

Global Insurance Market Report (GIMAR)

December 2023



About the IAIS

The International Association of Insurance Supervisors (IAIS) is a voluntary membership organisation of insurance supervisors and regulators from more than 200 jurisdictions. The mission of the IAIS is to promote effective and globally consistent supervision of the insurance industry in order to develop and maintain fair, safe and stable insurance markets for the benefit and protection of policyholders and to contribute to global financial stability.

Established in 1994, the IAIS is the international standard-setting body responsible for developing principles, standards and other supporting material for the supervision of the insurance sector and assisting in their implementation. The IAIS also provides a forum for members to share their experiences and understanding of insurance supervision and insurance markets.

The IAIS coordinates its work with other international financial policymakers and associations of supervisors or regulators, and assists in shaping financial systems globally. In particular, the IAIS is a member of the Financial Stability Board (FSB), member of the Standards Advisory Council of the International Accounting Standards Board (IASB) and partner in the Access to Insurance Initiative (A2ii). In recognition of its collective expertise, the IAIS also is routinely called upon by the G20 leaders and other international standard-setting bodies for input on insurance issues as well as on issues related to the regulation and supervision of the global financial sector.

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About the GIMAR

This is the eleventh issue of the Global Insurance Market Report (GIMAR). The GIMAR reports on the outcomes of the IAIS' Global Monitoring Exercise (GME). The GME is the IAIS' framework for monitoring risks and trends in the global insurance sector and assessing the possible build-up of systemic risk.

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Acronyms and abbreviations

Abs	Absolute
AE	Advanced economy
ARV	Absolute reference value
BCBS	Basel Committee on Banking Supervision
BPS	Basis points
CDS	Credit default swap
CSA	Cross-sectoral analysis
CLO	Collateralised loan obligation
CO ₂	Carbon dioxide
CPRS	Climate policy relevant sectors
CRA	Climate-related assets
DAC	Deferred acquisition costs
EMDE	Emerging market and developing economy
GA	General account
GDP	Gross domestic product
GIMAR	Global Insurance Market Report
GME	Global Monitoring Exercise
GRMS	Global Reinsurance Market Survey
GWP	Gross written premiums
IAIS	International Association of Insurance Supervisors
ICP	Insurance Core Principle
IFRS	International Financial Reporting Standards
IIM	Individual insurer monitoring
ILR	Insurance liquidity ratio
IMF	International Monetary Fund
L&M	Loans and mortgages
MGVP	Minimum guarantees on variable products
NatCat	Natural catastrophe
ND-GAIN	Notre Dame Global Adaptation Index
OTC	Over-the-counter
ORSA	Own Risk and Solvency Analysis
PE	Private equity
Pred	Predominantly
RI	Reinsurance investments
ROA	Return on assets
S&P	Standard and Poor's
SWM	Sector-wide monitoring
VaR	Value at risk
YE	Year-end
YoY	Year-over-year

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Executive summary

The 2023 Global Insurance Market Report (GIMAR) shares the outcomes of the 2023 Global Monitoring Exercise (GME), the International Association of Insurance Supervisors' (IAIS') risk assessment framework to monitor key risks and trends and detect the potential build-up of systemic risk in the global insurance sector.

Section 1 introduces the GME and its data collections.

The GME builds on individual insurer monitoring, covering data collected from approximately 60 of the largest international insurance groups, as well as aggregate data from sector-wide monitoring by supervisors across the globe, covering over 90% of global gross written premiums. The analysis covers data to the end of 2022, updated with more recent financial market data where available.

Section 2 outlines global insurance market developments in 2022 in terms of assets, liabilities, solvency, profitability and liquidity. Levels of capital adequacy remain sound, with the aggregate solvency ratio for insurers participating in the 2023 GME remaining well above 100%, yet slightly declining at year-end 2022 compared to year-end 2021. Key drivers behind these declines are financial market developments, notably lower asset valuations triggered by declines in equities, widened credit spreads on corporate and sovereign debt, higher volatility in interest rates and weaker currencies in some jurisdictions. These

declines are partly offset by increases in interest rates, which lower the valuation of insurer liabilities at year-end 2022 compared to year-end 2021.

Looking ahead, inflation, potential lapses, significant unrealised loss positions and the possibility of a reduction in demand for insurance due to strains on the purchasing power of households are identified by supervisors as potential risk factors that could affect future solvency and profitability. Although the effects of the Covid-19 pandemic are largely considered as overcome, geopolitical tensions – including the war in Ukraine – continue to negatively influence the outlook of supervisors.

Section 3 explores the two macroprudential themes identified in this year's GME: (1) interest rate, liquidity and credit risks in a challenging macroeconomic environment; and (2) structural shifts in the life insurance sector, including allocation of capital to alternative assets and cross-border asset-intensive reinsurance.

Regarding the first theme, key vulnerabilities associated with increasing interest rates include increased policy surrenders and liquidity risks stemming from the use of derivatives and margin calls. In terms of supervisory responses, ongoing and more frequent monitoring of surrenders and liquidity risk via offsite and onsite supervision has been observed, including sensitivity analysis and liquidity risk stress testing (eg mass lapse risk scenarios).

Increasing credit risk is also covered under this theme, particularly in relation to (commercial) real estate exposures and the insurance sector's interconnectedness with banks. While direct exposures are limited at the global level, a higher concentration is apparent for some insurers. In terms of supervisory response, supervisors are undertaking efforts to regularly monitor insurers' credit risk exposures, including through stress-testing exercises and in-depth portfolio assessments (with a specific focus on increases in holdings of less liquid assets). Insurers with substantial real estate and mortgages portfolios are monitored more closely (eg through onsite inspections).

In terms of banking sector interconnectedness, key measures taken by supervisors include regular monitoring of exposures and, in some cases, setting investment limits on financial sector or counterparty exposures to ensure diversification. In addition, requirements have been set out for funding and liquidity contingency planning to ensure that liquidity sources remain robust and available even during banking sector downturns, and to ensure greater access to capital markets for insurers to enhance fundraising flexibility.

The second theme highlights that the shift to alternative investments is material for some insurers. Alternative investments are associated with higher liquidity risk and complexity in terms of risk assessment and valuation.

The importance of an adequate understanding of these investments and the management of their risk at the insurer level is discussed, along with making sure that investment portfolio characteristics are appropriate given the liquidity profile of insurers' liabilities.

The use of asset-intensive reinsurance (ie reinsurance whereby a material part of the investment risk is also transferred to the reinsurer) is increasingly observed, notably for long-tailed life insurance liabilities. Reinsurers taking on this asset-intensive reinsurance are currently concentrated in only a few jurisdictions, although this practice is not uncommon in the reinsurance business. Cedents of such liabilities are also concentrated in a few jurisdictions where life insurance business models are characterised by long-tailed life insurance liabilities. This has raised questions about whether this concentration could be associated with the leveraging of regulatory differences in terms of valuation, reserving or capital requirements. In this respect, it is worth noting that existing supervisory recognition mechanisms may help to mitigate some of the risks related to these questions.

The supervisory focus on these reinsurance transactions also relates to having clarity on who retains the asset ownership (cedent or reinsurer), who manages the assets and which jurisdiction has supervisory authority over these assets. Finally, in terms of supervisory standards, the IAIS will assess the extent to which asset-intensive reinsurance is adequately covered under Insurance Core Principle 13 (Reinsurance and other forms of risk transfer), and if needed, explore the development of additional supervisory guidance.

Section 4 of this report covers climate-related risks to the insurance sector. Through an iterative process, the IAIS continues to improve its insights into the insurance sector's exposure to climate-related risks. This year, data was collected from individual insurers as a complement to the sector-wide data provided by supervisors.

While the quantitative analysis in the previous two years focused on the impact of climate change on insurers' investments, this year insurers' liability risks related to exposures to natural catastrophe (NatCat) events are also assessed in a quantitative manner.

On insurers' investments, the analysis finds that exposures to climate-related assets remain significant across the globe – estimated at 37% of reported assets. Within the equity, corporate bond, loans and mortgages portfolios of insurers, the share of assets that are most exposed to transition risks range between 29% (in Europe and Africa) and 42% (in Latin America), with the North America and Asia and Oceania regions in between. This shows that insurers continue to allocate material shares of their portfolios to the six climate-relevant sectors – and that exposure to transition risk persists. The year-end 2022 numbers¹ suggest a slight increase in exposure to climate-relevant assets compared to year-end 2021 data, which is primarily due to improved data coverage and granularity, and is not necessarily the result of an actual shift in aggregate asset allocation by insurers.

One of the main physical risks of climate change for insurers is the expected increase in claims related to NatCat events. Setting risk-based capital requirements for NatCat risk can ensure that capital resources are appropriately allocated to cover this risk. The majority of survey responses from supervisory authorities indicated that capital requirements for NatCat risks are already in place in their jurisdictions, while two members indicated that they plan to introduce such requirements in the near future. The NatCat data received from individual insurers was used to estimate the impact of extreme weather events on insurers' capital levels. Immediately following a 1-in-200-year

event, insurers' capital coverage ratios could decline by 34% on average. This could create a significant capital management challenge if it becomes difficult for insurers to quickly raise capital, disrupting reinsurance markets and thereby reducing reinsurance capacity.

Given the growing focus on NatCat events, the IAIS has recently published its report "A call to action: the role of insurance supervisors in addressing natural catastrophe protection gaps", outlining actions for insurance supervisors in addressing NatCat protection gaps.²

Section 5 outlines aggregate results from the 2023 individual insurer monitoring. A comparison of aggregate systemic risk scores of insurers to those of banks shows that the total cross-sectoral scores for banks are still significantly higher than for insurers. However, insurers show a higher increase than banks in their aggregate systemic risk score from year-end 2019 to year-end 2020. Three cross-sectoral indicators increased for insurers at year-end 2022 compared to year-end 2021: level 3 assets (which are illiquid, difficult-to-value assets), the notional amount of over-the-counter derivatives and intra-financial system liabilities. The IAIS is further analysing the different trends in holdings of level 3 assets observed for insurers and banks, particularly to investigate whether this may be related to accounting differences (where banks hold more loans and mortgages "at cost" compared to insurers).

Aggregate Insurer Pool systemic risk scores have declined by 3.1% at year-end 2022 compared to year-end 2021. Key drivers for this decrease are lower exposures to short-term funding, liability liquidity, intra-financial assets and minimum guarantees on variable products. These declines are partly offset by increases in intra-financial liabilities, derivatives, premiums for specific business lines and level 3 assets.

¹ Note, data for Japan is on a March-end basis.

² See IAIS (2023). [A call to action: the role of supervisors in addressing natural catastrophe protection gaps](#).

Finally, [section 6](#) focuses on the global reinsurance market. Gross reinsurance premiums reported in the GME continued the growth trajectory of recent years, increasing by almost 10% in 2022. This is a materially different trend to the one reported for the global insurance market (covering both primary and reinsurance markets), which saw a slight decrease of 0.3% in GWP in 2022. Net reinsurance premiums increased by 12% in 2022. Significant increases in insured losses caused by NatCat events created pressure on reinsurers' profitability, which deteriorated materially in 2022, notably in the Americas and Europe regions. Slight increases were observed at year-end 2022 in reinsurers' solvency positions and gearing ratios.³ Reinsurers' asset allocations remained stable overall, with minor increases observed in allocations to equities and loans, whereas holdings of corporate and sovereign debt decreased slightly.

Aggregate Insurer Pool
systemic risk scores
have declined by

3.1%

at year-end 2022
compared to year-end
2021, remaining well
below that of banks.

³ The gearing ratio is calculated as recoverables from reinsurance and retrocessions/capital resources.

1. Introduction

This report is based on the outcome of the Global Monitoring Exercise (GME), which is the IAIS' framework for monitoring key risks and trends in the insurance sector and assessing the build-up of any potential systemic risk in the global insurance sector.

1.1 DATA COLLECTION

The 2023 GME consists of two confidential data collections covering the period to year-end 2022:

- **Individual insurer monitoring (IIM)** applies to insurance groups meeting the Insurer Pool criteria,⁴ consisting of approximately 60 of the largest international insurance groups from 18 jurisdictions; and
- **Sector-wide monitoring (SWM)** covers aggregate insurance market data collected from IAIS members

from 27 jurisdictions, comprising more than 90% of global GWP. These jurisdictions meet the criteria as outlined in the [GME document](#). The criteria are designed to allow for broad coverage in terms of global participation. In addition, jurisdictions not meeting the criteria may volunteer to participate in the SWM data collection.

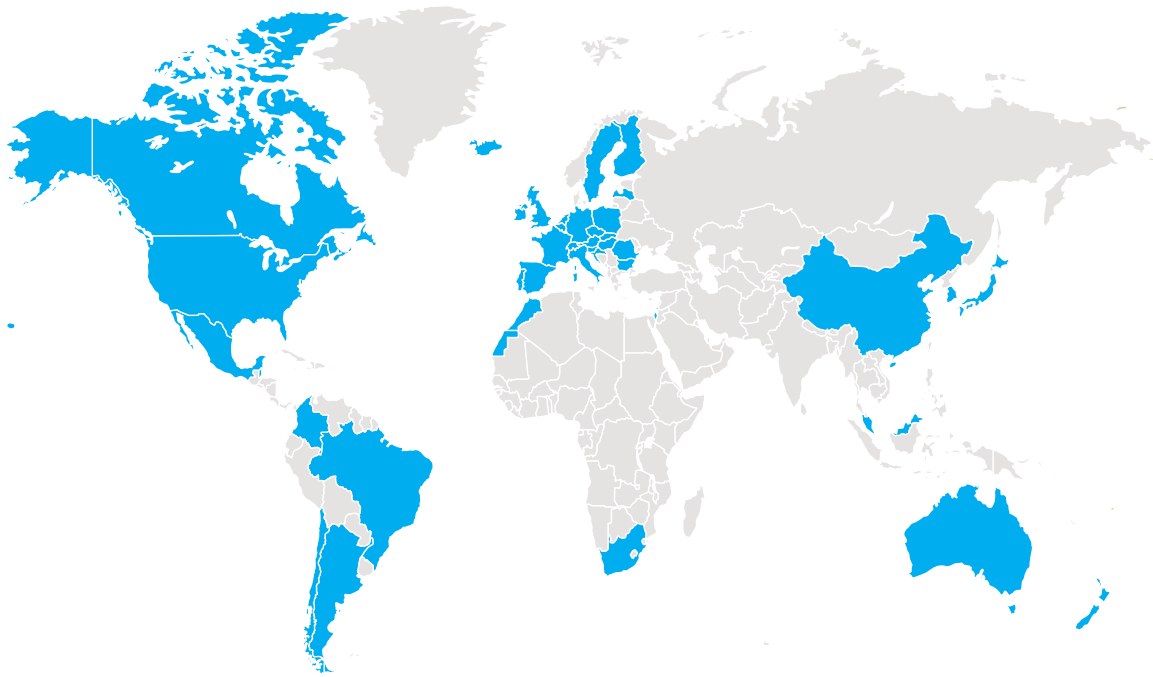
A total of 45 jurisdictions participated in at least one of the components of the SWM 2023 data collection.⁵ They are highlighted in blue on Map 1.⁶

⁴ The Insurer Pool criteria, as outlined in the GME document that was updated in June 2023, are: Total assets of more than \$65 billion and a ratio of premiums from jurisdictions outside the home jurisdiction to total premiums of 5% or more, or total assets of more than \$215 billion and a ratio of premiums from jurisdictions outside the home jurisdiction to total premiums greater than 0%, or applying jurisdictional discretion.

⁵ The SWM 2023 data collection consisted of qualitative, quantitative, climate and reinsurance components.

⁶ SWM 2023 participating jurisdictions are: Argentina; Australia; Austria; Belgium; Bermuda; Brazil; Bulgaria; Canada; Cayman Islands; Chile; China; China, Hong Kong; Chinese Taipei; Colombia; Croatia; Czech Republic; Finland; France; Germany; Hungary; Iceland; Ireland; Israel; Italy; Japan; Korea; Latvia; Luxembourg; Malaysia; Malta; Mexico; Morocco; Netherlands; Poland; Portugal; Romania; Singapore; Slovak Republic; Slovenia; South Africa; Spain; Sweden; Switzerland; United Kingdom; and United States of America.

MAP 1: JURISDICTIONS THAT PARTICIPATED IN THE SWM 2023 DATA COLLECTION (IN BLUE)



Source: IAIS SWM 2023

The 2023 GME consists
of two confidential
data collections
covering more than
90%
of global gross
written premiums.

2. Global insurance market developments

This section outlines the key global insurance market developments, covering assets and liabilities (Section 2.1), solvency (Section 2.2), liquidity (Section 2.3) and profitability (Section 2.4).

2.1 ASSETS AND LIABILITIES

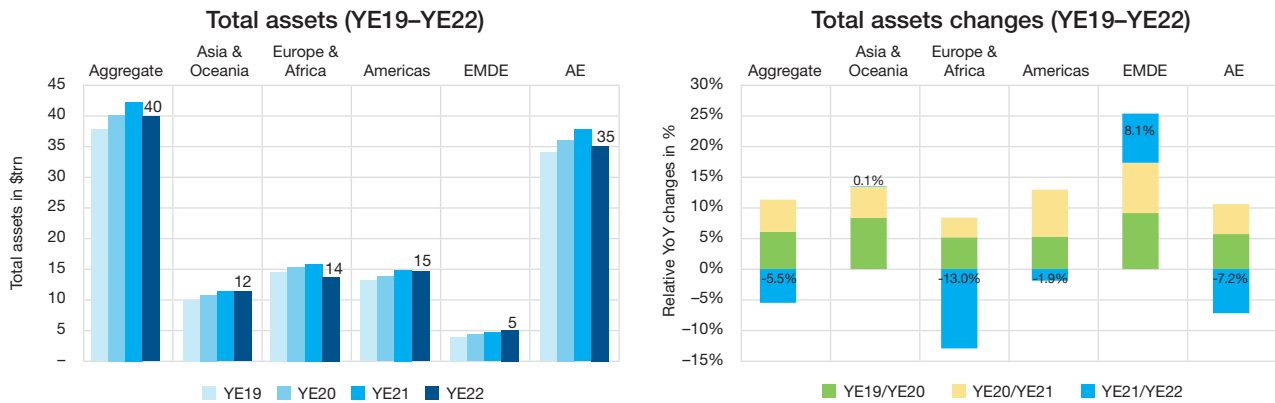
Figures 1 and 2 show that total assets as reported in the SWM declined by 5.5% to \$40⁷ trillion and total liabilities declined by 5.8% to \$35 trillion at year-end 2022. Key drivers behind the decline in total assets are declines in equity prices and widened credit spreads on corporate and sovereign debt. Declines in liabilities were mainly driven by increased interest rates at year-end 2022 compared to year-end 2021.

Comparing developments in emerging markets and developing economies (EMDEs) to advanced economies (AE), Figure 1 shows that EMDEs have seen several consecutive years of growth in total assets, including from year-end 2021 to year-end 2022 (+8.1%). In contrast, AEs have seen a decline in the last year (–7.2%) after two consecutive years of growth. A similar trend is observed for total liabilities.

Key drivers behind the decline in total assets are declines in equity prices and widened credit spreads on corporate and sovereign debt.

