average remaining contractual life of the Company's outstanding exercisable stock options and SARs at December 31, 2021 was 4.4 years.

(2) Includes 1,608,354 common shares remaining available for future issuance under our Employee Share Purchase Plan and 10,837,164 common shares remaining available for future issuance under our equity compensation plans. Shares available for future issuance under our equity compensation plans may be issued in the form of stock options, SARs, restricted shares, restricted share units payable in common shares or cash, share awards in lieu of cash awards, dividend equivalents, performance shares and performance units and other share-based awards. In addition, 3,310,797 common shares, or 26.6% of the 12,445,518 common shares remaining available for future issuance may be issued in connection with full value awards (*i.e.*, awards other than stock options or SARs).

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

The information required by this item is incorporated by reference from the information to be included in the Proxy Statement which we intend to file pursuant to Regulation 14A with the SEC no later than 120 days after the end of the Company's fiscal year ended on December 31, 2021, which Proxy Statement is incorporated by reference.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required by this item is incorporated by reference from the information to be included in our Proxy Statement which we intend to file pursuant to Regulation 14A with the SEC no later than 120 days after the end of the Company's fiscal year ended on December 31, 2021, which Proxy Statement is incorporated by reference.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

(a) Financial Statements, Financial Statement Schedules and Exhibits.

1. Financial Statements

Included in Part II – see Item 8 of this report.

2. Financial Statement Schedules

	Page No.
II. Condensed Financial Information of Registrant	
As of December 31, 2021 and 2020, and for the years ended December 31, 2021, 2020 and 2019	175
III. Supplementary Insurance Information	
For the years ended December 31, 2021, 2020 and 2019	178
IV. Reinsurance	
For the years ended December 31, 2021, 2020 and 2019	179
VI. Supplementary Information for Property and Casualty Insurance Underwriters	
For the years ended December 31, 2021, 2020 and 2019	180

Schedules other than those listed above are omitted for the reason that they are not applicable or the information is provided in Item 8 of this report.