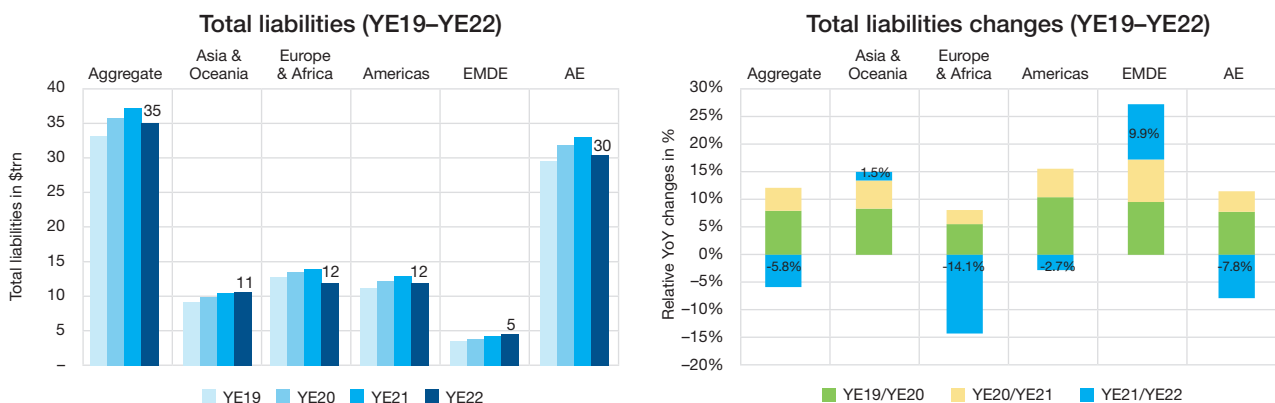
⁷ The \$ refers to United States dollars (USD) throughout the report.

FIGURE 1



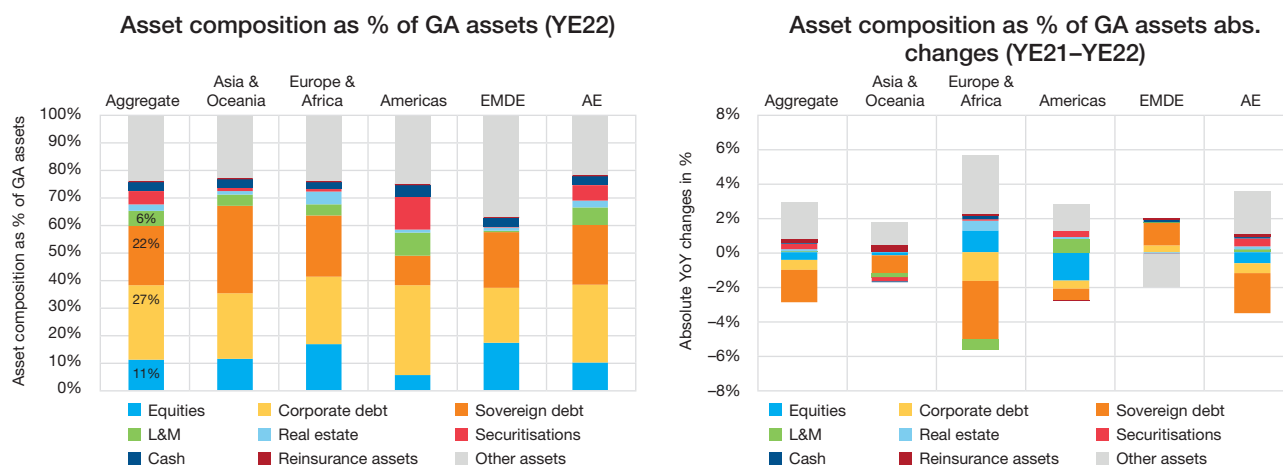
Source: IAIS SWM 2023

FIGURE 2



Source: IAIS SWM 2023

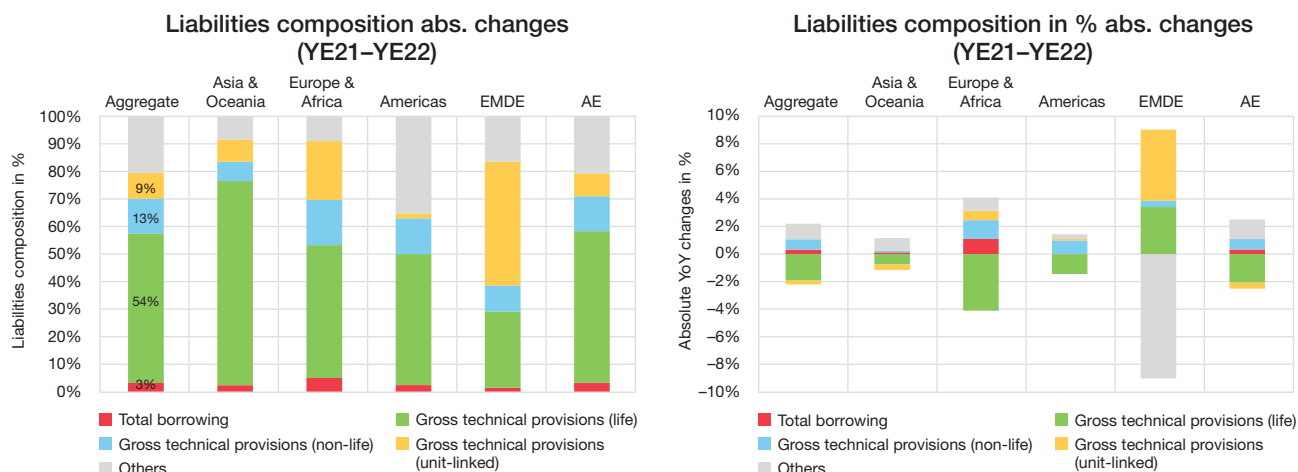
FIGURE 3



Source: IAIS SWM 2023

Figure 3 shows that insurers' assets are still mostly composed of fixed-income investments, notably corporate debt (27% of total general account, or GA, assets), sovereign debt (22%) and loans and mortgages (L&M) (6%). The second largest asset class is equities (11%).

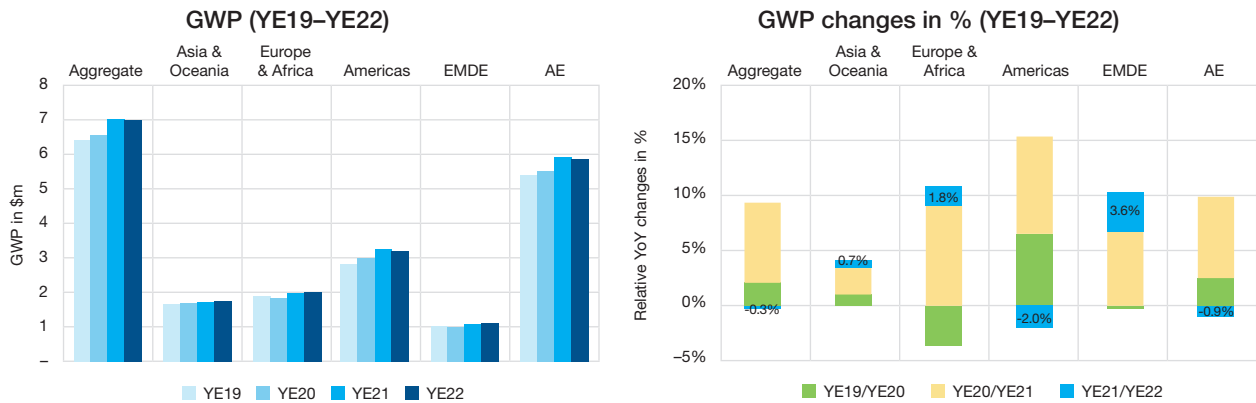
FIGURE 4



Source: IAIS SWM 2023

Turning to the composition of liabilities in Figure 4, on aggregate, liabilities at year-end 2022 were mostly composed of gross technical provisions for life insurance (54%), gross technical provisions for non-life insurance (13%) and gross technical provisions for unit-linked insurance (9%). The overall amount of borrowing remained limited at 3%, showing no change compared with the previous year.

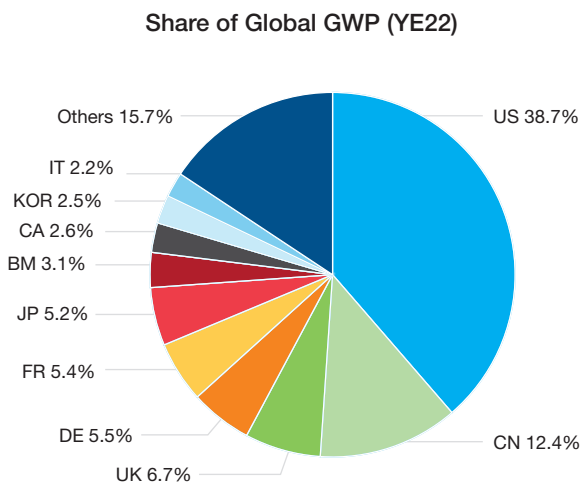
FIGURE 5



Source: IAIS SWM 2023

Figure 5 shows that overall, gross written premiums (GWP) covered by the SWM decreased by 0.3% at year-end 2022 compared to year-end 2021, which is a significant change from the 7.2% increase observed from year-end 2020 to year-end 2021.

FIGURE 6

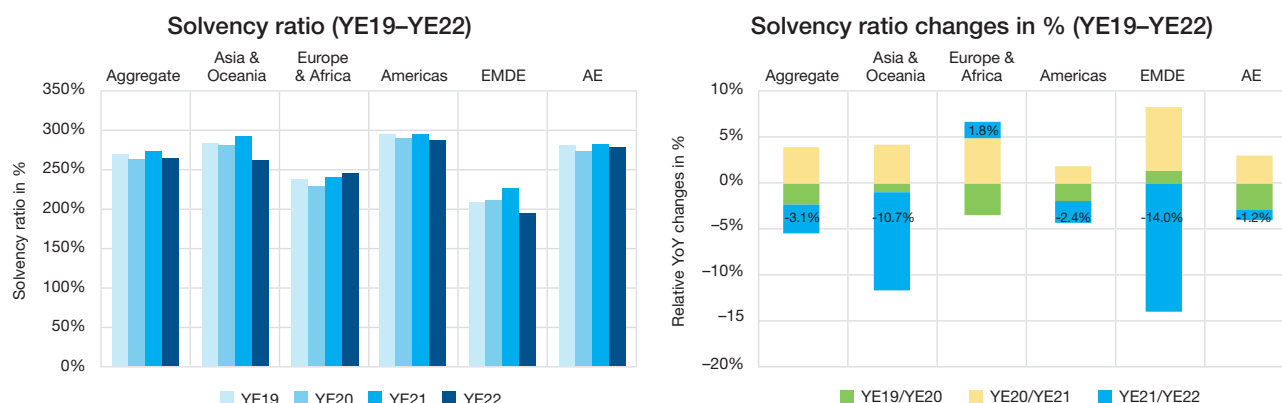


Source: IAIS SWM 2023

In terms of geographic distribution of GWP, Figure 6 shows that according to the SWM data, most premiums at year-end 2022 were underwritten in the United States of America (US) (38.7%), followed by China (CN) (12.4%), the United Kingdom (UK) (6.7%), Germany (DE) (5.5%), France (FR) (5.4%) and Japan (JP) (5.2%).

Jurisdictional solvency ratios decreased slightly in all regions except Europe and Africa where a slight increase was observed.

FIGURE 7



Source: IAIS SWM 2023

2.2 SOLVENCY

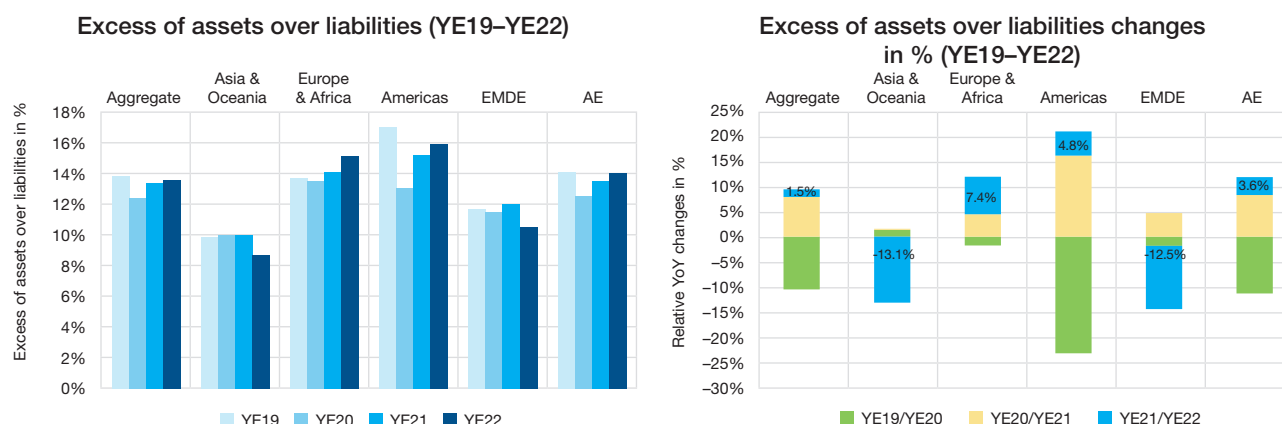
2.2.1 Developments

As shown in Figure 7, jurisdictional solvency ratios decreased slightly in 2022 in all regions except Europe and Africa where a slight increase was observed.⁸ The most significant decreases were observed in Asia and Oceania and in EMDE jurisdictions. The key drivers of these declines were lower asset valuations – including declines in equities – widened credit spreads on corporate and sovereign debt, higher volatility of interest rates and weaker currencies in some jurisdictions.

These declines were partially offset by increases in interest rates at year-end 2022 compared to year-end 2021, which reduced the aggregate value of liabilities.

At the global level, the excess of assets over liabilities reported in the SWM (see Figure 8) slightly increased on aggregate (by 1.5%). Supervisors noted that this increase was mostly driven by the life insurance business, where liabilities were positively affected by the rise in interest rates. Discounting future cashflows at higher interest rates resulted in lower liability values.

FIGURE 8



Source: IAIS SWM 2023

⁸ Note that insurance capital regimes are different across jurisdictions, thus the comparison between regions needs to be interpreted with caution.

2.2.2 Measures taken by supervisors

In 2022, supervisors continued to closely monitor insurers' solvency ratios. Many supervisors conducted stress-testing exercises. In addition, some supervisors completed in-depth analyses of and closely monitored the methodologies to calculate technical provisions in order to ensure that the methodologies adequately reflect changes in the economic environment, in particular those relating to inflation. Some supervisors also reported closely monitoring dividend distributions.

In several jurisdictions, supervisors reported a change to their solvency regime or that such a change is planned for the near future. Depending on the jurisdiction, transitional measures were also put in place. In addition, the introduction of International Financial Reporting Standards (IFRS) 9 and IFRS 17 has impacted solvency calculations in several jurisdictions.

2.2.3 Outlook

Looking ahead, most supervisors expect a stable or slightly negative outlook for the solvency position of insurers in their jurisdictions, particularly in light of uncertainties in the economic environment.

The effects of the Covid-19 pandemic are largely considered to have been overcome, however geopolitical

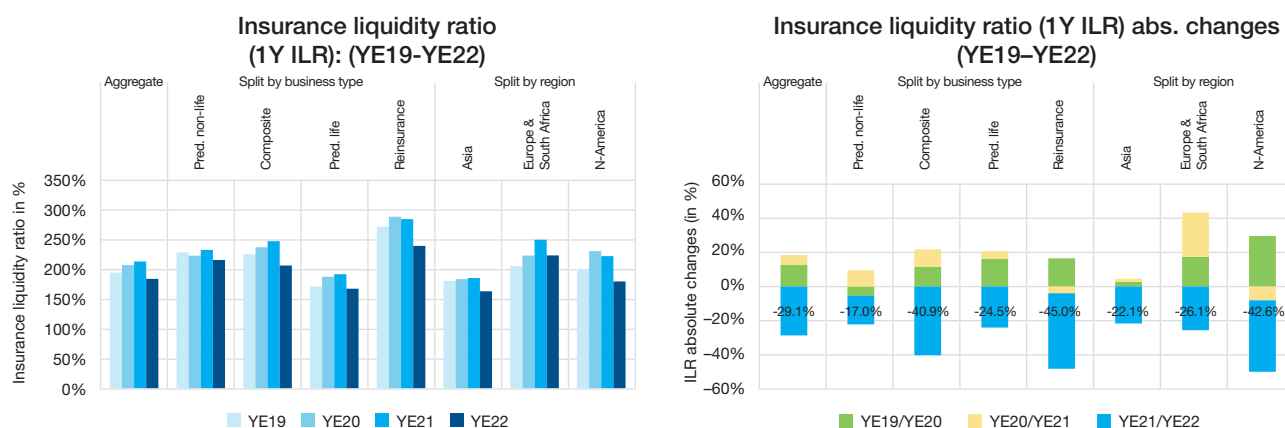
tensions, including the war in Ukraine, and the overall volatility of financial markets continue to negatively influence supervisors' outlook for the insurance sector. Second-round effects from higher interest rates in many jurisdictions are also being closely monitored. Supervisors noted concerns that a possible decline in real estate markets would negatively affect insurers' assets. Key risks for non-life insurance relate to the inflationary environment, while lapses and surrenders resulting from higher interest rates and a rise in the cost of living could negatively affect life insurers.

2.3 LIQUIDITY

2.3.1 Developments

As shown in Figure 9, on aggregate, the insurance liquidity ratio (ILR) has decreased compared to year-end 2021, while remaining well above 100%. Key liquidity sources are liquid investments such as highly-rated sovereign and non-financial corporate debt, as well as premium income. Key liquidity needs mainly consist of surrender values. Supervisors reported that, on aggregate, insurers hold large amounts of highly liquid assets to be prepared for potential liquidity needs, for instance stemming from policy surrenders or margin calls on derivative exposures.

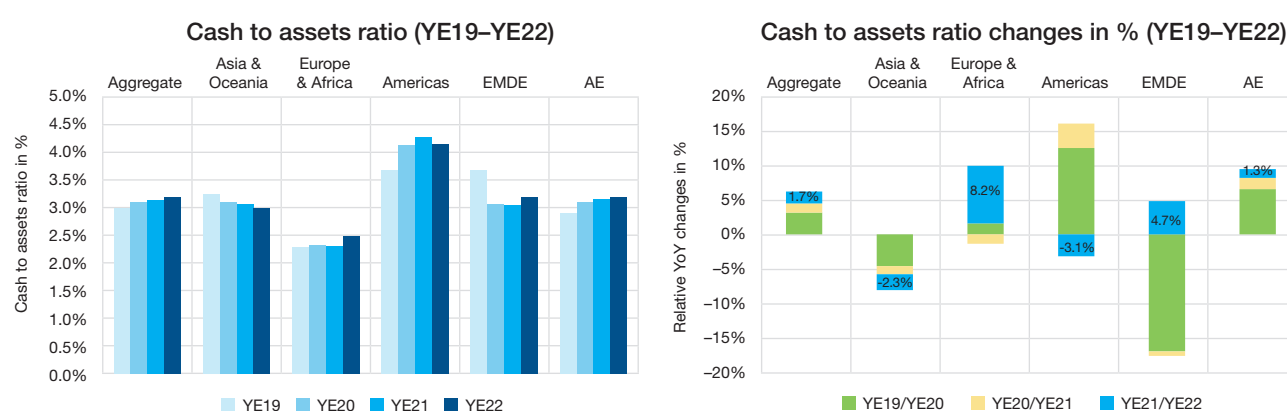
FIGURE 9



Source: IAIS IIM 2023

The SWM results indicate an increase in the cash held by insurers in most jurisdictions (see Figure 10). By increasing cash positions, insurers build buffers against potential increases in liquidity needs and also shorten their asset duration, thereby reducing their exposure to potential further rises in interest rates. Several supervisors reported that insurers in their jurisdictions had strengthened their liquidity positions in order to cope with potential increases in surrenders. Some supervisors also reported an increase in observed liquidity needs relating to margin calls on derivatives.

FIGURE 10



Source: IAIS SWM 2023

2.3.2 Measures taken by supervisors

Supervisors reported that they are closely monitoring liquidity needs and resources. Some have issued specific guidance for insurers to reinforce liquidity sources. Several supervisors also indicated that they are conducting dedicated liquidity risk stress tests and collecting data to evaluate the adequacy of available liquidity sources compared to potential liquidity needs. Overall, supervisors have increased the resources dedicated to monitoring liquidity risks.

2.3.3 Outlook

Supervisors anticipate that liquidity positions may be considerably impacted by the overall macroeconomic environment and developments in financial markets. Persistently high interest rates in many markets are expected to continue to affect surrender risk. Continued geopolitical uncertainty could contribute to further market volatility, which could result in margin or collateral calls. Looking ahead, supervisors expect to continue to closely monitor insurers' liquidity needs and resources.

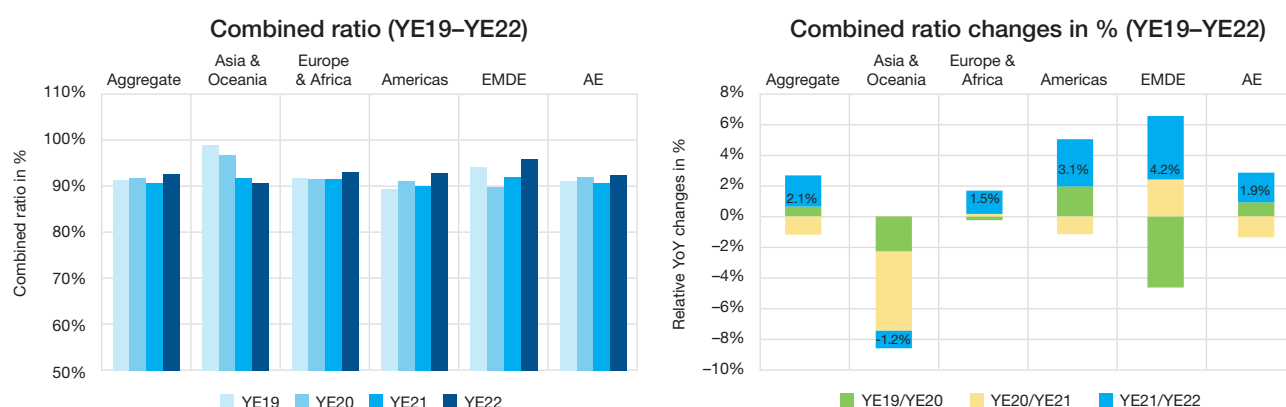
Looking ahead, most supervisors expect a stable or slightly negative outlook for the solvency position of insurers in their jurisdictions, particularly in light of uncertainties in the economic environment.

2.4 PROFITABILITY

2.4.1 Developments

Supervisors reported heterogeneous developments in terms of profitability in 2022. For non-life activities, profitability was negatively impacted by extreme weather events, inflation and the rise in energy prices. Prices in the reinsurance market rose in 2022, weighing further on non-life insurers' profitability. These developments were partially offset by increases in premiums. On aggregate, combined ratios⁹ increased by 2.1%. An increase in the combined ratio was observed in most regions, except in Asia and Oceania (see Figure 11).

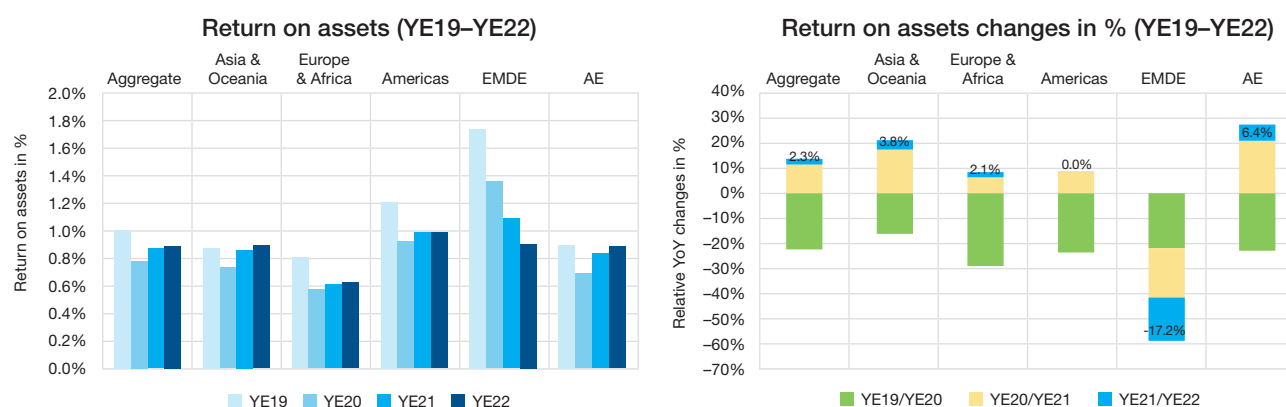
FIGURE 11



Source: IAIS SWM 2023

Life insurers' profitability was impacted by changes in interest rates. As can be seen in Figure 12, the return on assets (ROA), excluding unrealised losses, has remained generally stable from year-end 2021 to year-end 2022. If unrealised losses were included, a strong decline in asset returns would be observed. In EMDE markets, the ROA has declined in recent years.

FIGURE 12



Source: IAIS SWM 2023

⁹ Combined ratio = (incurred claims including loss adjustment expenses + expenses other than loss adjustment expenses)/net earned premiums.

2.4.2 Measures taken by supervisors

Several supervisors conducted stress-testing exercises and collected additional data to strengthen their monitoring of the profitability of insurers. In addition, some supervisors issued guidance to insurers recommending that they bolster their capital position by moderating dividend payments.

2.4.3 Outlook

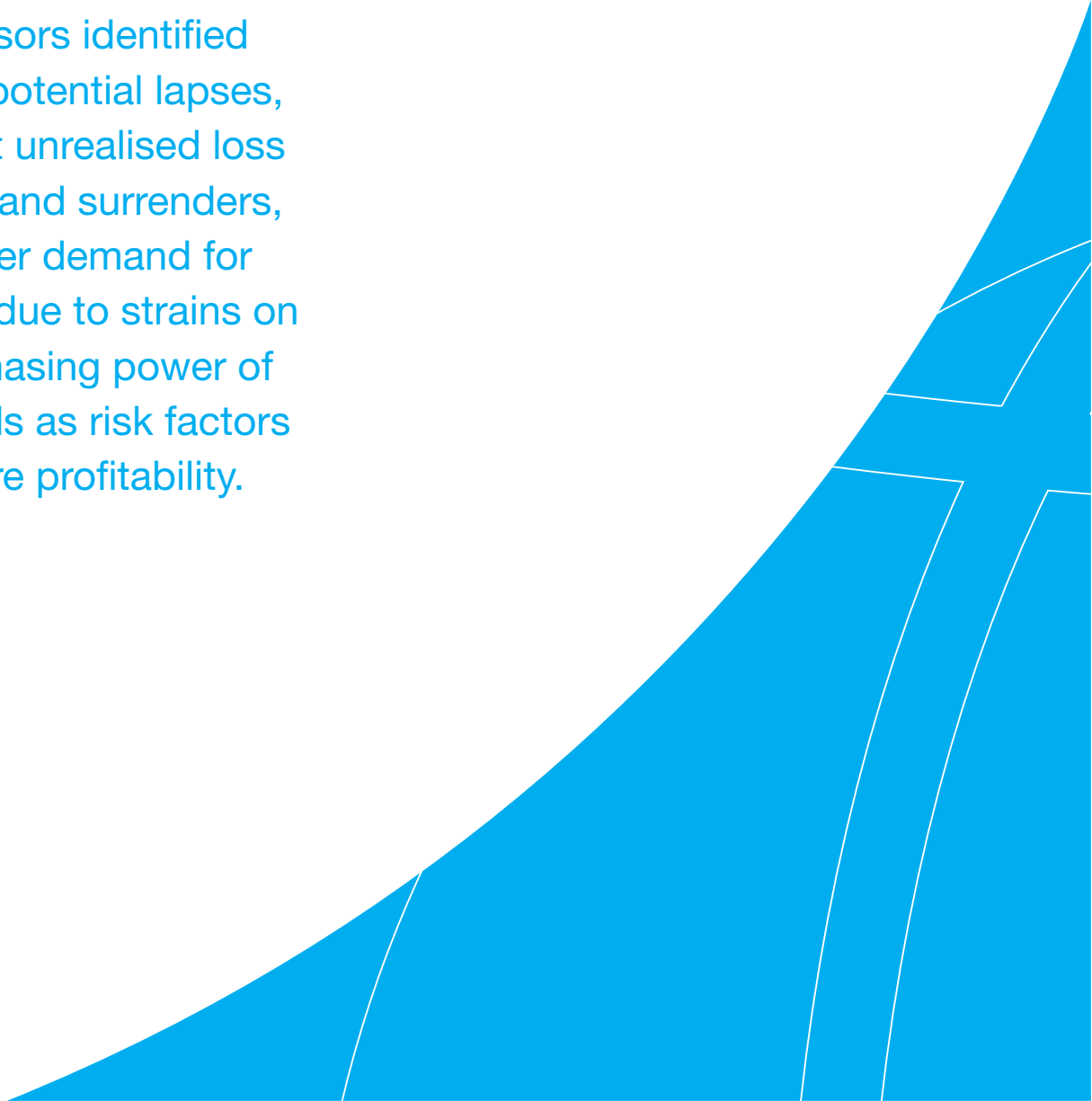
Most supervisors underscored the high degree of uncertainty with respect to future profitability developments in the current economic environment, which is characterised by increased volatility. Some supervisors, however, note improvements in profitability

positions due to higher premiums. The higher interest rate environment is also expected to improve asset returns in the coming years, following years of low, or even negative, interest rates in many jurisdictions.

On the other hand, supervisors identified inflation, potential lapses, significant unrealised loss positions and surrenders and lower demand for insurance due to strains on the purchasing power of households as risk factors for future profitability.

Some supervisors also mentioned the entry into force of IFRS 17 as a potential source of change in profitability for insurers.

Supervisors identified inflation, potential lapses, significant unrealised loss positions and surrenders, and lower demand for insurance due to strains on the purchasing power of households as risk factors for future profitability.



3. Macprudential themes

In this year's GME, the IAIS identified two macroprudential themes based on supervisory priorities highlighted by the annual SWM: (1) Managing interest rate, liquidity and credit risks in a challenging macroeconomic environment (Section 3.1); and (2) Understanding structural shifts in the life insurance sector, with a focus on asset allocation to alternative investments, and asset-intensive cross-border reinsurance (Section 3.2).

3.1 MANAGING INTEREST RATE, LIQUIDITY AND CREDIT RISKS IN A CHALLENGING MACROECONOMIC ENVIRONMENT

The current macroeconomic environment is characterised by persistently high inflation rates in several jurisdictions, tighter monetary policy and increased interest rates across many regions. Financial market sentiment remains fragile, with high degrees of volatility and uncertainty. This theme focuses on how the insurance sector is managing the challenging combination of increased risks relating to interest rates, credit and liquidity against this backdrop.

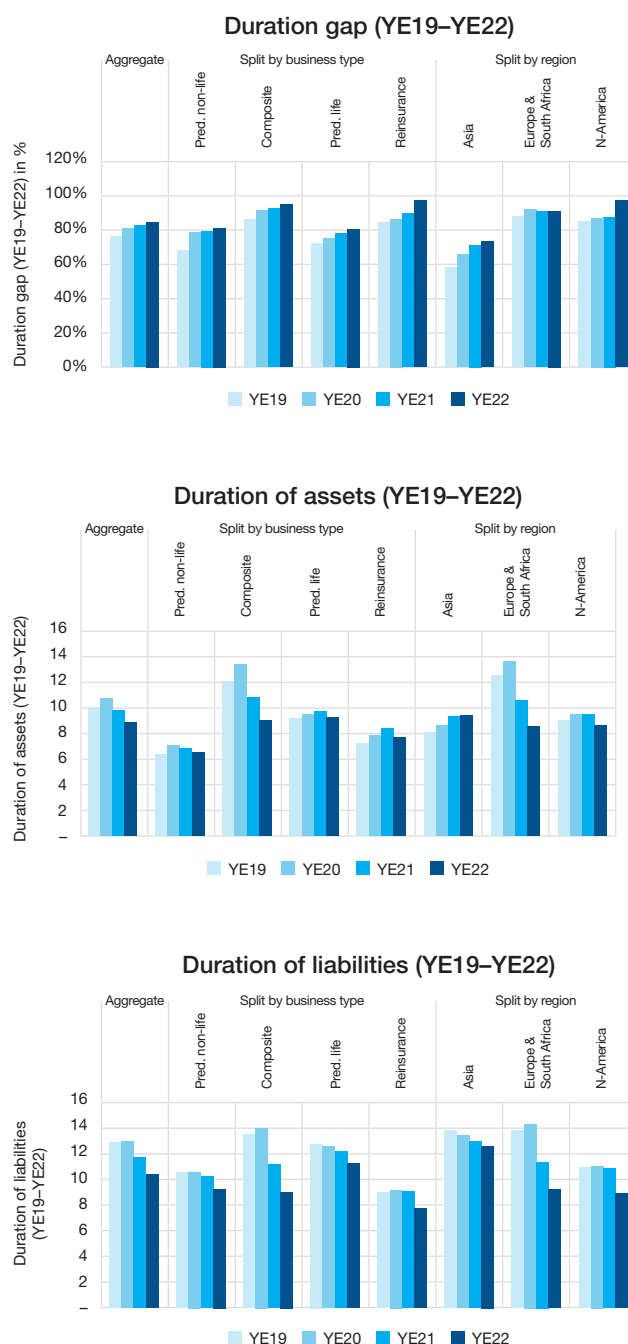
3.1.1 Interest rate and liquidity risk

As outlined in section 2.3, aggregate insurance liquidity ratios have fallen compared to year-end 2021, yet remain well above 100%.

Regarding interest rate risk, from the perspective of matching asset and liability duration, the Insurer Pool data shows that asset durations are still shorter than liability durations on aggregate, meaning assets decrease less in value than liabilities when interest rates rise linearly. This explains why some insurers have seen a positive impact on their solvency positions at year-end 2022 compared to year-end 2021. Note, however, that when interest rates do not rise linearly (for example in the case of inverted yield curves), solvency positions may be negatively impacted.

Surrender risk and margin calls related to derivative exposure have been identified as areas of continued focus with respect to interest rate and liquidity risk.

FIGURE 13



Source: IAIS IIM 2023

Two areas of continued focus have been identified with respect to interest rate and liquidity risk going forward: surrender risk and margin calls related to derivative exposures.

Surrender risk

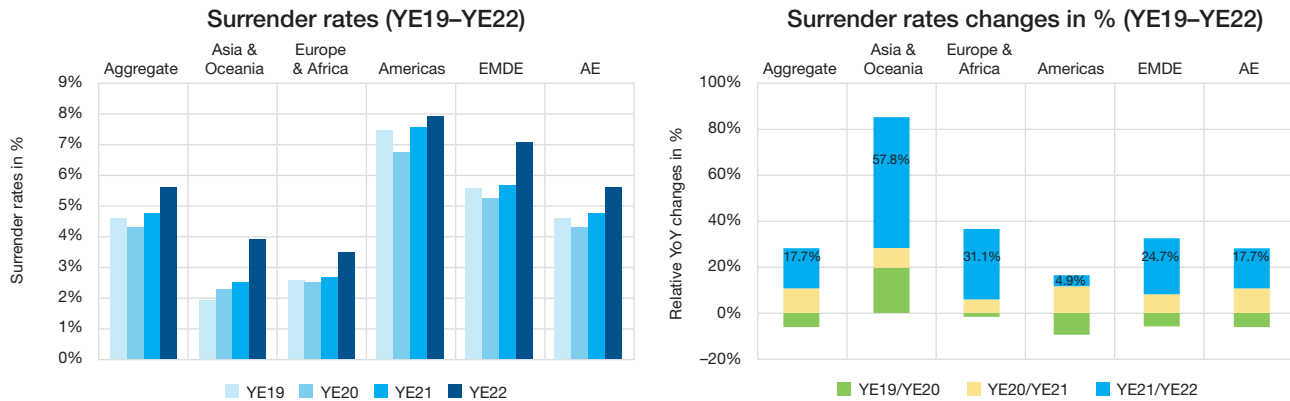
The sharp rise in inflation and interest rates in many regions over the past year has already increased surrender risk and triggered the potential for additional liquidity needs. In terms of outlook, supervisors note higher potential returns on traditional asset classes (such as bank deposits or money market funds), which can entail further surrender risk going forward if policyholders switch into these other assets. In particular, policies with low guaranteed interest rates – issued during the extended period of low interest rates – may be susceptible to early surrenders.

The vulnerability of different types of life insurance policies to surrender risk depends on a number of factors: product type (eg protection vs savings products, with the latter being more susceptible to surrenders); contractual guarantees (if any); replacement cost and availability of life insurance coverage; existence of policyholder protection schemes (eg government guarantees of life insurance savings contracts, similar to banking deposit insurance schemes); distribution channels; surrender value compared to market value; any mandatory time delays in terms of access to funds; and economic penalties relative to account value.

From SWM data, an uptick in life insurance surrender rates is observed for the 22 jurisdictions that provided data from SWM20 (year-end 2019) through to SWM23 (year-end 2022).

The sharp rise in inflation and interest rates in many regions over the past year has already increased surrender risk and triggered the potential for additional liquidity needs.

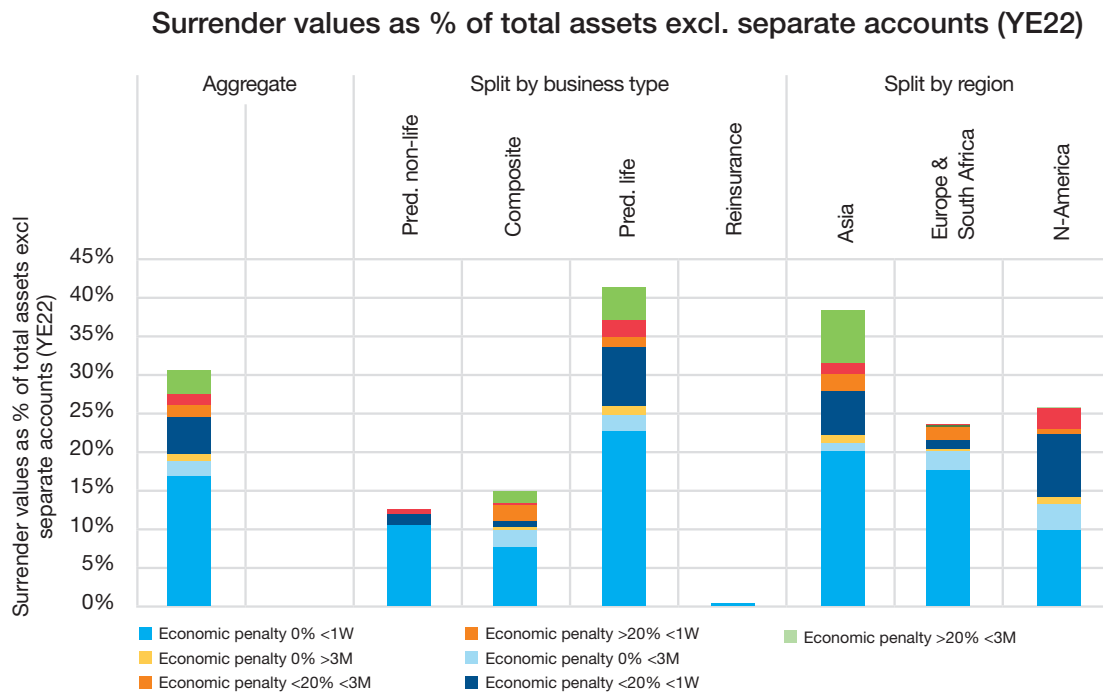
FIGURE 14



Source: IAIS SWM 2023

IIM data shows that the total of surrender values adds up to 30% of total assets, excluding separate accounts. Half of these surrender values relate to contracts without any economic penalty, which are redeemable within one week (noting that fiscal disincentives may still apply to the policyholder). The vast majority of supervisors note that surrender risk represents a low to moderate risk, provided that regulatory, fiscal and economic disincentives are in place to mitigate the risk of early withdrawals.