3. Exhibits

Exhibit Number	Exhibit Description	Incorporated by Reference			Filed Herewith
		Form	Original Number	Date Filed	
2.1	Memorandum of Association of ACGL	S-4	3.1	September 8, 2000	
2.2	Bye-Laws of ACGL	10-Q	3	August 5, 2016	
2.3	ACGL Certificate of Deposit of Memorandum of Increase of Share Capital	10-K	3.3	February 28, 2011	
3.1	Certificate of Designations of Series F Non-Cumulative Preferred Shares	8-K	4.1	August 17, 2017	
3.2	Certificate of Designations of Series G Non-Cumulative Preferred Shares	8-K	4.1	June 11, 2021	
3.3	Specimen Common Share Certificate	10-K	4.1	April 2, 2001	
3.4	Specimen Series F Non-Cumulative Preferred Share Certificate	8-K	4.2	August 17, 2017	
3.5	Specimen Series G Non-Cumulative Preferred Share Certificate	8-K	4.2	June 11, 2021	
4.1	Indenture, dated as of May 4, 2004, between ACGL, as issuer, and The Bank of New York Mellon, as successor trustee to JPMorgan Chase Bank, N.A. (formerly JPMorgan Chase Bank) ("JPMCB"), as trustee	8-K	4.1	June 30, 2020	
4.2	First Supplemental Indenture, dated as of May 4, 2004, between ACGL, as issuer, and JPMCB, as trustee	8-K	99.3	May 7, 2004	
4.3	Second Supplemental Indenture, dated as of June 30, 2020, by and between Arch Capital Group Ltd. and The Bank of New York Mellon (including the form of Global Notes for the Notes).	8-K	4.2	June 30, 2020	
4.4.1	Indenture, dated as of December 13, 2013, among Arch Capital Group (U.S.) Inc. ("Arch U.S."), as issuer, ACGL, as guarantor, and The Bank of New York Mellon ("BNYM"), as trustee	8-K	4.1	December 13, 2013	
4.4.2	First Supplemental Indenture, dated as of December 13, 2013, among Arch U.S., as issuer, ACGL, as guarantor, and BNYM, as trustee	8-K	4.2	December 13, 2013	
4.4.3	Second Supplemental Indenture, dated as of May 10, 2018, among Arch Capital Finance LLC, as issuer, ACGL, as guarantor, and BNYM, as trustee	8-K	4.1	May 15, 2018	
4.5.1	Deposit Agreement, dated August 17, 2017, between ACGL, as issuer, and AST, as depositary, registrar and transfer agent and as dividend disbursing agent and redemption agent, and the holders from time to time of the depositary receipts	8-K	4.3	August 17, 2017	
4.5.2	Deposit Agreement, dated June 11, 2021, between ACGL, as issuer, and AST, as depositary, registrar and transfer agent and as dividend disbursing agent and redemption agent, and the holders from time to time of the depositary receipts	8-K	4.3	June 11, 2021	
4.6.1	Form of Depositary Receipt, dated August 17, 2017	8-K	4.4	August 17, 2017	
4.6.2	Form of Depositary Receipt, dated June 11, 2021	8-K	4.4	June 11, 2021	
4.7.1	Indenture, dated as of December 8, 2016, among Arch Capital Finance LLC, as issuer, ACGL, as guarantor, and BNYM, as trustee	8-K	4.1	December 9, 2016	
4.7.2	First Supplemental Indenture, dated as of December 8, 2016, among Arch Capital Finance LLC, as issuer, ACGL, as guarantor, and BNYM, as trustee	8-K	4.2	December 9, 2016	
4.8	Description of Securities				X
10.2.1	Third Amended and Restated ACGL Incentive Compensation Plan†	10-Q	10.7	August 5, 2016	
10.2.2	First Amendment to Third Amended and Restated ACGL Incentive Compensation Plan†	10-Q	10.1	May 5, 2017	
10.2.3	Second Amendment to Third Amended and Restated ACGL Incentive Compensation Plan				X
10.3.1	ACGL 2007 Long Term Incentive and Share Award Plan†	DEF 14A		April 3, 2007	
10.3.2	ACGL 2012 Long Term Incentive and Share Award Plan†	DEF 14A		March 27, 2012	
10.3.3	ACGL 2015 Long Term Incentive and Share Award Plan†	DEF 14A		March 26, 2015	
10.3.4	ACGL 2018 Long Term Incentive and Share Award Plan†	DEF 14A		March 28, 2018	
10.3.5	ACGL Amended and Restated 2007 Employee Share Purchase Plan†	DEF 14A		March 23, 2016	
10.4.1	Form of Restricted Share Agreement, dated as of May 13, 2015, between ACGL and each of, Marc Grandisson, Nicolas Papadopoulo, Maamoun Rajeh and Louis T. Petrillo†	10-Q	10.2	August 7, 2015	
10.4.2	Form of Restricted Share Agreement, dated as of May 13, 2016, between ACGL and each of Marc Grandisson, Nicolas Papadopoulo, Maamoun Rajeh and Louis T. Petrillo†	10-Q	10.2	August 5, 2016	
10.4.3	Form of Restricted Share Agreement, dated as of May 4, 2017, between ACGL and each of the Non-Employee Directors of ACGL†	10-Q	10.3	August 4, 2017	
10.4.4	Form of Restricted Share Agreement, dated as of May 8, 2017, between ACGL and each of Marc Grandisson, Nicolas Papadopoulo, Maamoun Rajeh and Louis T. Petrillo†	10-Q	10.4	August 4, 2017	