FIGURE 15



Source: IAIS IIM 2023

An overview of measures taken by insurers and supervisors in response to surrender risk

Key measures by supervisors:

- Ongoing and more frequent monitoring of surrender and liquidity risk via offsite and onsite supervision, including sensitivity analysis and liquidity risk stress-testing (eg mass lapse risk scenarios);
- Implementing the power to temporarily limit or suspend (mass) surrenders in the event of liquidity concerns regarding an insurer;
- Requiring surrender charges to be in place for a minimum number of years, notably for interest-sensitive insurance products (eg where in the first years of the policy the surrender value of the policy is lower than the premiums paid, disincentivising the policyholder to surrender); and
- Educating policyholders about the importance of maintaining their policies during market downturns.

Key measures by insurers:

- Modelling the impact of potential mass lapses in Own Risk and Solvency Analysis (ORSAs);
- Ensuring contracts have surrender penalties and/or market value adjustment disincentives, subject to any regulatory limitations in terms of market conduct requirements;
- Taking out (re)insurance against mass-lapse risk;
- Changing product pricing and/or product features to reflect surrenders experience; and
- Exploring more attractive investment options and other policyholder retention strategies.

Two additional specific elements have been identified by supervisors as having the potential to impact surrender risk, which are (1) the type of distribution channel and (2) shareholder disengagement.

In terms of the distribution channel, as insurance products with a savings element tend to face higher surrender risk than protection-type products, this translates into higher surrender risk for distribution channels where the distribution of savings-related insurance products, eg annuity products, dominates. Banks were mentioned as a distribution channel with a higher share of savings-related insurance products; in some cases, insurance is marketed by banks more as a financial (investment) product

than a protection product. Supervisors, generally, have not put in place specific measures to address surrender risk arising from distribution channels, given the flexibility that insurers need in terms of the various modes of distribution channels used.

In terms of shareholder disengagement (whereby the shareholder stops providing funding or capital), supervisors noted that this may have a material impact, notably affecting corporate governance, culture, reputation, customer behaviour and, hence, surrender risk. In some specific cases, it was noted that inadequate shareholder engagement resulted not only in ineffective corporate governance, but also in lower solvency and liquidity positions.

An overview of measures taken by insurers and supervisors regarding shareholder (dis)engagement

Key measures by supervisors:

- Assessing shareholders' engagement/long-term commitment as part of the licensing process;
- Requiring major shareholdings of insurers to be subject to approval by the supervisor;
- Enhancing supervisory requirements or guidelines on corporate governance;
- Ongoing supervision, such as monitoring insurers where shareholders may have limited engagement and performing internal analysis as part of off-site supervision;
- Examining whether the major shareholders have improperly intervened in the operations and governance of insurers; and
- Developing a risk assessment system to improve the supervisor's ability to monitor insurance sector developments.

Key measures by insurers:

- Notifying supervisor of significant shareholder participations (regulatory requirement);
- Assessing reputation risk through annual risk assessment process;
- Discussing strategic and financial plans with investors and analysts; and
- Disclosing shareholder structure, in accordance with regulation.

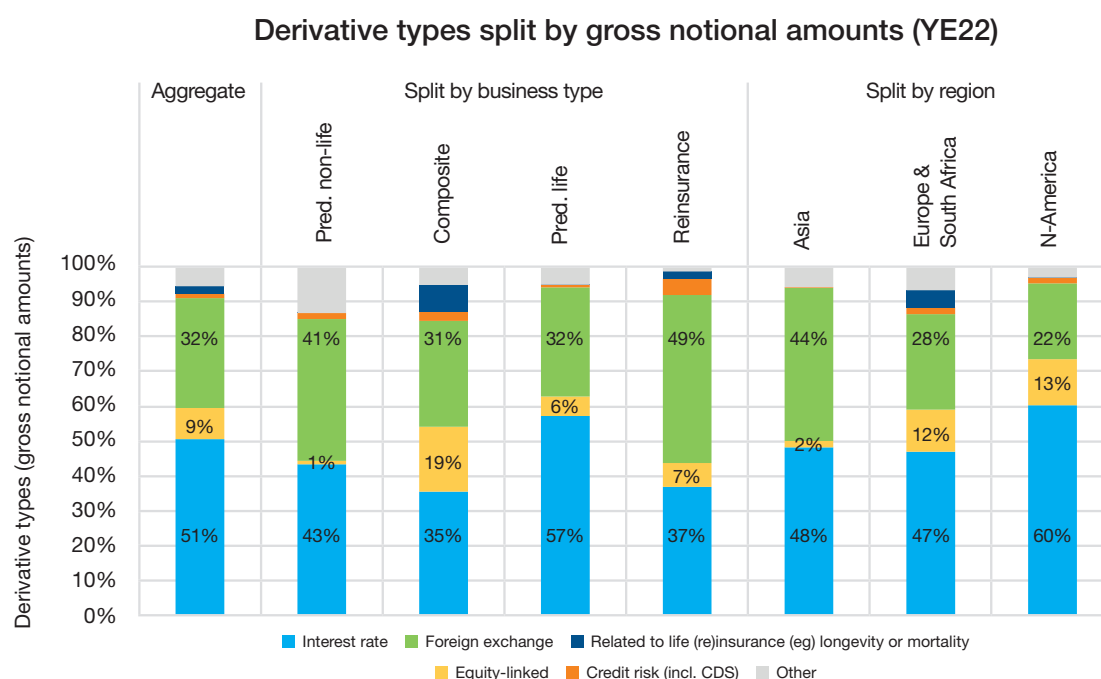
Derivatives and margin calls

The second area of attention regarding interest rate and liquidity risk relates to derivatives and margin calls.

At the aggregate Insurer Pool level, derivatives exposures are limited. However, differences exist across insurers and jurisdictions. The main types of derivatives that are employed are interest rate derivatives (especially in life insurance), followed by foreign exchange derivatives (primarily used by insurers investing in foreign assets) and, to a lesser extent, equity-linked derivatives (see Figure 16).

The main types of derivatives employed are interest rate derivatives, followed by foreign exchange derivatives and, to a lesser extent, equity-linked derivatives.

FIGURE 16



Source: IAIS IIM 2023

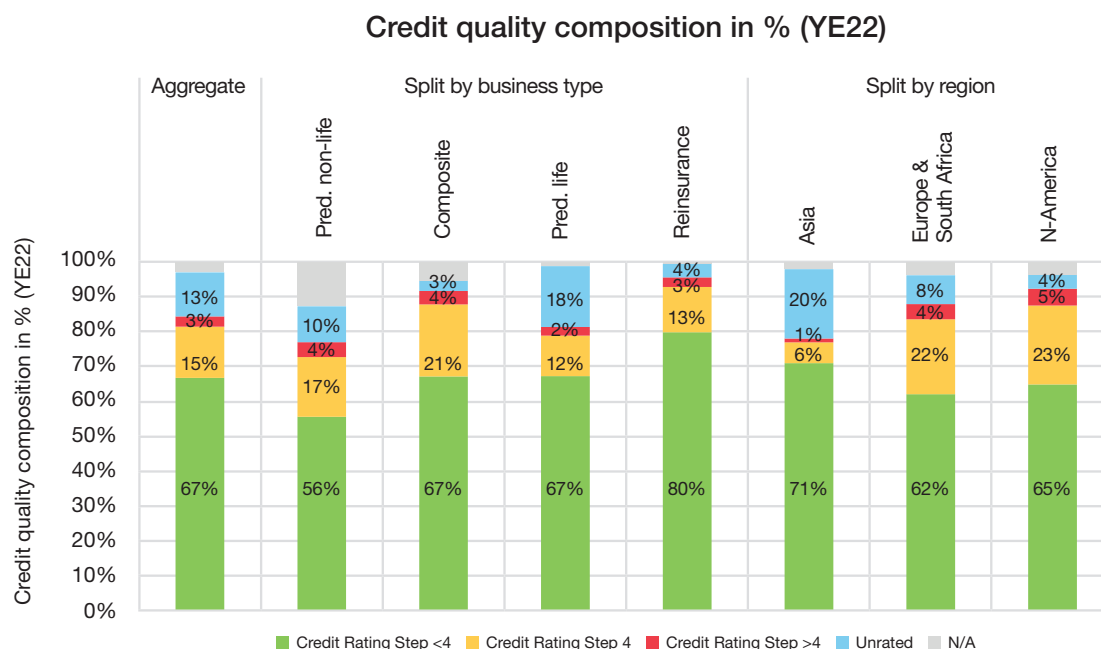
In jurisdictions where interest rate derivatives are more material, supervisors noted a significant impact of rising interest rates on margin calls, in some cases leading insurers to sell liquid assets to meet collateral requirements. Some supervisors anticipate that the continued increase in cash collateralisation of derivatives contracts will put pressure on the future liquidity needs of insurers. It was noted that the permissibility of pledging securities to meet margin calls mitigates liquidity risk and cash needs, thereby avoiding the risk of asset sales and/or weakened cash positions.

An overview of supervisory measures regarding derivatives exposures

Key measures by supervisors:

- Close monitoring of derivatives exposures and derivatives margin calls in liquidity analysis and/or counterparty risk assessments;
- Requiring liquidity stress testing related to derivatives (mostly on an annual basis but more frequently in some jurisdictions);
- Undertaking specific supervisory reviews aimed at better understanding insurer derivative usage; and
- Ensuring committed credit facilities are accessible in case of liquidity needs (ie in times of stress). In some jurisdictions, rules were amended to allow insurers to participate in repo transactions to improve access to short-term liquidity.

FIGURE 17



Source: IAIS IIM 2023

3.1.2 Credit risk

Finally, theme 1 also looked at credit risk faced by the insurance sector.

As noted earlier (see Figure 3), fixed-income investments continue to represent the most material investments for insurers (more than 50% of GA assets).

The vast majority of participating insurers' fixed income investments are of very high – above investment grade – credit quality. Unrated assets and assets below investment grade increased at year-end 2022 compared with year-end 2021. At year-end 2022, 12.8% of total investments were unrated investments, while 3% were below investment grade.

One area of increased attention going forward is real estate exposures – notably for commercial real estate. This is particularly the case for life insurers, via either real estate assets (that are generally considered suitable long-term investments to back long-term liabilities) or commercial real estate loans (mostly backed by income-generating real estate). A few supervisors mentioned that some insurers are increasing their exposure to more complex forms of property risk and products. Such risks may warrant further analysis by experts with more specialised skill sets. As the relevance of insurers' real estate exposures and securitisations varies, a real estate downturn may have significant implications for the financial position of some insurers. However, at this stage, the direct impact is expected to remain limited for the aggregate insurance market.

One area of increased attention going forward is real estate exposures – notably for commercial real estate.

Overview of measures regarding (commercial) real estate exposures

Supervisors regularly monitor insurers' real estate exposures as part of their supervisory framework and through recurring stress-testing exercises and in-depth portfolio assessments, with a specific focus on increases in holdings of less liquid assets. Insurers with substantial real estate and mortgages portfolios are monitored more closely (eg through onsite inspections).

Insurers monitor their exposures to these risks as part of their credit and investment processes to ensure they remain within appropriate risk appetite limits. Some insurers have also developed specific stress tests and scenario analyses to closely monitor their real estate exposures. Some insurers are planning to reduce their exposure to commercial real estate due to the increasing trend of working from home and other changes in ways of working.

As part of the credit risk analysis, insurers' exposure to investment fund leverage and insurers' interconnectedness with banks were discussed.

On the leverage of investment funds, although the current levels of leverage are not causing immediate concerns, supervisors emphasised the importance of ongoing monitoring and assessment of leverage. While certain jurisdictions may not have measures in place that specifically target investment fund leverage, supervisors still employ various mechanisms to manage associated risks, such as scenario and stress tests, look-through approaches and reporting obligations.

Regarding interconnectedness with the banking sector, the SWM data shows that exposures to banks and the broader financial sector vary across regions. In markets characterised by financial conglomerates, the direct interconnectedness is notably higher. Several supervisors note that insurers have reduced their exposure to banks since the 2008 global financial crisis. Supervisors have remarked that a downturn in the banking sector negatively impacts both insurers' direct and indirect exposures (ie not only direct investment exposures, but also counterparty exposures from repo, securities lending, derivatives transactions and exposures to funding) as well as liquidity from banks (eg through credit lines or contingent liquidity lines).

Overview of supervisory measures regarding interconnectedness with banks

- Monitoring of and/or imposing investment limits on financial sector/counterparty exposures, to ensure diversification;
- Requiring funding and liquidity contingency planning to ensure liquidity sources remain robust and available even during banking sector downturns;
- Strengthening insurers' access to capital markets, which enhances fundraising flexibility;
- Stress testing, including financial sector stress and broader macroeconomic downturns;
- Closer monitoring of smaller insurers who may have higher exposure to, and dependency on, banks; and
- Taking into account banking sector interconnectedness in the assessment of the domestic systemic importance of insurers.

3.1.3 Next steps

The IAIS will continue its global assessment of these significant risks. Supervisors note that by fully analysing the GME results, they are (also) able to identify (new) risks and appropriate supervisory actions at the local level. Supervisors highlight that because insurance continues to be globally interconnected, it is important not only to look at domestic risks, but also to consider cross-border and cross-sectoral risks in order to have a more holistic assessment of systemic risk.

In summary, these risks will continue to be monitored, with particular attention to:

- A continued focus on interest rate and inflation risk;
- Increased focus on derivatives – eg through the development of ancillary metrics; and
- Closer monitoring of commercial real estate exposures in the GME.

3.2 STRUCTURAL SHIFTS IN THE LIFE INSURANCE SECTOR

The life insurance sector has witnessed significant structural shifts in recent years, which have reshaped the landscape and require an adapted supervisory approach. Over the last three years, the IAIS has monitored these shifts and assessed their impact on the life insurance sector, global financial stability and supervisory responses to associated risks. The 2021 GIMAR focused on the private equity (PE) ownership of (re)insurers. The PE industry's growing involvement in life insurance was a noteworthy development affecting both the life insurance sector and business model. This shift in ownership was accompanied by discussions related to affiliated transactions and potentially riskier investment strategies deployed by PE-owned life insurers. The 2022 GIMAR adopted a broader perspective and did not limit the scope to activities involving PE firms so as not to overlook broader structural shifts and related risks, including

herding behaviour and concentration risks. Within this context, the 2022 GIMAR provided a comprehensive overview of both macro- and microprudential risks associated with these structural shifts and recommended a roadmap for subsequent work in 2023.

Building on these foundations, the second theme of the 2023 GIMAR focuses on two key trends within the life insurance sector: (1) cross-border asset-intensive reinsurance and (2) the increased allocation of capital to more illiquid investments, including private debt, private asset-backed securities/collateralised loan obligations and alternative asset classes, which reflect the sector's search for enhanced yield. While these two trends are not causally linked, they are interdependent. The primary profit driver for reinsurers offering asset-intensive reinsurance agreements is their ability to generate additional yield or "spread" on assets supporting ceded liabilities. However, this search often results in a greater allocation of capital to illiquid, complex and/or hard-to-value assets.

This section describes these trends in more detail, and outlines the supervisory risk assessment, potential threats to financial stability and next steps for the GME.

**The IAIS review
of structural shifts in
the life insurance sector
included a focus on
cross-border asset-
intensive reinsurance
and the increased
allocation of capital to
more illiquid investments.**

3.2.1 Allocation of capital to alternative assets

The persistently low interest rate environment in prior years led many life insurers to seek higher-yielding investments, notably to back longer-term liabilities (such as annuities, structured settlements, and permanent life insurance). As a result, insurers have allocated a greater portion of their investments to assets that are more illiquid, are more difficult to value and have less transparent structures. This change in investment strategy has enabled insurers to capture illiquidity and complexity premiums. These types of investments have been broadly referred to as “alternative assets” or “alternative investments”, although there is no consensus on a globally recognised definition. They serve as an alternative to traditional investments and often have complex and/or opaque structures and a more limited investor base, which can result in lower liquidity.

Principle-based criteria

Given the lack of a common definition, this report introduces fundamental principles for identifying alternative assets that revolve around certain risk-based characteristics, for purposes of the GME. As a result of these characteristics, alternative assets require additional supervisory considerations. The identified characteristics are:

- Illiquidity (eg the lack of a liquid secondary market under normal conditions);
- Valuation uncertainty (eg marked to model or marked with stale or indicative prices); and
- Complexity and/or opacity (eg underlying assets not listed, rated or well-understood; assets with embedded options or guarantees; and assets that could involve conflicts of interest at origination (eg originated by an affiliated entity) or whose structure may be too complex to “look through”).

Assets may display these principles to varying degrees. Further considerations may include volatility, embedded leverage and the interplay between assets and the liabilities backing those assets.

Jurisdictional differences in asset classification

Supervisors note that there are differences in local definitions of “alternative assets”. Some jurisdictions have no specific, standardised definition of alternative assets. Instead, they use terms like “other assets”, “non-traditional investments” or “high-risk assets” to describe assets that are not considered to be traditional investments for local insurers. Some asset classes, which could be considered alternative assets based on the proposed principles, are already subject to closer supervisory scrutiny.

In the 2023 GME, supervisors listed asset classes that are considered “non-traditional” in their jurisdictions. Although not all supervisors provided examples, responses revealed regional differences in how assets are classified. For example, some jurisdictions consider equity funds and real estate as non-traditional, while others consider these to be traditional investments. Furthermore, while certain jurisdictions may lack a precise alternative asset definition, assets such as high-yield debt, equities and emerging market debt are categorised as high-risk assets.

Asset classes attracting supervisory interest or being labelled as non-traditional varied across jurisdictions, potentially due to distinct market characteristics. For instance, in the US, mortgage-backed securities are not classified as alternative assets and have a well-established and liquid market. In contrast, in Europe, structured securities are categorised as alternative assets and face a less liquid market.

Further supervisory input has highlighted that some alternative assets are less straightforward to classify. Such assets could include bundled assets, private credit-backed structured assets, assets originated by the insurer or related parties, leveraged investments (or those exposed to leverage), non-investment grade tranches, assets with irregular cash flows and assets containing bespoke elements.

Table 1 roughly maps the proposed principles to asset classes, based on responses categorising them as “alternative”, “non-traditional”, “other” or “high risk”. Darker shading indicates higher aggregate exposure to risk-based characteristics within each asset class. For example, a PE investment may simultaneously be illiquid, have valuation uncertainty and a complex structure. It is important to note that differences are likely to exist within each asset class, as different assets may exhibit these risk-based characteristics to varying degrees.

Jurisdictional differences in capital requirements and asset allocation

For jurisdictions with risk-based solvency regimes, differences in capital requirements may play a role in shaping the allocation of capital to non-traditional or alternative assets. Insurers trying to optimise return on regulatory capital are likely to choose different asset classes depending on the amount of regulatory capital the insurer is required to hold in specific jurisdictions.