10.4.5	Form of Restricted Share Agreement, dated as of September 19, 2017, between ACGL and each of Nicolas Papadopoulo and Maamoun Rajeh†	10-K	10.4.13	February 28, 2018
10.4.6	Form of Restricted Share Agreement for Named Executive Officers and certain Executive Officers of ACGL and subsidiaries†	10-Q	10.3	August 8, 2018
10.4.7	Form of Restricted Share Agreement between ACGL and each of the Non-Employee Directors of ACGL†	10-Q	10.6	August 8, 2018
10.5	Form of Performance Restricted Share Agreement for Named Executive Officers and certain Executive Officers of ACGL and subsidiaries†	10-Q	10.5	August 8, 2018
10.6.1	Form of Non-Qualified Stock Option Agreement, dated as of May 13, 2015, between ACGL and each of Marc Grandisson†	10-Q	10.3	August 7, 2015
10.6.2	Form of Non-Qualified Stock Option Agreement, dated as of May 13, 2016, between ACGL and each of Marc Grandisson, Nicolas Papadopoulo, Maamoun Rajeh and Louis T. Petrillo†	10-Q	10.3	August 5, 2016
10.6.3	Form of Non-Qualified Stock Option Agreement, dated as of May 8, 2017, between ACGL and each of Marc Grandisson, Nicolas Papadopoulo, Maamoun Rajeh and Louis T. Petrillo†	10-Q	10.5	August 4, 2017
10.6.4	Non-Qualified Stock Option Agreement, dated as of September 19, 2017, between ACGL and Maamoun Rajeh†	10-K	10.5.6	February 28, 2018
10.6.5	Non-Qualified Stock Option Agreement, dated as of September 19, 2017, between ACGL and Nicolas Papadopoulo†	10-K	10.5.7	February 28, 2018
10.6.6	Form of Non-Qualified Stock Option Agreement for Named Executive Officers and certain Executive Officers of ACGL and subsidiaries†	10-Q	10.4	August 8, 2018
10.6.7	Non-Qualified Stock Option Agreement, dated as of April 9, 2018, between ACGL and Marc Grandisson†	10-Q	10.5	May 9, 2018
10.7.1	Form of Share Appreciation Right Agreement, dated as of May 9, 2008, between ACGL and each of, John D. Vollaro, Marc Grandisson and Louis T. Petrillo†	10-Q	10.1	November 10, 2008
10.7.2	Form of Share Appreciation Right Agreement, dated as of May 6, 2009, between ACGL and each of Marc Grandisson and John D. Vollaro†	10-K	10.12.4	February 26, 2010
10.7.3	Form of Share Appreciation Right Agreement, dated as of May 5, 2010, between ACGL and each of Marc Grandisson and Louis T. Petrillo†	10-Q	10.4	November 8, 2010
10.7.4	Share Appreciation Right Agreement, dated as of May 6, 2011, between ACGL and Marc Grandisson†	10-Q	10.7	November 8, 2011
10.7.5	Share Appreciation Right Agreement, dated as of May 6, 2011, between ACGL and Louis T. Petrillo†	10-Q	10.12	November 8, 2011
10.7.6	Share Appreciation Right Agreement, dated as of May 6, 2011, between ACGL and Maamoun Rajeh†	10-Q	10.1	November 3, 2017
10.7.7	Share Appreciation Right Agreement, dated as of May 9, 2012 between ACGL and Maamoun Rajeh†	10-Q	10.2	November 3, 2017
10.7.8	Form of Share Appreciation Right Agreement, dated as of May 9, 2012, between ACGL and each of Marc Grandisson and Louis T. Petrillo†	10-Q	10.3	November 9, 2012
10.7.9	Share Appreciation Right Agreement, dated as of July 1, 2012 between ACGL and Maamoun Rajeh†	10-Q	10.4	November 3, 2017
10.7.10	Form of Share Appreciation Right Agreement, dated as of November 12, 2012, between ACGL and each of Marc Grandisson, Maamoun Rajeh and Louis T. Petrillo†	10-Q	10.3	August 9, 2013
10.7.11	Form of Share Appreciation Right Agreement, dated as of May 9, 2013, between ACGL and each of Marc Grandisson, Maamoun Rajeh and Louis T. Petrillo†	10-Q	10.2	November 8, 2013
10.7.12	Form of Share Appreciation Right Agreement, dated as of May 13, 2014, between ACGL and each of Marc Grandisson, Maamoun Rajeh and Louis T. Petrillo†	10-Q	10.3	August 8, 2014
10.7.13	Share Appreciation Right Agreement, dated as of July 1, 2014, between ACGL and Maamoun Rajeh†	10-Q	10.15	November 3, 2017
10.7.14	Share Appreciation Right Agreement, dated as of November 6, 2014, between ACGL and Marc Grandisson†	10-Q	10.2	May 8, 2015
10.8.1	Employment Agreement, dated as of October 27, 2008, between ACGL and John D. Vollaro†	8-K	10.1	October 28, 2008
10.8.2	Amendment to Employment Agreement, dated February 27, 2015, between ACGL and John D. Vollaro†	10-Q	10.1	May 8, 2015
10.8.3	Second Amendment to Employment Agreement, dated as of January 1, 2018, between ACGL and John D. Vollaro†	10-Q	10.1	May 9, 2018
10.10	Employment Agreement, dated as of September 19, 2017 between ACGL and Maamoun Rajeh†	10-Q	10.26	November 3, 2017
10.11	Employment Agreement, dated as of September 19, 2017 between ACGL and Nicholas Papadopoulo†	10-Q	10.27	November 3, 2017

10.12	Employment Agreement, dated as of May 25, 2018, between ACGL and François Morin†	8-K/A	10.1	July 26, 2018	
10.13	Employment Agreement, dated as of April 9, 2018, between ACGL and Marc Grandisson†	8-K/A	10.1	April 11, 2018	
10.14	Employment Agreement, dated as of November 13, 2018, between Arch Capital Services Inc. and Louis Petrillo†	10-K	10.16	February 28, 2019	
10.15	Employment Agreement dated as of October 1,2019 between Arch Capital Group Ltd. and David Gansberg †	10-K	10.16	February 28, 2020	
10.16	Employment Agreement dated as of May 7, 2021 between Arch Capital Group Ltd. and Christine Todd †	10-Q	10.1	August 5, 2021	
10.17	Arch U.S. Executive Supplemental Non-Qualified Savings and Retirement Plan†	10-K	10.24	March 2, 2009	
10.18	Third Amended and Restated Credit Agreement, dated as of December 17,2019, by and among ACGL, certain of its subsidiaries as subsidiary borrowers, Bank of America, N.A., as Administrative Agent, Fronting Bank and L/C Administrator, and the lenders party thereto	8-K	10.1	December 18, 2019	
10.19	First Amendment to Third Amended and Restated Credit Agreement, dated as of August 12, 2020 by and among Arch Capital Group Ltd., the other Loan Parties party hereto, the Lenders party hereto, and Bank of America, N.A., as Administrative Agent.	10-Q	10.1	November 4, 2021	
10.20	The LIBOR Transition Amendment to the Third Amended and Restated Credit Agreement, dated as of September 29, 2021.	10-Q	10.2	November 4, 2021	
21	Subsidiaries of Registrant				X
23	Consent of PricewaterhouseCoopers LLP				X
24	Power of Attorney				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
101	The following financial information from ACGL's Annual Report on Form 10-K for the year ended December 31, 2021 formatted in Inline XBRL: (i) Consolidated Balance Sheets at December 31, 2021 and 2020; (ii) Consolidated Statements of Income for the years ended December 31, 2021, 2020 and 2019; (iii) Consolidated Statements of Comprehensive Income for the years ended December 31, 2021, 2020 and 2019; (iv) Consolidated Statements of Changes in Shareholders' Equity for the years ended December 31, 2021, 2020 and 2019; (v) Consolidated Statements of Cash Flows for the years ended December 31, 2021, 2020 and 2019; and (vi) Notes to Consolidated Financial Statements				X
104	Cove Page Interactive Data File (embedded within the Inline XBRL document)				

† Management contract or compensatory plan or arrangement.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

ARCH CAPITAL GROUP LTD.
(Registrant)

By: /s/ Marc Grandisson
Name: Marc Grandisson
Title: Chief Executive Officer (Principal Executive Officer)

February 25, 2022

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities and on the dates indicated.