There are, however, large indicative differences in capital requirements across asset classes and jurisdictions.¹⁰ For instance, securitisations, including collateralised loan obligations (CLOs), currently have lower capital requirements in the US than in the European Union (EU) (0.8% for an A-rated CLO under the US risk-based capital requirement, compared to 23% for a five-year duration A-rated securitisation in the EU¹¹ and 83% for a five-year duration A-rated CLO under

TABLE 1: INDICATIVE MAPPING OF NON-TRADITIONAL ASSETS TO THE PROPOSED PRINCIPLES

Meet most the principles	Meet some of the principles	Meet only a few of the principles
Hybrid investment products	Structured credit/bonds	High yield debt
Unlisted property trusts	Alternative investments funds (eg hedging, event driven, fixed-income directional and relative value, managed futures, commodities)	Emerging market debt
Private equity		Level 3 assets
Land		Equities
Infrastructure		
Private credit		
Venture capital	Hedge funds	
Senior structured funds	Unlisted property/real estate	
Private funds		

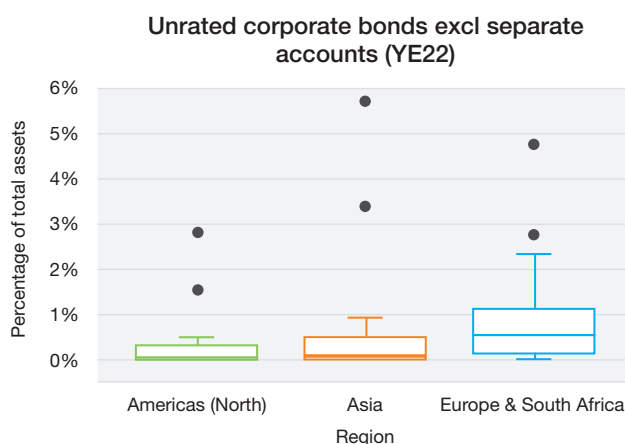
¹⁰ For example, it is important to note that there are fundamental differences between risk-based capital in the US and Solvency II in Europe (eg based on book value vs market values, valuation of liabilities and measurement objectives) and different jurisdictions can interpret similar regulations differently.

¹¹ For tranches that are not the most senior in securitisations.

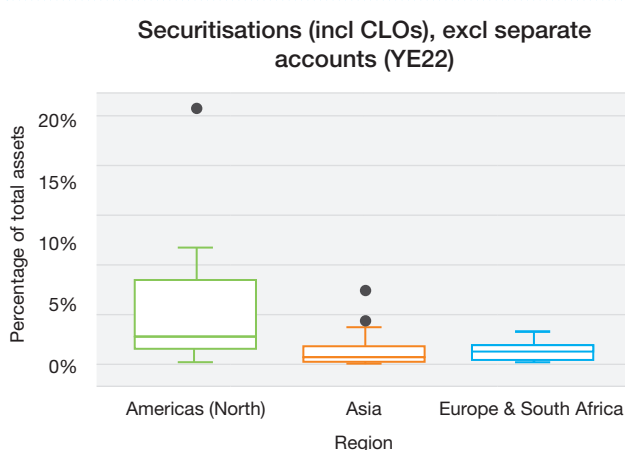
the Solvency II standard formula). Conversely, unrated corporate debt has lower capital requirements in the EU (15% for a five-year duration asset under the Solvency II standard formula compared to 30% under the US risk-based capital requirement).

In the case of CLOs, where capital requirements in the US are lower than in the EU, US insurers in the IIM Insurer Pool allocate an average of 5.7% of their total assets to this asset class, while their EU counterparts allocate an average of 1.3% of their total assets. Conversely, for unrated corporate debt, where capital requirements under the Solvency II standard formula in the EU are lower than those in the US, the average capital allocation to this asset class is 0.9% of total assets for EU insurers in the Insurer Pool while it is 0.4% for US insurers. The data also points to a difference in average capital allocation to loans and mortgages in the IIM data (US: 8.6%, EU: 5.2%, Asia: 7.3%). Data gathered via the SWM shows a similar pattern. In some European and Asian jurisdictions, up to 20% of total assets can be loans and mortgages (including commercial and residential) whereas they remain below 10% in the US. On the other hand, securitisations (including CLOs) make up to 14% of total assets in some jurisdictions in the Americas region, while remaining below 2% in European jurisdictions and below 6% in jurisdictions in Asia and Oceania.

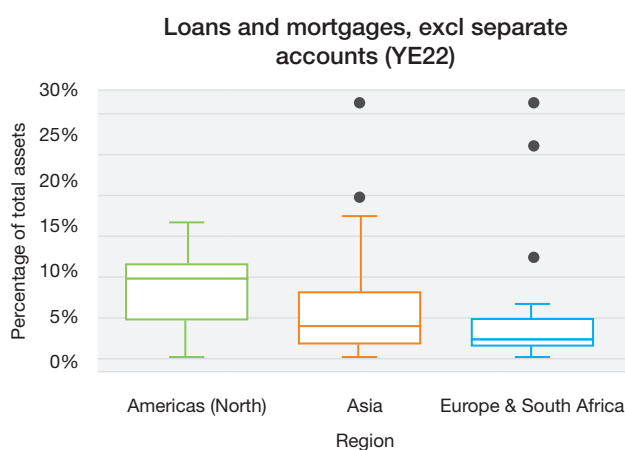
Differences in capital requirements may play a role in shaping the allocation of capital to non-traditional or alternative assets.

FIGURE 18

Source: IAIS IIM 2023

FIGURE 19

Source: IAIS IIM 2023

FIGURE 20

Source: IAIS IIM 2023

Trends in alternative asset allocation

The allocation of capital to alternative assets has been driven by various factors, further outlined below. As previously noted, the strongest driver is likely to have been the search for yield during a sustained period of low interest rates and the longer duration of some alternative assets.¹²

Several supervisors note that the regulatory capital treatment of certain assets has contributed to asset allocation shifts, referring to the return on regulatory capital (as shown in the section above). This has also been noted by analysts who have argued that alternative assets can provide high returns on required regulatory capital while also enabling insurers to match their longer-dated liabilities.¹³ Furthermore, some supervisors have highlighted the diversification benefits associated with alternative assets.

Another driver of this structural shift is likely to be an increase in non-bank intermediation, potentially driven by increased capital requirements for banks.¹⁴ Supervisors also noted that PE and credit firms have stepped in to fill the funding gap left by banks as they scaled back these balance sheet-intensive activities.

Supervisors have also noted connections with asset-intensive reinsurance (see next sub-section), where the assets backing the transferred insurance liabilities are likely to have a higher allocation to alternative assets compared to more traditional insurance asset allocations. Finally, insurers affiliated with PE and/or private debt managers also have unique sourcing capabilities and may increase their allocations accordingly.

Although definitions of alternative assets vary, the trend of increasing allocation to alternative assets is more widespread in developed markets across Europe, North America and Asia. Nevertheless, this trend is not homogenous within these regions. For instance, supervisors reported that less than half of European jurisdictions have experienced an increase in the allocation of capital to alternative assets. Furthermore, some supervisors reported that the overall trend within their jurisdictions has been driven by a small subset of firms, leading to variations in individual firm holdings.

Although difficult to quantify with 2023 GME data, there is a slight upward trend in the allocation of capital to alternative assets in the IIM dataset as proxied by level 3 assets (assets held at fair value or marked to model). Notably, this measure excludes all assets of similar complexity that are held at cost. Specifically, the IIM Insurer Pool invested on average 4.5% of their total assets in level 3 assets in 2022 compared to 3.4% in 2020 (See Figure 21). This increase could also be driven by a decline in the valuation of level 1 and level 2 assets due to increases in interest rates. Available data also indicates a small increase (see Figure 22) in holdings of real estate, securitisations and loans and mortgages (including assets held both at cost and at fair value).

To put this trend into perspective, another global survey estimated that alternative assets represented 21% of global assets under management and 50% of global revenue in 2022.¹⁵ The survey further expects the compound annual growth rate for these assets to be about 7% over the next five years.

¹² See also BIS. (2021). [The rise of private markets](#). BIS Quarterly Review, December 2021.

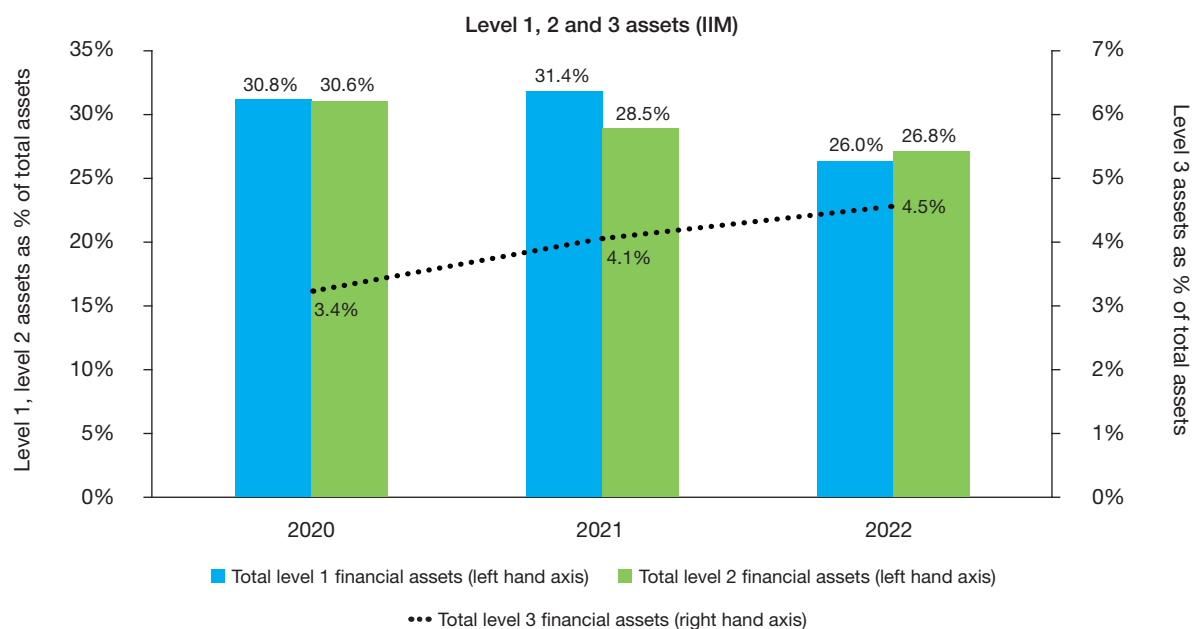
¹³ Love Actuary: JP Morgan. (November 2022). European Equity Research; Milliman. (August 2023.) [Profiles of alternative assets in the life insurance landscape](#).

¹⁴ OECD. (2020): [Structural developments in global financial intermediation: The rise of debt and non-bank credit intermediation](#).

¹⁵ Boston Consulting Group Global Asset Management report. (2023). [The tide has turned](#). Alternative assets are here defined as: hedge funds, PE, real estate, infrastructure, commodities, private debt and liquid alternative mutual funds (such as absolute return, long and short, market neutral and trading oriented).

FIGURE 21

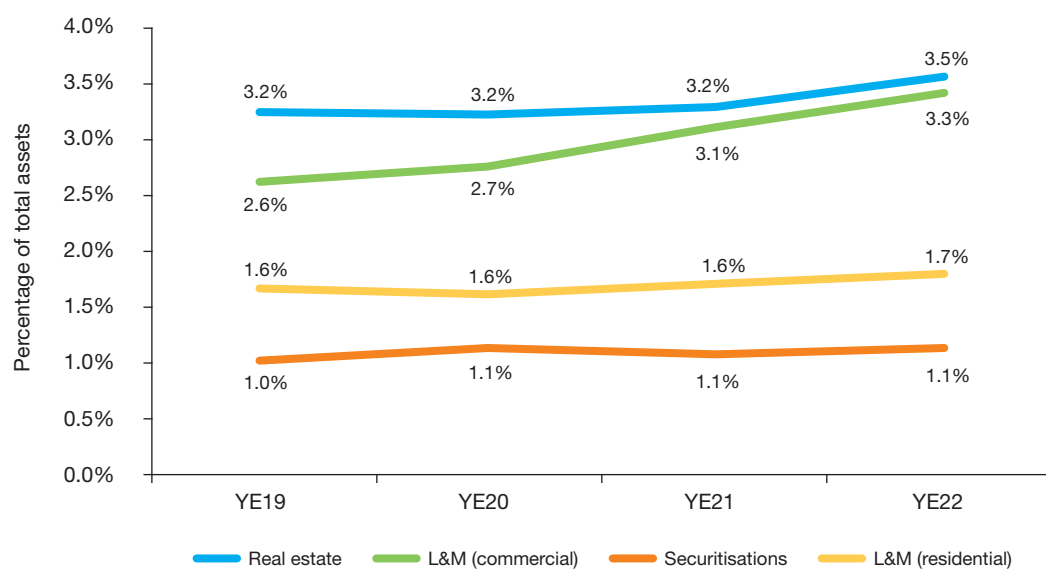
Average percentage of total assets invested in level 3 and selected assets (YE20–YE22)



Source: IAIS IIM 2023

FIGURE 22

Capital allocation to asset classes (YE19–YE22)



Source: IAIS SWM 2023

3.2.1.1 Supervisory risk assessment

The overall risk of an asset depends on the extent to which it exhibits one or more risk characteristics, some of which are outlined below.

Illiquidity is an important supervisory area of attention because it can hamper the effectiveness of risk management tools when assets cannot be liquidated to meet liabilities. Compared to traditional investments, alternative assets tend to be more illiquid and so they may exhibit an enhanced sensitivity to downturns in the credit cycle or may diminish insurers' ability to meet unexpected cash demands. Some jurisdictions have specifically highlighted the illiquidity considerations of alternative assets. However, it is also worth noting that the long-term nature of certain alternative assets offers a good duration match for insurers with long-term liabilities, such as annuity liability portfolios. Furthermore, any liquidity-related risks need to be assessed in conjunction with the liabilities backing these assets and the liquidity risk management of the insurer.

The valuation of alternative assets poses challenges, with guidelines provided by organisations like the International Private Equity and Venture Capital Valuation Board and private firms offering valuation services. Valuations can experience lags (from one quarter up to a year or more) and may include judgment and bias risk. Even so, insurers are unlikely to tolerate excessive valuation time lags or unrealistic valuations within their fund investments. During periods of economic downturns, the stickiness of valuations can also be a stabilising factor from an investor's perspective. However, this may translate in re-pricing in the long run, notably in an economic environment characterised by low growth and tighter monetary conditions.

Credit ratings are another important consideration. Some supervisors note that credit ratings can impact capital requirements and that external credit ratings are often unavailable. When available, one supervisor noted that only certain ratings agencies were recognised in their jurisdiction and further feedback suggested that ratings for the same alternative asset could differ between rating agencies, potentially indicating a possibility of "rating shopping". In the absence of ratings, one supervisor noted that the governance of internal ratings, including processes for downgrading, are important considerations for investments in alternative assets.

Complex assets present challenges not only for insurers but also for supervisors. Academic literature has shown that complex assets can potentially yield higher risk-adjusted returns than traditional assets when investors possess the necessary investment expertise. Conversely, research has shown that investors lacking expertise in complex assets may experience lower risk-adjusted returns and increased portfolio volatility. This interplay between complexity and expertise has far-reaching implications, affecting not only investors (eg suitability) but also supervisors. As financial markets continue to evolve, the increasing complexity of new assets demands greater investment expertise among supervisors to effectively assess the prudential implications of insurers' allocation of capital to these instruments.¹⁶

There may also be additional risk concentrations where the lending arms of some alternative asset managers who operate PE firms provide a large proportion of their lending to PE-sponsored companies.¹⁷ Where these PE firms also partially own insurers, additional risk concentrations may occur.

¹⁶ Eisfeldt, Andrea L., Hanno Lustig, and Lei Zhang. (2023). [Complex asset markets](#). *The Journal of Finance* 78(5): 2519–2562.

¹⁷ Moody's. (2022). *Cross sectoral analysis*, May.

Finally, a shifting macroeconomic environment may heighten risks for holders of alternative assets, particularly those with sensitivity to interest rates, such as private debt. Rising interest rates will increase financing costs as existing debt matures and is rolled over. This challenge is expected to be more pronounced in the coming years, as the levels of maturing debt increase steeply in the US and Europe from 2025.¹⁸ While corporations can potentially cushion the impact

of refinancing debt at higher rates with larger-than-average cash reserves, the growth of unprofitable firms could limit the corporate sector's ability to absorb heightened financing costs.¹⁹ This is likely to have a more significant impact on leveraged buy-out firms and high-yield borrowers. With approximately \$2.5 trillion of high-yield bonds and leveraged loans coming due between 2025 and 2028 in Europe and the US, the pace of restructuring is likely to accelerate.²⁰

Overview of concerns and benefits associated with alternative assets

Concerns

- **Discretionary valuation of assets:** Valuation methodologies may not accurately represent fundamentals and current macroeconomic conditions. Valuations could exhibit significant time lags, a high degree of subjectivity and susceptibility to model risk.
- **Liquidity risks and their impact on valuation:** Alternative assets may lack well-established secondary markets, thereby diminishing available liquidity sources. This lack of liquidity could become more pronounced during periods of market stress.
- **Hidden leverage:** Hidden sources of leverage (eg leverage in a fund or structured product) may pose greater risks than currently accounted for by risk and capital management.
- **Credit risk associated with alternative assets:** This source of risk is not as well understood as in publicly traded assets, which are subject to market dynamics and analysis. Therefore, it is challenging to predict how these assets might perform in the face of macroeconomic or credit downturns.
- **Transactions with affiliated parties:** This could potentially exacerbate the risks mentioned above by compromising independence and weakening corporate governance through conflicts of interest and insufficient separation between affiliated entities.

Benefits

- **Asset-liability matching:** Due to their long-term nature, certain alternative assets can effectively align with long-term insurance liabilities, potentially mitigating liquidity and valuation issues.
- **Pricing:** When the additional yield earned from alternative assets appropriately compensates for the additional risk, insurers can offer more competitively priced insurance products, reducing the life insurance/pensions protection gap and potentially improving the insurers' profitability.
- **Real economy:** The long-term nature of insurance liabilities make insurers well suited to act as long-term investors. As a result, they could be suitable investors to provide long-term funding for the real economy.
- **Diversification:** Some alternative assets provide access to capital markets that may otherwise not be available to insurers. This could, in turn, provide diversification benefits to insurers if these assets exhibit low or negative correlations with existing assets.

¹⁸ Bloomberg. (2023). [Watch Out, the Debt Maturity Wall Is Near](#). September.

¹⁹ Goldman Sachs Research. (2023). [The Corporate Debt Maturity Wall: Implications for Capex and Employment](#). August.

²⁰ Bloomberg. (2023). [Watch Out, the Debt Maturity Wall Is Near](#). September.

3.2.1.2 Potential financial stability implications

While the SWM responses from supervisors did not point to major financial stability concerns with insurers' increased allocation of capital to alternative assets at present, several financial stability considerations were highlighted. Economic downturns can exert substantial pressure on returns, primarily due to lower credit quality and heightened leverage. Although insurers often engage in a "buy and hold" asset management strategy, the need to liquidate alternative assets in high-stress scenarios, marked by low or non-existent liquidity, could pose challenges. The opacity of certain alternative assets, such as PE funds and structured products, requires effective risk management. Furthermore, any significant increases in exposure to higher-yielding and illiquid alternative assets in the coming years may generate imbalances in supply and demand, disconnecting prices from fundamentals. Heightened exposure to alternative assets may also exacerbate market downturns through fire sales and liquidity spirals, which may introduce new systemic risk transmission channels and intensify volatility within the financial sector. Additionally, industry consolidation and the concentration of investment positions may result in systemic risks that could have financial stability implications. These considerations collectively underscore the need for continued monitoring and proactive measures to mitigate potential risks arising from concentrations of alternative assets in insurers' portfolios.