Name	Title	Date
/s/ Marc Grandisson Marc Grandisson	Chief Executive Officer (Principal Executive Officer)	February 25, 2022
/s/ François Morin François Morin	Executive Vice President and Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer) and Treasurer	February 25, 2022
* John M. Pasquesi	Chairman of the Board	February 25, 2022
* John L. Bunce, Jr.	Director	February 25, 2022
* Eric W. Doppstadt	Director	February 25, 2022
* Francis Ebong	Director	February 25, 2022
* Laurie S. Goodman	Director	February 25, 2022

Name	Title	Date
* Moira Kilcoyne	Director	February 25, 2022
* Eileen Mallesch	Director	February 25, 2022
* Louis J. Paglia	Director	February 25, 2022
* Brian S. Posner	Director	February 25, 2022
* Eugene S. Sunshine	Director	February 25, 2022
* John D. Vollaro	Director	February 25, 2022
* Thomas R. Watjen	Director	February 25, 2022

* By François Morin, as attorney-in-fact and agent, pursuant to a power of attorney, a copy of which has been filed with the Securities and Exchange Commission as Exhibit 24 to this report.

/s/ François Morin

Name: François Morin
Attorney-in-Fact

SCHEDULE II

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
CONDENSED FINANCIAL INFORMATION OF REGISTRANT
(U.S. dollars in thousands)

Balance Sheet
(Parent Company Only)

	December 31,	
	2021	2020
Assets		
Total investments	$ 2,038	$ 172
Cash	16,317	18,932
Investments in subsidiaries	14,822,024	14,377,529
Investment in operating affiliates	6,877	7,731
Due from subsidiaries and affiliates	11	—
Other assets	9,604	10,659
Total assets	$ 14,856,871	$ 14,415,023
Liabilities		
Senior notes	$ 1,286,208	$ 1,285,867
Due to subsidiaries and affiliates	—	—
Other liabilities	24,767	23,270
Total liabilities	1,310,975	1,309,137
Shareholders' Equity		
Non-cumulative preferred shares	830,000	780,000
Common shares ($0.0011 par, shares issued: 583,289,850 and 579,000,841)	648	643
Additional paid-in capital	2,085,075	1,977,794
Retained earnings	14,455,868	12,362,463
Accumulated other comprehensive income (loss), net of deferred income tax	(64,600)	488,895
Common shares held in treasury, at cost (shares: 204,365,956 and 172,280,199)	(3,761,095)	(2,503,909)
Total shareholders' equity	$ 13,545,896	$ 13,105,886
Total liabilities and shareholders' equity	$ 14,856,871	$ 14,415,023

The financial information for the parent company (Arch Capital Group Ltd.) should be read in conjunction with the Consolidated Financial Statements and Notes thereto.

SCHEDULE II
(continued)

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
CONDENSED FINANCIAL INFORMATION OF REGISTRANT
(U.S. dollars in thousands)

Statement of Income
(Parent Company Only)

	Year Ended December 31,		
	2021	2020	2019
Revenues			
Net investment income	$ 1,524	$ 53	$ 212
Net realized gains (losses)	—	(2,110)	—
Total revenues	1,524	(2,057)	212
Expenses			
Corporate expenses	71,818	65,566	62,701
Interest expense	58,741	40,445	22,154
Net foreign exchange (gains) losses	7	3	1
Total expenses	130,566	106,014	84,856
Income (loss) before income taxes and income (loss) from operating affiliates	(129,042)	(108,071)	(84,644)
Income (loss) from operating affiliates	(590)	(437)	(762)
Income (loss) before equity in net income of subsidiaries	(129,632)	(108,508)	(85,406)
Equity in net income of subsidiaries	2,286,481	1,514,029	1,721,725
Net income available to Arch	2,156,849	1,405,521	1,636,319
Preferred dividends	(48,343)	(41,612)	(41,612)
Loss on redemption of preferred shares	(15,101)	—	—
Net income available to Arch common shareholders	$ 2,093,405	$ 1,363,909	$ 1,594,707

The financial information for the parent company (Arch Capital Group Ltd.) should be read in conjunction with the Consolidated Financial Statements and Notes thereto.

SCHEDULE II
(continued)

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
CONDENSED FINANCIAL INFORMATION OF REGISTRANT
(U.S. dollars in thousands)

Statement of Cash Flows
(Parent Company Only)

	Year Ended December 31,		
	2021	**2020**	**2019**
Operating Activities:			
Net Cash Provided By Operating Activities	$ 1,727,529	$ 124,751	$ 52,487
Investing Activities:			
Net (purchases) sales of short-term investments	(1,866)	(130)	61
Capital contributed to subsidiaries	(487,161)	(988,975)	(2,121)
Purchase of fixed assets	(783)	(15)	(162)
Net Cash Used For Investing Activities	(489,810)	(989,120)	(2,222)
Financing Activities:			
Purchases of common shares under share repurchase program	(1,234,294)	(83,472)	(2,871)
Proceeds from common shares issued, net	6,418	1,876	6,203
Proceeds from issuance of preferred shares, net	485,821	—	—
Redemption of preferred shares	(450,000)	—	—
Proceeds from borrowings	—	988,393	—
Preferred dividends paid	(48,280)	(41,612)	(41,612)
Net Cash Used For Financing Activities	(1,240,335)	865,185	(38,280)
Increase (decrease) in cash and restricted cash	(2,616)	816	11,985
Cash and restricted cash, beginning of year	18,960	18,144	6,159
Cash and restricted cash, end of period	$ 16,344	$ 18,960	$ 18,144

The financial information for the parent company (Arch Capital Group Ltd.) should be read in conjunction with the Consolidated Financial Statements and Notes thereto.

SCHEDULE III

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
SUPPLEMENTARY INSURANCE INFORMATION
(U.S. dollars in thousands)

	Deferred Acquisition Costs	Reserves for Losses and Loss Adjustment Expenses	Unearned Premiums	Net Premiums Earned	Net Investment Income (1)	Net Losses and Loss Adjustment Expenses Incurred	Amortization of Deferred Acquisition Costs	Other Operating Expenses (2)	Net Premiums Written
December 31, 2021									
Insurance	$378,265	$9,810,622	$2,937,664	$3,626,468	NM	$2,344,365	$606,265	$558,906	$4,148,193
Reinsurance	424,390	6,878,721	2,263,264	2,840,443	NM	1,924,719	536,754	212,810	3,254,374
Mortgage	99,186	1,067,813	811,014	1,283,419	NM	56,677	97,418	194,010	1,261,068
Other				331,968	NM	259,042	62,741	32,869	354,702
Total	$901,841	$17,757,156	$6,011,942	$8,082,298	NM	$4,584,803	$1,303,178	$998,595	$9,018,337
December 31, 2020									
Insurance	$254,833	$8,989,930	$2,334,225	$2,871,420	NM	$2,092,453	$418,483	$489,153	$3,162,907
Reinsurance	278,422	5,027,742	1,356,983	2,162,229	NM	1,628,320	354,048	168,011	2,457,370
Mortgage	203,748	976,673	740,043	1,397,935	NM	528,344	134,240	162,202	1,279,850
Other	53,705	1,519,583	407,714	560,351	NM	440,482	98,071	55,810	537,589
Total	$790,708	$16,513,928	$4,838,965	$6,991,935	NM	$4,689,599	$1,004,842	$875,176	$7,437,716
December 31, 2019									
Insurance	$188,684	$7,900,328	$1,991,496	$2,397,080	NM	$1,615,475	$361,614	$454,770	$2,641,726
Reinsurance	197,856	4,270,013	971,776	1,466,389	NM	1,011,329	239,032	141,484	1,602,723
Mortgage	182,816	457,872	937,370	1,366,340	NM	53,513	134,319	153,092	1,261,756
Other	64,044	1,263,629	438,907	556,689	NM	453,135	105,980	51,651	532,862
Total	$633,400	$13,891,842	$4,339,549	$5,786,498	NM	$3,133,452	$840,945	$800,997	$6,039,067