Insurers often adopt a "buy and hold" strategy, but liquidating alternative assets during stress may present challenges.

Supervisory assessment of potential financial stability implications

The GME established that some jurisdictions often consider broader asset allocations, including alternative assets, in financial stability assessments. In some jurisdictions, particular asset classes such as illiquid or "fallen angel" corporate bonds, mortgage loans and real estate merit closer examination and an increased awareness in terms of financial stability. However, many jurisdictions have reported that alternative assets are not currently included in their financial stability assessments, primarily because of the minimal allocations to these assets in their markets. It is acknowledged that this may change should allocations to alternative assets increase in the future.

3.2.1.3 Supervisory measures

While most jurisdictions do not necessarily have specific rules or guidelines for alternative assets, many have overarching disclosure and management requirements for illiquidity, duration management and other considerations.

- **Asset class vs principles:** Most respondents took a principles-based approach to assessing any potential risk related to alternative assets. However, several respondents also noted that specific asset classes could be subject to further scrutiny.
- **Regulatory framework:** Many jurisdictions use an investment risk management or governance framework in their regulatory framework, with several jurisdictions reported to require insurers to follow a prudent person principle or a similar approach. Many utilise risk-based capital requirements, including the application of specific risk factors depending on the type of assets or vehicles, to incentivise insurers to invest prudently and in less risky assets.

- **Measures and tools to support the supervisors in assessing investment risk:** In general, jurisdictions rely on regular reporting conducted at various intervals (monthly, quarterly and annually) as the foundation for their ongoing analyses and monitoring of investment risk. These reports encompass both quantitative data, such as detailed asset information provided through quantitative reporting templates, and qualitative reports, including ORSA reviews.
- **Risk indicators:** A common practice across jurisdictions involves the use of specific risk indicators to evaluate the quality of the investment portfolios. These indicators cover various aspects, including profitability, liquidity and concentration, both at individual insurer and sector levels. Furthermore, the outcomes of these analyses aimed at assessing investment risk often lead to supervisory actions with respect to specific identified insurers or specific asset types. Additionally, several jurisdictions emphasise the use of stress tests and thematic reviews as useful instruments for assessing investment risk.
- **Monitoring of alternative assets:** Typically, the monitoring of alternative assets forms a part of supervisors' general insurance monitoring. In cases where insurers have higher allocations to non-traditional or alternative assets, additional supervisory measures have been implemented to enhance oversight and risk management. In some jurisdictions, there are reported instances of specific asset review frameworks or considerations of capital add-ons. These measures are designed to ensure insurers' effective management of the risk associated with alternative asset allocations, particularly when certain material investments are not adequately captured within existing supervisory practises. Conversely, in some jurisdictions, the allocation of alternative assets is so low in insurers' portfolios that no additional measures are required.

- **Further supervisory measures:** The majority of jurisdictions are not actively considering any additional measures as they do not deem it necessary at present. However, in a few jurisdictions, there is an ongoing consideration of various additional measures aimed at enhancing risk management and oversight of alternative assets. These measures range from increasing scrutiny of ownership structures and gaining a deeper understanding of asset composition (particularly in funds), to assessing affiliated party investments and privately structured securities. Additionally, some jurisdictions are exploring the possibility of conducting more detailed analyses and, if warranted, implementing capital add-ons to address specific risks associated with alternative assets.

Although the insurance sector currently appears to have a limited exposure to alternative assets (and there are recognised benefits of current allocations), these overall considerations collectively underscore the importance of continued monitoring and proactive measures to mitigate potential risks arising from the growing exposure to alternative assets in insurers' investment portfolios.

Supervisors note the importance of continued monitoring and proactive measures to mitigate potential risks arising from the growing exposure to alternative assets in insurers' investment portfolios.

3.2.1.4 Next steps

The IAIS' commitment to understanding alternative assets and their evolving landscape is reflected in its ongoing efforts, outlined below, to:

- Continue to monitor alternative assets in the GME, guided by risk-based characteristics (liquidity, valuation and complexity/transparency) and mapping of asset classes to these risks.
- Continue to develop a principles-based classification of alternative assets. This includes further exploration of how these risk-based characteristics evolve under different macroeconomic and market conditions and their potential macroprudential implications, as well as exploring the roles of credit rating agencies and the impact of leverage.
- Share best practices among supervisors, including supervisory measures and the development of guidance for valuation, liquidity and transparency risks.

Two factors are noted as shaping the increasing use of asset-intensive reinsurance in the life insurance sector: the previous period of persistently low interest rates in many regions and evolving regulatory frameworks.

3.2.2 Cross-border asset-intensive reinsurance

Two factors are noted as shaping the increasing use of asset-intensive reinsurance in the life insurance sector: the previous period of persistently low interest rates in many regions and evolving regulatory frameworks.²¹ The low interest rate environment has increased insurers' cost of holding life insurance liabilities, exacerbated pricing issues in legacy liabilities and dampened growth for insurers in developed countries. Moreover, products with minimum guarantees have become more capital-intensive and a drag on long-term profitability. Furthermore, the traditional composition of assets held to back these liabilities are exposed to market and credit risks that can make earnings and capital volatile. Lastly, differences in the pace of evolution of prudential frameworks and varied supervisory approaches have given rise to important jurisdictional differences.²²

Asset-intensive reinsurance has emerged as a potential solution to optimise and consolidate risk and capital management while mitigating fluctuations in earnings and capital requirements. By transferring biometric and investment risks to a reinsurer, insurers gain the flexibility to explore diverse strategies and expand into potentially more profitable business lines.^{23,24,25}

This type of reinsurance agreement, which has existed for decades, has been on the rise in recent years, although concentrated in a few jurisdictions on both the cedent and reinsurer side. In the US, the amount of life and annuity reserves ceded increased, from over \$755 billion in 2017 to approximately \$1.2 trillion in 2022. About 40% of the total reserves ceded were assumed by reinsurers located outside the US.

²¹ Kartasheva, Anastasia. (2023). [Funded reinsurance as a divestment tool for life insurance books with financial guarantees](#). University of St. Gallen Institute of Insurance Economics, February.

²² Kojen, Ralph SJ, and Motohiro Yogo. (2023). [Financial economics of insurance](#). Princeton University Press.

²³ Caslin, John and Brian Cunningham (2021). [Annuity Reinsurance](#). The Society of Actuaries in Ireland, December.

²⁴ Comerford, Eamon, Paul Fulcher, Rik van Beers, and Rosemary Maher (2020). [Reinsurance as a capital management tool for life insurers](#). Milliman, July.

²⁵ Zieroff, Joseph, Nick Sontheimer, and Ryan Stevens. (2021). [Asset-Intensive Buyers' Guide](#). RGA, January.

Although the market size in other jurisdictions is smaller than that of the US, there has been a noticeable uptick in transactions and a growing level of interest. For instance, insurers within the EU have been actively transferring life businesses, with transactions involving a total of €70 billion in transferred technical provisions from 2017 to 2021. In the UK, transactions in the bulk purchase annuity market in 2023 are poised to exceed the £43 billion in transactions registered in 2019. Bulk purchase annuity transactions tend to also be supported by cross-border (re)insurance agreements.²⁶ Additionally, there is a growing appetite among asset-intensive reinsurers to enter mature markets in Asia. Notably, since 2021, there have been \$9 billion worth of deals reported in Japan and \$6 billion in China, Hong Kong. Furthermore, upcoming regulatory capital reforms and accounting changes in Asia are likely to drive increased demand for this type of reinsurance agreement.²⁷

Asset-intensive reinsurance is an agreement that transfers the investment and biometric risk associated with a block of insurance liabilities from a ceding primary insurer to another insurer or reinsurer.

The sections below briefly explain what asset-intensive reinsurance is, the economic rationale for all parties, the risk assessment of supervisors, main supervisory concerns, supervisory tools to address some of these issues and next steps.

Understanding asset-intensive reinsurance

Asset-intensive reinsurance²⁸ is an agreement that transfers the investment and biometric risk associated with a block of insurance liabilities from a ceding primary insurer to another insurer or reinsurer. This form of reinsurance targets long-term life liabilities for which investment risk is the key pricing factor, more so than biometric, lapse and expense risks. These insurance liabilities include deferred annuities, universal life policies and bulk purchase annuity or pension risk transfers.

The distinctiveness of this agreement lies in its substantial investment risk component, which differs significantly from conventional insurance risks, as for example underwritten in simple yearly renewable term arrangements. The increased adoption of these agreements means that investment risk now constitutes a more significant portion of the total risk assumed by some reinsurers.

Generally in these agreements, all risks, including investment risks, are assumed by the reinsurer (most commonly on a quota share basis).²⁹ To mitigate counterparty risk for the ceding primary insurer, and in some cases to comply with regulatory requirements, these transactions are generally backed by collateral. This collateralisation minimises counterparty risk and allows the ceding insurer to obtain reinsurance credit. Since the reinsurer has assumed the investment risk, the reinsurer often manages the assets. There is also a

²⁶ See Reinsurance News. (2023). [UK bulk annuity market to experience a record-breaking 2023: Aon](#). 3 October.

²⁷ See Carpenter, Guy. (2023). [Dedicated reinsurance capital for Asia life business](#). May.

²⁸ Also known as funded reinsurance, asset-backed reinsurance and quota share reinsurance.

²⁹ It is important to note that some specific risks can be carved out, such as inflation risk.

separate investment agreement agreed by both parties that delineates investment guidelines and collateral terms. These guidelines define the eligible asset classes and limits available to the reinsurer, and they prescribe the manner in which these assets are to be managed.

Due to the asset-intensive nature of these contracts, four key determinants come into play: the collateral agreement, investment agreement, collateral valuation and termination events. The collateral agreement defines critical aspects such as collateralisation levels, required credit enhancements, haircuts, the nature of the custody account and margining frequency. The investment agreement outlines the investment opportunity set, currency risk management, liquidity and credit rating requirements, sector limits and duration or cash flow matching specifications. Collateral valuation determines the methods for assessing collateral and adjusting for expected credit loss. Finally, termination events specify the circumstances under which the contract can be terminated, whether through bilateral agreement or unilateral action.³⁰

As part of the GME, supervisors reviewed the prevalence of these agreements within their respective jurisdictions. Results suggest a connection between the adoption of asset-intensive reinsurance agreements and the size, complexity and depth of the financial markets within those jurisdictions. Additionally, supervisors reported that these transactions are very complex, demanding specialised expertise, resources and time from all involved parties. Hence, these agreements are most economically viable when conducted at a significant scale.

Pricing, reserving and solvency

The reinsurer prices this business based on the reserve valuation of the ceded liabilities and the associated capital requirements, among other technical and commercial factors. Another pricing factor for the reinsurer may be its ability to obtain capital at a lower cost than the ceding insurer. Importantly, the discount rate curve of the liabilities is determined, in some instances, by the expected return on the assets that back them, subject to any prudential guardrails. Consequently, the range of available assets and the terms of collateral can have a direct impact on this discount rate curve and hence on the pricing. For example, an increased discount rate results in a lower reserve valuation, potentially reducing capital requirements and, ultimately, leading to a more favourable reinsurance premium for the insurer. At the same time, looser collateral terms and an expanded investment opportunity set could expose the portfolio to increased risks.

For the cedent in any reinsurance transaction, the advantages are potentially lower reserves and reduced capital requirements due to the risk transfer. This may be somewhat offset by an increase in the capital requirements relating to counterparty risk.

For the reinsurer, the key profit driver lies in their ability to manage the asset and liability sides together and, if prudently managed, potentially generate higher spreads without incremental credit risk. Reinsurers aim to achieve superior investment results by leveraging their internal asset management capabilities or forging strategic alliances with asset managers who have asset origination expertise.

³⁰ Many of these arrangements are covered under modified coinsurance contracts in which the assets are held on the books of the ceding insurer, in the jurisdiction of the ceding insurer, and denominated in the currency of the ceding insurer. Such arrangements tend to be more transparent and reduce the credit risk associated with other structures.

3.2.2.1 Supervisory risk assessment

As part of the GME, supervisors shared their risk assessment regarding the use of these agreements in their jurisdictions:

- Asset-intensive reinsurance is utilised as a risk and capital management tool in the life sector, with varying degrees of adoption across different jurisdictions. This is a widely used tool in only a handful of jurisdictions. Some jurisdictions have reported limited transaction volumes but increasing interest, while others have noted no activity at all.
- The motivation for cross-border asset-intensive reinsurance transactions ranges from risk management (eg risk-sharing and consolidating blocks of business) and financial management (eg raising capital) to potentially leveraging regulatory differences across jurisdictions (eg valuation, reserving and capital requirements). Consequently, each transaction must be assessed on its individual merits.
- The economic rationale for recent reinsurance activity may differ from that of more traditional reinsurance activities. The primary objective may be managing investment risk, which can expose reinsurers to significant vulnerabilities tied to undiversifiable (systemic) risks, noting that primary insurers themselves may also be subject to this risk.³¹ The asset-intensive nature of the reinsurance requires a focused asset manager; this asset manager is often also involved in the ownership structure of the (re) insurer as an affiliate, which adds another layer of complexity and economic incentives that supervisors need to understand.³²
- Some respondents stressed the need for supervisors to familiarise themselves with foreign regulatory frameworks where asset-intensive reinsurers operate in order to evaluate such transactions. Most of these jurisdictions have supervisory recognition mechanisms among themselves. Some members observed that effective communication and collaboration between supervisors in these jurisdictions have been paramount, but could be further enhanced. Furthermore, supervisors have pointed out that the specific language used to describe the reinsurance contract is less critical than understanding key aspects, such as asset retention, valuation standards, investment behaviour,³³ supervisory authority and jurisdictional differences in cross-border transactions.
- Supervisors also indicated that these transactions can place a substantial burden on supervisory resources. Some supervisors noted that utilising supervisory tools, such as transaction templates to assess total asset requirements before and after a cession, has proved useful.
- For cross-border transactions, supervisors stressed the importance of robust communication between supervisors in the cedent and reinsurer jurisdictions, of both a formal and informal nature. This includes activities such as joint risk assessments through supervisory colleges for affiliated transactions, written regulator-to-regulator inquiries and bilateral meetings, all of which are essential for building confidence and ensuring effective oversight.

³¹ The previous section on allocation to alternative assets covers some of these exposures in more depth.

³² According to S&P, as at the end of 2022, the reserve credits and modified coinsurance reserves associated with PE-linked reinsurance accounted for 35% of the total reserve credits and modified coinsurance reserves in the United States. For more information, see S&P Global Market Intelligence. (2023). [Affiliated, private equity-backed reinsurers fuel life and annuity cession surge](#). 15 May.

³³ If the insurer invests in the reinsurer and the investment is held under a trust agreement in a coinsurance arrangement with assets withheld.

Supervisory challenges

Supervisory challenges surrounding asset-intensive reinsurance agreements are multifaceted and warrant comprehensive attention. These challenges span various dimensions, as reported through the GME:

1. Some knowledge gaps about prudential frameworks in foreign jurisdictions may hinder effective supervision. One significant challenge lies in the supervisory burden placed on resource-constrained supervisors, which can result in knowledge gaps regarding these structures and the corresponding prudential frameworks in jurisdictions where reinsurers offering such agreements are located. This knowledge gap may pose hurdles to effective oversight and may require proactive efforts to bridge the informational divides. In this respect, it is worth noting that supervisory recognition mechanisms may help to mitigate some of these risks.
2. Obstacles to the exchange of information among supervisors hinder the development of a holistic understanding of the risks associated with these transactions. Collaborative efforts and enhanced information-sharing mechanisms are imperative to address this challenge. Jurisdictions without memoranda of understanding or those not supporting group-wide supervisory practices pose challenges for cedent and reinsurer jurisdictions. Effective coordination between jurisdictions is crucial in addressing this issue.
3. In a corporate structure where the relevant asset manager and a reinsurer are part of the same group, the profitability goals of the asset manager may affect the risk appetite of the reinsurer. This interplay can lead the group to instruct the reinsurer to take on additional risk, ultimately increasing premium income. This additional income can then be funnelled to the asset manager, enhancing fee generation through asset origination. Affiliated transactions, where a primary insurer is also part of the corporate structure, bring additional challenges tied to potential conflicts of interest. Supervisors must navigate these different incentives to ensure the integrity of the supervisory framework.
4. Concentration risks have become a significant concern for some members, primarily because a limited number of reinsurers and jurisdictions account for a very large portion of the transaction volume. However, some supervisors highlight that concentration risks are not exclusive to this type of agreement and not uncommon in reinsurance business.
5. The increasing complexity of these agreements, which may involve elements like retrocession and special purpose vehicles, is also prompting significant attention from supervisors.
6. With respect to reserving, the question arises as to the methods and the frequency with which insurers as well as supervisors must review the adequacy of compliance with the accounting standards.
7. While it was noted that recapture risk³⁴ in certain forms of asset-intensive reinsurance is limited, recaptures may introduce their own set of supervisory challenges, due to their lack of precedent and challenges related to potentially illiquid or complex assets. Handling recaptures may involve costly portfolio rebalancing and specialised skills that insurers may not possess. Additionally, similar to other reinsurance contracts, there may be an underestimation of legal risk.

³⁴ A recapture provision in a reinsurance contract allows the cedent to take back some or all of the risk(s) transferred to the reinsurer.

8. For transactions in which assets are retained by the cedent, distinguishing between the assets supporting ceded liabilities and those supporting retained liabilities in financial statements can be challenging. This issue is compounded by the fact that such information is not typically a reporting requirement in most jurisdictions.

3.2.2.2 Potential financial stability implications

Some of the risks outlined above with respect to asset-intensive reinsurance may have implications for financial stability that should be considered.

Most of the nominal transaction volume of asset-intensive reinsurance is originated by a small number of reinsurers located in a handful of jurisdictions, although this is not uncommon in the reinsurance business. Cedents of such liabilities are also concentrated in a few jurisdictions. As the market grows, the importance of these jurisdictions and reinsurers in the ecosystem will continue to grow. The growth and evolution of this market could make these reinsurers and jurisdictions more systemically important due to their interconnectedness and size.

The capital relief provided by these agreements could drive herd behaviour, with many insurers seeking to adopt these reinsurance strategies to optimise capital management or to minimise the competitive advantage that this affords competitors. This herd behaviour could, in turn, increase concentration risk on the counterparty side. It could also create concentrated aggregate exposures if several reinsurers pursue similar investment strategies.

As mentioned above, in corporate structures where both the relevant asset manager and a reinsurer belong to the same group, fee income generation at the asset manager level could influence the reinsurer's risk appetite. In the context of financial stability, these incentives have the potential to drive rapid market

growth and foster deeper connections with the insurance sector and broader financial markets. The size and interconnectedness of this market will determine how unforeseen losses impact critical market participants, worsen market sentiment, increase risk premiums and, consequently, impact more widely held assets.

Recapturing could impose high portfolio rebalancing costs if assets are illiquid or if the insurer lacks the in-house skills or strategic partnerships to deal with more complex assets. Theoretically, if there was a wave of recaptures, for instance due to a macroeconomic shock, this could make the asset sales associated with rebalancing even more expensive. For instance, fire sales resulting from portfolio rebalancing due to recaptures could not only jeopardise the prudential position of the cedents but also impact other market participants.