(1) The Company does not manage its assets by segment and, accordingly, net investment income is not allocated to each underwriting segment. See note 4, “Segment Information,” to our consolidated financial statements in Item 8 for information related to the ‘other’ segment.

(2) Certain other operating expenses relate to the Company’s corporate segment. Such amounts are not reflected in the table above. See note 4, “Segment Information,” to our consolidated financial statements in Item 8 for information related to the corporate segment.

SCHEDULE IV

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
REINSURANCE
(U.S. dollars in thousands)

	Gross Amount	Ceded to Other Companies (1)	Assumed From Other Companies (1)	Net Amount	Percentage of Amount Assumed to Net
Year Ended December 31, 2021					
Premiums Written:					
Insurance	$ 5,833,873	$ (1,719,541)	$ 33,861	$ 4,148,193	0.8 %
Reinsurance	408,520	(1,839,556)	4,685,410	3,254,374	144.0 %
Mortgage	1,213,333	(246,757)	294,492	1,261,068	23.4 %
Other	251,106	(102,763)	206,359	354,702	58.2 %
Total	$ 7,706,832	$ (3,734,150)	$ 5,045,655	$ 9,018,337	55.9 %
Year Ended December 31, 2020					
Premiums Written:					
Insurance	$ 4,659,416	$ (1,525,655)	$ 29,146	$ 3,162,907	0.9 %
Reinsurance	305,435	(1,014,716)	3,166,651	2,457,370	128.9 %
Mortgage	1,192,316	(194,149)	281,683	1,279,850	22.0 %
Other	396,743	(190,957)	331,803	537,589	61.7 %
Total	$ 6,553,910	$ (2,650,352)	$ 3,534,158	$ 7,437,716	47.5 %
Year Ended December 31, 2019					
Premiums Written:					
Insurance	$ 3,879,752	$ (1,266,267)	$ 28,241	$ 2,641,726	1.1 %
Reinsurance	238,229	(720,500)	2,084,994	1,602,723	130.1 %
Mortgage	1,224,373	(204,509)	241,892	1,261,756	19.2 %
Other	339,169	(222,019)	415,712	532,862	78.0 %
Total	$ 5,681,523	$ (2,099,893)	$ 2,457,437	$ 6,039,067	40.7 %

(1) Certain amounts included in the gross premiums written of each segment are related to intersegment transactions and are included in the gross premiums written of each segment. 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.

SCHEDULE VI

ARCH CAPITAL GROUP LTD. AND SUBSIDIARIES
SUPPLEMENTARY INFORMATION FOR PROPERTY AND CASUALTY INSURANCE UNDERWRITERS
(U.S. dollars in thousands)

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H		Column I	Column J	Column K
							Net Losses and Loss Adjustment Expenses Incurred Related to				
Affiliation with Registrant	Deferred Acquisition Costs	Reserves for Losses and Loss Adjustment Expenses	Discount, if any, deducted in Column C	Unearned Premiums	Net Premiums Earned	Net Investment Income	(a) Current Year	(b) Prior Years	Amortization of Deferred Acquisition Costs	Net Paid Losses and Loss Adjustment Expenses	Net Premiums Written
Consolidated Subsidiaries											
2021	$ 901,841	$17,757,156	$ 55,575	$ 6,011,942	$8,082,298	$ 389,118	$4,940,987	$(356,184)	$ 1,303,178	$ 2,826,551	$9,018,337
2020	790,708	16,513,929	23,326	4,838,965	6,991,935	519,608	4,851,051	(161,452)	1,004,842	2,661,117	7,437,716
2019	633,400	13,891,842	22,012	4,339,549	5,786,498	627,738	3,297,037	(163,585)	840,945	2,383,255	6,039,067

ITEM 16. FORM 10-K SUMMARY

Not applicable.

DIRECTORS

John M. Pasquesi [3,4,5,6]
Chair of Board
Managing Member of Otter Capital LLC

John L. Bunce, Jr. [2,3,4,5]
Managing Director and Founder of Greyhawk Capital Management, LLC and Managing Director and Founder of Steel Box, LLC

Eric W. Doppstadt [2,4,5]
Vice President and Chief Investment Officer of the Ford Foundation

Francis Ebong [4,6]
Managing Director, Program Management at X

Laurie S. Goodman [1,5,6]
Institute Fellow at the Urban Institute and Founder of its Housing Finance Policy Center

Moira Kilcoyne [4,5,6]
Former Managing Director, Co-Chief Information Officer of Morgan Stanley

Eileen Mallesch [1,6]
Former SVP & CFO of Nationwide Property and Casualty Segment, Nationwide Mutual Insurance Company

Louis J. Paglia [2,5,6]
Founder of Oakstone Capital LLC and Former Executive Vice President of UIL Holdings Corporation

Brian S. Posner [1,5,6]
President of Point Rider Group LLC

Eugene S. Sunshine [1,2,5]
Former Senior Vice President for Business and Finance at Northwestern University

John D. Vollaro [4,6]
Senior Advisor
Former Executive Vice President, Chief Financial Officer and Treasurer

Thomas R. Watjen [1,2,4]
Former President and Chief Executive Officer of Unum Group

OFFICERS

Marc Grandisson [3]
Chief Executive Officer
Director

Jennifer Centrone
Chief Human Resources Officer

David E. Gansberg
Chief Executive Officer, Mortgage Group

Chris Hovey
Chief Operations Officer

François Morin
Chief Financial Officer and Treasurer

Nicolas Papadopoulo
President and Chief Underwriting Officer
Chief Executive Officer, Insurance Group

Louis T. Petrillo
General Counsel

Maamoun Rajeh
Chief Executive Officer, Reinsurance Group

Jay Rajendra
Chief Strategy and Innovation Officer

Christine Todd
Chief Investment Officer

1 Audit Committee
2 Compensation Committee
3 Executive Committee
4 Finance, Investment and Risk Committee
5 Nominating and Governance Committee
6 Underwriting Oversight Committee

SHAREHOLDER INFORMATION

CORPORATE ADDRESS

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100 Pitts Bay Road
Pembroke HM 08, Bermuda
T: 441 278 9250

MARKET INFORMATION

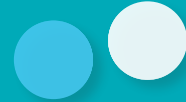
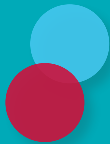
The common shares of Arch Capital Group Ltd. are listed on the NASDAQ Global Select Market under the symbol ACGL.

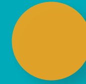
TRANSFER AGENT

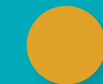
American Stock Transfer & Trust Company, LLC
6201 15th Avenue
Brooklyn, New York 11219

SHAREHOLDER INQUIRIES

François Morin
Chief Financial Officer and Treasurer
T: 441 278 9250





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