3.2.2.3 Supervisory measures

Supervisors participating in the GME reported a number of tools at their disposal to monitor and supervise these agreements. Supervisory measures relating to these agreements can be taken by the supervisors of both the cedent and the reinsurer, and effective supervisory outcomes have been achieved where the relevant supervisory bodies coordinate responses. Coordination between the international supervisory community helps to facilitate the identification, mitigation and management of associated risks.

In terms of the approval process for these transactions, most respondents reported that, while pre-approval is not required by most jurisdictions, they often retain the capacity to retrospectively review these transactions. In specific instances, where a transaction is deemed significant or exceptionally complex, insurers are required to inform their supervisory authorities and, in some cases, seek approval. Notably, there is one jurisdiction that has started to review all transactions being written by reinsurers in its jurisdiction as of January 2023.

In jurisdictions where transaction volumes or interest in these arrangements have surged, supervisory guidance has been issued, outlining expectations and setting the tone for regulatory compliance. Furthermore, supervisors reported that the level of oversight of assets supporting ceded liabilities can vary depending on the specific transaction. In principle, certain jurisdictions retain indirect asset oversight mechanisms, even when assets are transferred to the reinsurer. This oversight is achieved through the application of prudential principles or through ad hoc requests. Additionally, supervisors across many jurisdictions have the authority to establish collateral requirements for these transactions. In some jurisdictions, supervisors expect the implementation of risk mitigation measures that facilitate the potential recapture of collateral.

3.2.2.4 Next steps

Asset-intensive reinsurance transaction volumes are increasing and the adoption of these agreements is expanding into new jurisdictions. Also, these transactions tend to be cross-border in nature, which presents challenges in terms of coordination and supervisory oversight.

The IAIS will maintain its global monitoring of these trends. The IAIS will assess as input to the preparation of the GME data package for next year, which external data sources could be used to better quantify this trend, and what quantitative data points and/or qualitative assessments may be needed for next year's GME.

The IAIS will facilitate information exchange and may develop material to support the effective supervision of these transactions, which include but are not limited to information on:

- Types of transactions, features, risks and safeguards.
- Jurisdictional approaches to collateral requirements, capital requirements, reserving, and asset valuation.

The IAIS will also assess the extent to which asset-intensive reinsurance is adequately covered under Insurance Core Principle (ICP) 13 (Reinsurance and other forms of risk transfer) and, if needed, explore the development of additional supervisory guidance.

Asset-intensive reinsurance transaction volumes are increasing and the adoption of these agreements is expanding into new jurisdictions.

4. Climate-related risks in the insurance sector

Climate change remains an overarching global threat and a source of financial risk.

In September 2023, the United Nations Framework Convention on Climate Change issued a technical report on the first global stocktake on the implementation of the Paris Agreement.³⁵ The report states that “global emissions are not in line with modelled global mitigation pathways consistent with the temperature goal of the Paris Agreement, and there is a rapidly narrowing window to raise ambition and implement existing commitments in order to limit global warming to 1.5°C above pre-industrial levels”. Given the limited progress so far, the likelihood of a delayed and divergent transition has increased, which has a considerable impact on the insurance sector by increasing physical, transition, liability and reputational risks. Therefore, it is critical for insurance supervisors to strengthen their understanding of the type and magnitude of climate-related risks and exposures of the insurance sector to effectively identify, monitor and reflect climate change risks in their supervisory responsibilities. The IAIS contributes to enhancing this understanding through an annual data collection exercise and analysis, among other actions.

Climate data elements are now a regular feature of the GME, providing a global baseline of climate risk data for the insurance sector. This year, data was collected from individual insurers, as a complement to the sector-wide data provided by supervisors.

4.1 DATA COLLECTION

To support this chapter, the IAIS collected quantitative and qualitative information from jurisdictions as part of the regular GME process in the SWM 2023 data collection and, for the first time, also included data collected from insurers in the IIM 2023 Insurer Pool. The data is based on year-end 2022.³⁶ As in previous years, analysis of insurers’ investments (Section 4.2) focuses on the insurance sector’s investments in the GA. Unit-linked products or separate accounts were excluded in this analysis as the associated risks are mostly borne by policyholders. The analysis of insurers’ exposures to NatCat events (Section 4.3) relied primarily on data on expected and 1-in-200-year NatCat losses, broken down by key peril and geographical area, both gross and net of reinsurance.

³⁵ See unfccc.int/documents/631600, page 5

³⁶ With the exception of Japan, which provided data to end-March 2022.

A total of 41 jurisdictions, representing about 93% of the global insurance market, provided climate data in the SWM 2023 (compared to 34 jurisdictions covering 88% of the market as part of the 2022 data collection exercise). Thirty-eight jurisdictions also shared asset splits for equities, corporate bonds, and loans and mortgages in comparison with 29 jurisdictions in 2022. A majority of insurers participating in the IIM 2023 also provided data related to the monitoring of climate-related risks. Individual insurers provided sectoral splits for equities, corporate debt instruments and premiums, NatCat losses and qualitative assessment of the climate-related risks and the initiatives taken to address these risks.

4.2 CLIMATE-RELATED RISKS TO INSURERS' INVESTMENTS

4.2.1 Data collection, improvements and limitations

Data quality and completeness have improved further relative to the 2022 GIMAR:

- Several new jurisdictions provided data this year, which resulted in increased global coverage.
- The inclusion of data from individual insurers further improved the data quality and completeness, especially for jurisdictions and regions with limited information on sectoral splits. This led to more robust regional sectoral splits.
- A number of jurisdictions were able to improve their data collection response to better capture climate-related data or to refine their historically provided data. The enhancements were related either to improved granularity of climate-related data or to an increased scope of their jurisdictional climate submissions.

The improvement in climate-related data collection this year compared to last year is noteworthy, and the additional contributions and effort put in by relevant jurisdictions and individual insurers are very welcome. Despite the improvements in data coverage and quality, the quantitative analysis presented in this chapter should be interpreted with some caution given the best effort nature of the data collection. The climate data collection will be continually refined over time and contributing jurisdictions and insurers will likewise improve their climate risk-related reporting frameworks and the granularity of data collected.

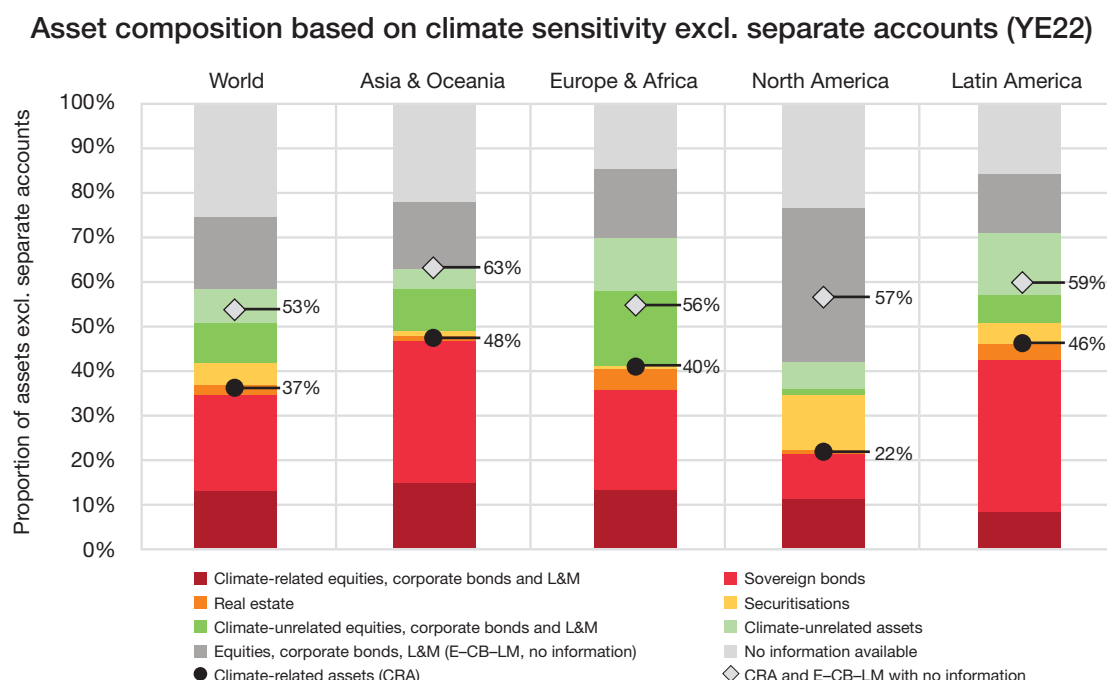
4.2.2 Investment-related exposures

One of the main objectives of this chapter is to provide an update on the proportions of different types of climate-related assets (CRA) held by the insurance sector.³⁷ The exposures presented in this section are based on the SWM 2023 and IIM 2023 data described above, complemented when necessary by other data and/or assumptions, as specified in the corresponding subsections (eg various climate-related indices used in the analysis). The analysis performed is aligned with the approach and methodologies applied in the 2022 GIMAR and 2021 Climate GIMAR to ensure consistency.

**Insurance supervisors
must strengthen their
understanding of the type and
magnitude of climate-related
risks and exposures of the
insurance sector to effectively
identify, monitor and reflect
climate change risks.**

³⁷ Climate-related assets are those assets that are exposed to the risks from climate change.

FIGURE 23



Source: IAIS SWM 2023 and IIM 2023

Figure 23 presents the asset mix of climate-related and climate-unrelated assets for the full data sample consisting of 41 jurisdictions that provided at least some quantitative climate risk information to the IAIS.³⁸ The overall mix by asset class is complemented by a split of equity, corporate bonds, and loans and mortgages in climate-related sectors,³⁹ providing a comprehensive overview of the asset mix that can be affected by climate change, by region.

The assets in Figure 23 can be divided into three broad categories:

- Climate-related assets including sovereign debt instruments, real estate⁴⁰ and equities, corporate debt instruments, and loans and mortgages belonging to six climate-related sectors: agriculture, energy-

intensive, fossil fuel, housing, transport and utilities (shaded in variants of red);

- Climate-unrelated assets including reinsurance recoverables, reinsurance assets, cash and cash equivalents, deferred acquisition costs and equities, corporate debt instruments, and loans and mortgages not belonging to six climate-related sectors (shaded in variants of green); and
- Assets without information regarding their allocation or sectoral split. This category includes equities, corporate debt instruments, and loans and mortgages without any information about their sector, securitisations and assets without information about their asset class (shaded in variants of grey and orange). It is important to note that these assets may contain some climate-related assets.

³⁸ This is the case even if these jurisdictions did not provide any sectoral splits for equities, corporate debt, and loans and mortgages.

³⁹ Climate-related sectors are those economic sectors that are most likely to be affected by climate change, notably by transition risks.

⁴⁰ Sovereign debt instruments and real estate are classified as climate-related assets, in line with the 2021 Climate GIMAR. However, they represent heterogeneous asset classes with various levels of climate sensitivity (eg countries are exposed to different levels of physical and transition risks). More insights on climate-sensitive sovereign debt holdings can be seen in Figure 27.

The shares of climate-related assets (approximately 22% to 47% of all GA total assets) differ across regions. However, these differences are also influenced by available information on sectoral splits. The shares of climate-related assets combined with shares of equities, corporate bonds, and loans and mortgages with no sectoral information are comparable across all regions (approximately 55% to 63% of all GA total assets). Limited data availability is particularly visible in North America, where reported lower holdings of climate-related assets (about 22%) are accompanied by higher shares of assets without sectoral information (about 35%) and a further 23% of assets without information about their asset class. The latter is also evident in other regions. Data availability remains one of the challenges in transition risk monitoring but a continued focus on these data elements could reduce these gaps over time.

In comparison to the 2022 GIMAR, material changes were found in the shares of climate-related assets for certain jurisdictions. These changes were driven mainly by improved granularity of reported asset splits and increased sample coverage. In particular, more information on asset allocation is available in the Asia and Oceania region as a result of including information received from individual insurers. This led to an increase in climate-related assets in the region. Overall, a minor growth in the shares of climate-related assets across all regions was reported, from 33% to 37%. However, as noted, this may be more a result of improved insight on the exposures and less due to actual increases in exposures to climate-related risks in the insurance sector. Due to ongoing work on enhancing the sectoral splits, which is also impacting historical data, a comparison between this year's sectoral splits with those published in the 2022 GIMAR is not recommended.

4.2.2.1 Equity, corporate bonds, and loans and mortgages

For equities, corporate debt, and loans and mortgages, the choice of climate-related sectors is based on climate policy relevant sectors (CPRS), a classification of economic activities to assess transition risk, which was developed in Battiston et al. (2017)⁴¹ and refined over the years. The CPRS classification was also used in the 2021 Climate GIMAR and in the 2022 GIMAR and provides a standardised and actionable classification of activities where revenues could be negatively affected in a disorderly low-carbon transition scenario. As in the analysis in previous years, the IAIS applied two important adjustments to the CPRS classification:

- **Treatment of the utility sector:** The utility sector includes all electricity-generation activities, regardless of the energy source used. This lack of granularity results in renewable-energy assets being unduly considered as climate-related. In line with last year's analysis, a haircut was therefore applied to all amounts reported in the utility sector on a jurisdictional basis. The size of the haircut was determined with reference to the proportion of renewable power generation in the region of each jurisdiction, as published in the International Renewable Energy Agency regional factsheets.⁴²
- **Treatment of the financial sector:** These assets include participations in other insurers or banks, as well as holdings of investment funds (without look-through). These assets are also likely to exhibit some exposure to climate-related risks, depending on the type of the counterparty (bank, insurer, asset manager or other), its direct exposure to climate risk and its financial and operational leverage. In the absence of

⁴¹ Battiston, S., et al. (2017). *A climate stress-test of the financial system*. Nature Climate Change, 7(4): 283–8.

⁴² www.irena.org/statistics

insight into the actual exposures, the IAIS applied the same data adjustment to approximate a look-through approach as was used in previous years.⁴³ The impact of this adjustment is an increase in the share of the six climate relevant sectors by 12% on a global level.

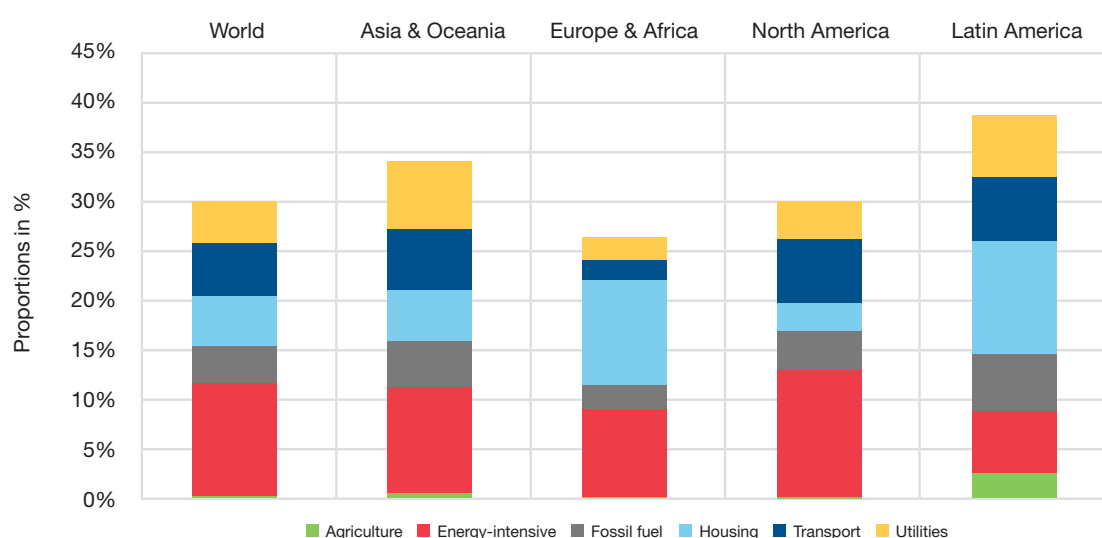
The biggest impact is related to the Europe and Africa regions (+17%) due to a high regional share of exposures to the financial sector (with no look-through feasible) on insurers' asset holdings (43% of all GA total assets).

Figure 24 presents the total proportions of equity, corporate bonds, and loans and mortgages for each region in the six climate-related sectors for jurisdictions that provided sectoral splits for equities, corporate debt, and loans and mortgages.⁴⁴ Depending on the region, climate-related sectors represent between 29% (Europe and Africa) and 42% (Latin America) of these asset classes.

The main changes compared to last year's results,⁴⁵ as published in the 2022 GIMAR, can be attributed to the following drivers: (1) improved data coverage of the IAIS climate data collections; (2) enhanced availability of sectoral splits in IAIS jurisdictions; and (3) interplays between IIM and SWM data collections. These drivers led to increased shares of the six climate-related sectors in equity, corporate bonds, and loans and mortgages (from 30% to 33%). The decreased share of the Asia and Oceania region is a result of the third driver listed above. As information on the total amount of assets with sectoral splits increased, the IAIS was able to calculate more precisely the share of the six climate-relevant sectors. The Latin America region has the overall highest proportion of the six climate-related sectors on all GA equity, corporate bonds, and loans and mortgages with a slight reported increase (using year-end 2021 data: 40% and year-end 2022 data: 42%).

FIGURE 24

Proportions of equity, corporate bonds and L&M in climate-relevant sectors (YE22)



Source: IAIS SWM 2023 and IIM 2023

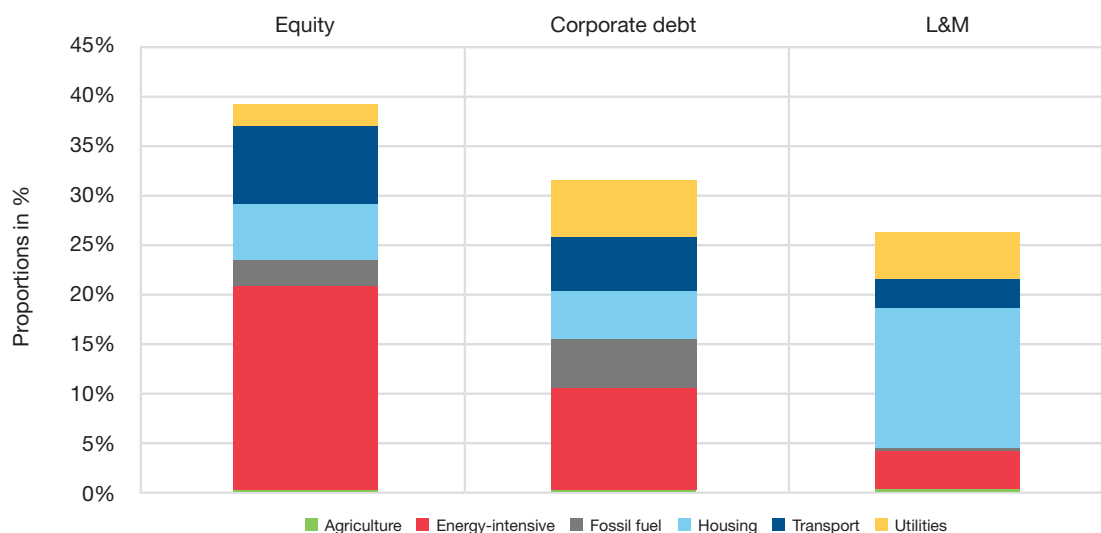
⁴³ To approximate the exposures that would result from a look-through approach, it was assumed that entities or funds classified in the financial sector include climate-relevant assets in similar proportion to that of assets held directly by insurers.

⁴⁴ The figure only includes asset classes for which jurisdictions provided sectoral splits.

⁴⁵ Last year, the IAIS used year-end 2021 data collected in the SWM 2022 data collection.

FIGURE 25

Proportions of equity, corporate bonds and L&M in climate-relevant sectors (YE22)

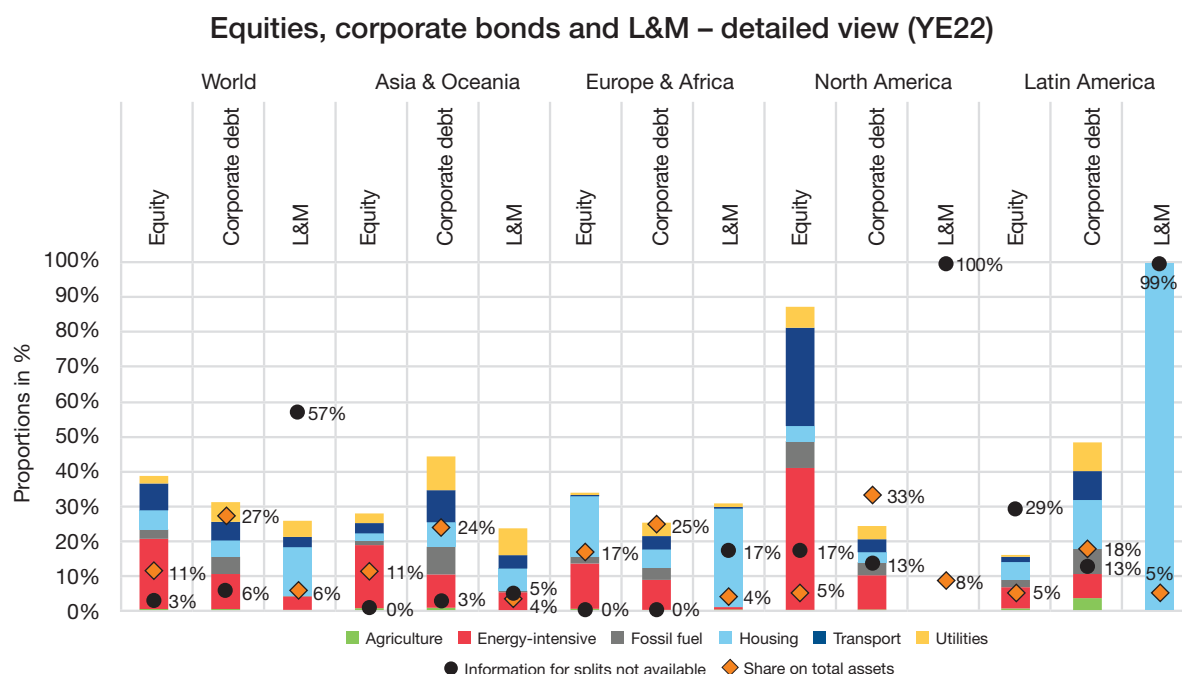


Source: IAIS SWM 2023 and IIM 2023

Figure 25 presents the shares of the six climate-related sectors on three monitored asset classes (GA only): equity, corporate bonds, and loans and mortgages. Insurers' equity holdings include 39% of investments to the six climate-related sectors. Outcomes of the corporate debt and loans and mortgages reported in 2023 were comparable (31% and 26% respectively). In comparison with last year's GIMAR, the results differ substantially for loans and mortgages (caused by a combination of the above listed drivers). In addition, holdings of the six climate-related sectors increased by 6% for corporate debt since last year. In conclusion, insurers allocate material shares of their equity, corporate and loans portfolios to the six climate-related sectors, leading to exposure to transition risk.

Similar to last year's analysis, the energy-intensive sector, which is quite broad and encompasses most of the manufacturing industry, remains globally dominant among climate-related equities, while the picture is more balanced for corporate bonds as can be seen in Figure 25. Climate-related loans and mortgages are primarily associated with the housing sector (due to high investments in mortgages in various jurisdictions). Figure 26 shows a more detailed view of sectoral splits per region and by type of asset class. The remaining proportions either belong to climate-unrelated assets or no information is available.

FIGURE 26



Source: IAIS SWM 2023 and IIM 2023

Figure 26 provides additional information about the percentage shares of the three monitored asset classes to total assets (in terms of materiality of asset classes, across various regions)⁴⁶ as well as the percentage shares of each asset class for which the sectoral split is not available (due to data availability in various regions).⁴⁷ This additional information helps to explain some outlier values, often caused by either lower materiality or lower data availability in certain regions (eg loan holdings of the six climate-related sectors in Latin America or North America). Thus, although Latin America may seem to be highly concentrated in the housing sector with regards to loans and mortgages, this asset class only represents 5% of the total assets for the region and, additionally, sectoral splits were available only for 1% of this asset class. In general,

data availability for equities and corporate debt is high, but globally there is no sectoral information for 57% of all loans and mortgages (which is an asset class equal to 6% of all insurers' GA total assets).

Insurers allocate material shares of their portfolios to six climate-related sectors, leading to exposure to transition risk.

⁴⁶ Red diamonds in Figure 26.

⁴⁷ Black dots in Figure 26.

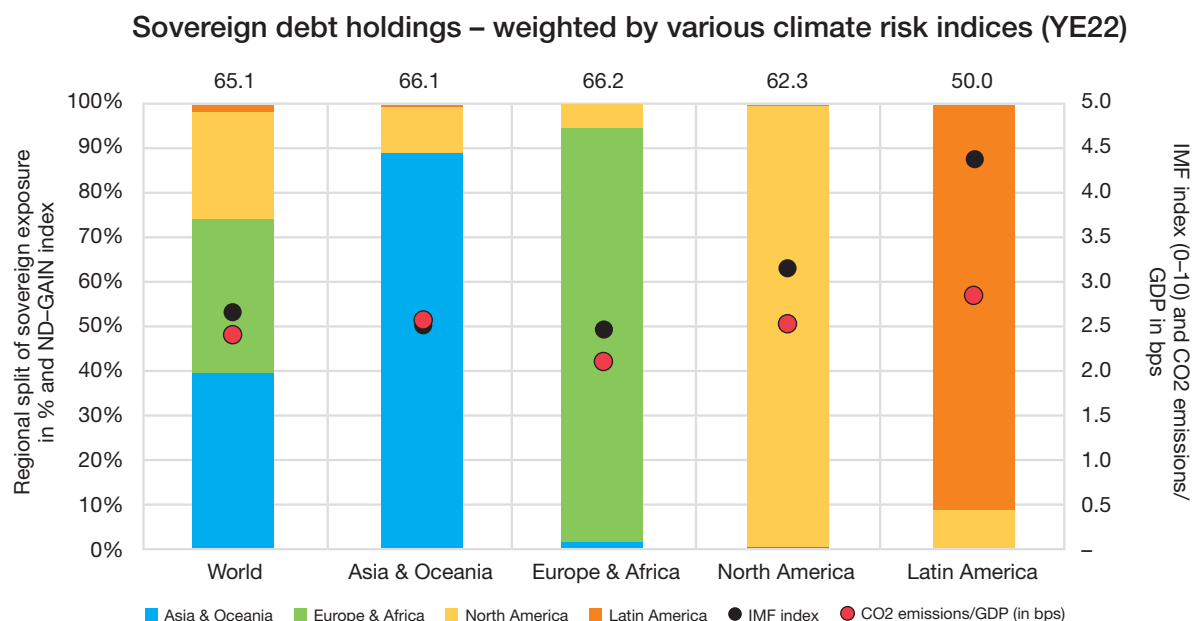
4.2.2.2 Sovereign bonds

Sovereign bonds are a significant asset class within the average insurance investment mix, however there is not yet a universally accepted metric to assess climate-related risks for sovereign bonds. Similarly to the 2022 GIMAR, the IAIS used three metrics to analyse the exposure to climate-related risks of sovereign debt instruments: the **ND-GAIN index**, the International Monetary Fund (IMF) climate-driven **INFORM risk index** (an indicative measure of physical risk)⁴⁸ and carbon dioxide (CO₂) emissions as reported by the Organisation for Economic Co-operation and Development and standardised by gross domestic product (GDP) (in basis points, an indicative measure of physical risk). To examine the relative risk of the sovereign bond portfolio to climate-related risks, a weighted ND-GAIN index was calculated. This reflected the weighted average ND-GAIN index of the sovereign bond portfolio of the insurance

sector in a particular market, based on the top five largest sovereign counterparties where this information was available (values between 0 and 100). A higher score means lower risk. For the remaining two metrics, a higher score represents a higher risk. These metrics provide greater insights specific to physical risk and transition risk and reflect the limitations of the ND-GAIN index (eg limited differentiation between physical and transition risks, a high correlation with countries' economic wealth).

The coloured bars show the distribution of the sovereign bond portfolio by geographic region. It can be observed that most sovereign debt instruments are intra-regional investments. While the ND-GAIN index and climate-driven INFORM risk index suggest that Latin America has higher physical risk relative to other regions (ie a lower ND-GAIN score and higher INFORM risk index), Latin America's transition risk (measured by CO₂ emission/GDP)

FIGURE 27



Source: IAIS SWM 2023

⁴⁸ The INFORM Risk Index is a global, open source risk assessment for crises and disasters. The climate-driven INFORM risk index is an adaptation of the INFORM Risk Index, adjusted by IMF staff to distil and focus on climate-driven risks. It has three dimensions: climate-driven hazard and exposure, vulnerability, and lack of coping capacity. See climatedata.imf.org/pages/fi-indicators.

appears to be relatively comparable with other regions and the world. All three tested metrics remained quite stable since last year. Some minor regional variations were detected in the INFORM risk index and the CO2 emissions/GDP.

4.3 ANALYSIS RELATED TO NATURAL CATASTROPHES

4.3.1 Importance of analysing exposure to natural catastrophes

One of the main effects of climate change on insurers is through the expected increase in natural catastrophes (NatCat)-related claims. In order to assess this potential effect, as a first step, supervisors need to have the data and tools to understand and monitor insurers' current exposure to NatCat. As a second step, supervisors need to consider how climate change, in conjunction with other relevant developments (such as an increase in exposure in high-risk areas and possible adaptation actions), may impact the cost of NatCat coverage in the medium to long term.

Estimates of the magnitude of the impact could help supervisors determine the likely changes in the materiality of NatCat risks relative to the other risks insurers face. As this risk becomes material, it will require strengthening insurers' NatCat risk capabilities to ensure they have the necessary frameworks and tools in place for adequate pricing, underwriting and risk management. Also, the NatCat quantification can help establish the degree to which climate change could cause earnings or solvency strain to insurers, especially those with significant exposure to NatCat. Furthermore, it can help supervisors understand whether there could be any systemic impact to the sector if a significant part of the insurance sector

is affected. Supervisors may also wish to consider the possible impacts through the reinsurance market in particular. If the reinsurance capacity provided by the international market is substantially reduced or reinsurance rates increase, this can also cause earnings and solvency strain for local insurers.

If climate change is shown to have a material impact in the near future, setting risk-based capital requirements for NatCat risk can ensure that capital resources are set aside to cover those risks, which will reflect the already accumulated impact of climate change. Virtually all of the IAIS members who responded indicated that there are capital requirements for NatCat risks in their jurisdictions, while two indicated that they plan to introduce them in the near future. Sixteen members were able to provide aggregate figures for the required capital for NatCat. Among them, capital required for NatCat represents between 1% and 17% of the total required capital for the industry, with an average of about 6%. Several members stated that they are not able to provide such figures due to the methodological difficulties in aggregating NatCat required capital figures, related to differences in the methods of setting these requirements (ie an internal model or standard formula in the case of Solvency II) and the challenges in adequately reflecting correlations in the aggregation calculation.

One of the main effects of climate change on insurers is through the expected increase in NatCat-related claims.

The impact of climate change on the frequency and severity of NatCat events is likely to be felt outside the insurance sector too. As the cost of claims increase, insurers are likely to increase premiums accordingly, potentially making insurance more expensive and even unaffordable. In extreme cases, insurers may withdraw from market segments as it becomes uneconomical to offer insurance, resulting in a larger protection gap.⁴⁹ More expensive insurance or uninsurable assets will likely depress the value of those assets (eg uninsured houses in the case of mortgage loans). Furthermore, the overall economic risk in areas of high NatCat risk may increase as a higher proportion of NatCat-related damages will no longer be covered by insurance. All of this will likely increase the spillover to other financial

sectors – as well as to the real economy – through increased market, credit and operational risks.

4.3.2 NatCat exposures of individual insurers

The IIM data helps with understanding the materiality of NatCat risks for some of the largest (re)insurers writing predominantly non-life business, which in turn provides insights about the impact across the wider insurance sector. This data also provides a basis to assess the potential materiality of the climate change impact on the magnitude of NatCat risks.

IIM data collected included expected and 1-in-200-year loss estimates for key perils and regions. The figures collected were both gross and net of reinsurance from 16 insurers⁵⁰ writing predominantly non-life business.

TABLE 3: VALUE AT RISK ESTIMATES FOR KEY NATCAT PERILS

Description	Metric	Average	Min	Max
Materiality of tail NatCat risks (before and after reinsurance)	Gross 99.5% NatCat Value at Risk (VaR) as % of total required capital	67.2%	3.3%	131.6%
	Net 99.5% NatCat VaR as % of total required capital	33.7%	2.1%	78.8%
Materiality of average annual NatCat claims (before and after reinsurance)	Gross mean NatCat losses as % of total capital resources	5.2%	0.3%	13.2%
	Net mean NatCat losses as % of total capital resources	3.4%	0.1%	10.4%
Share of NatCat claims that is related to earthquake	Earthquake VaR as % of total NatCat VaR	38.4%	0.0%	92.7%
Reliance on reinsurance for managing required capital for NatCat	Net NatCat VaR as % of gross NatCat VaR	51.8%	8.6%	76.2%
Reliance on reinsurance for managing earnings impact of NatCat	Net mean NatCat losses as % of gross mean NatCat losses	66.9%	36.6%	100.0%

⁴⁹ For a fuller discussion of insurance protection gaps, see IAIS. (2023). [A call to action: the role of supervisors in addressing natural catastrophe protection gaps](#).

⁵⁰ These include reinsurers.

The analysis shows that NatCat is a significant risk for non-life insurers and reinsurers in the Insurer Pool, with a 1-in-200-year net loss representing on average almost 34% of total required capital. Reinsurance is a significant mitigation factor: on average the net NatCat VaR is about half of the gross VaR. In other words, using the 99.5% NatCat VaR as a proxy for the amount of capital required for NatCat risks, the capital required would on average double if no reinsurance was in place. For insurers with the highest reliance on reinsurance, the capital impact is material even at the total required capital level – it could be more than 60% higher if they did not use reinsurance. This demonstrates the importance of a functional global reinsurance market for the effective risk and capital management of NatCat exposure.

It is important to highlight that a significant part of NatCat exposure, of about 38%, is related to earthquakes. While climate change is not expected to have a material impact on the frequency of earthquakes, sea level rise could increase the damages caused by earthquakes if they trigger tsunamis.

The data obtained by the IAIS included the specific geographic exposure for three key climate perils: a US tropical storm, a Japanese tropical storm and a European windstorm. For half of the insurers that provide data, one of these perils dominate their exposure and represent more than 50% of the gross total climate-related NatCat exposure. The relatively more concentrated NatCat profile of these insurers compared to their peers is likely to lead to their capital position being more sensitive to extreme weather events and to the functioning of the reinsurance market impacting these top perils.

4.3.2.1 Impact of severe NatCat on insurers' solvency

NatCat is typically not one of the highest risks that the insurance sector faces. For the insurers in this year's sample, an average NatCat year is estimated to have a fairly low impact of about 3% on their net assets. Insurers should normally be able to cover those exposures with the premiums collected. This regular and fairly low impact of NatCat claims on insurers' financial position may however create a false sense of security, as a severe NatCat event may still have a significant impact on insurers' solvency. As outlined above, immediately following a 1-in-200-year event, insurers' capital coverage ratios could drop by 34% on average. In such events, insurers' capital management can be significantly challenged if it becomes difficult for insurers to raise capital quickly and the reinsurance markets becomes disrupted, reducing reinsurance capacity. A decline of 50% in reinsurance utilisation could further reduce capital ratios by 50% on average, while for some insurers the drop could be higher than 75%.

Typically, a major NatCat event leads to a recalibration of NatCat models to reflect the latest events. However, such model recalibration could increase NatCat VaR estimates and further strain capital ratios following major NatCat events.

This means that the direct loss impact represents only part of the full capital impact following a major NatCat event, with other (indirect) effects, such as those occurring due to the disruption of the reinsurance market and recalibration of NatCat models, possibly significantly increasing the total impact on capital.

4.3.2.2 Capital impact of gradual deterioration of NatCat due to climate change

Even without major NatCat events, climate change may lead to the slow erosion of insurers' capital positions, if their pricing models do not adequately reflect the emerging impact of climate change. This is because it is still difficult to adequately quantify the impact of climate change on NatCat, despite significant progress in climate science. If insurers are not able to adjust pricing to reflect the prospective impact of climate change and continue to rely largely on models calibrated to historical data, they may experience continuous underwriting losses on their NatCat-related business. This could be exacerbated as reinsurance markets are typically nimbler, allowing reinsurers to reprice faster than insurers. This means that insurers may have to absorb that increased reinsurance cost if constrained by market dynamics from fully reflecting the increasing cost in their premiums. Reducing reliance on reinsurance is an alternative course of action for insurers to manage the earnings impact of higher reinsurance cost, but this will also erode the insurers' capital position.

4.4 INITIATIVES TO ADDRESS CLIMATE-RELATED RISKS

The IAIS also collected qualitative information from both supervisors and insurers on their views and initiatives to assess and address climate-related risks. This section provides insights into their responses.

4.4.1 Initiatives by supervisors

4.4.1.1 Climate risk data collection

A comprehensive understanding of the potential risks and exposures from climate change is dependent on accurate and sufficiently detailed data sources. When asked whether jurisdictions currently collect climate-related liability data in their jurisdiction, the majority of responses (18 out of 32) indicated that this is either currently not done or that this is planned for the near future.

It appears that there is very limited regular climate data collection by IAIS members other than data related to current NatCat exposures (see above). This remains an area where supervisors need to do more to gather relevant data on assets and liabilities. Improvements in climate-related data collections will allow them to assess the exposure of individual insurers to climate risk and to assess the potential financial stability risks caused by climate change to the insurance sector in their jurisdictions.

4.4.1.2 Climate risk assessment

Undertaking climate scenario analysis is a key supervisory initiative to assess potential risks relating to climate change. Many respondents (15) have already undertaken scenario analysis, while 12 respondents are planning to do so in the near future. Only five did not indicate that they intend to undertake scenario analysis. Only four respondents have conducted assessments to understand asset concentrations with regard to climate change impact, with six more working on developing this assessment.

Separately, supervisors were asked about their assessment of the probability and impact of climate change risks. There is still a relatively high number of IAIS members that are not able to assess the potential probability and impact of transition (nine out of 32), physical (seven out of 32) and legal liability (12 out of 32) risks in their jurisdictions. Four jurisdictions indicated that they do not view legal liability risk to be a concern.

Table 4 shows the number of jurisdictions that attributed a level of probability and impact to the various types of climate-related risks. It should be noted that some of these indications may not be based on comprehensive quantitative analyses, but rather on jurisdictions' qualitative assessments and views.

TABLE 4: SUPERVISORY PROBABILITY AND IMPACT ESTIMATES OF THE CLIMATE-RELATED RISKS

Impact	Transition Risks (26 out of 32 responses)				Physical Risks (25 out of 32 responses)				Legal Liability Risks (16 out of 32 responses)			
	High	0	0	3	High	0	0	2	High	0	0	0
	Medium	3	4	3	Medium	4	5	4	Medium	2	0	0
	Low	6	7	0	Low	6	4	0	Low	11	3	0
		Low	Medium	High		Low	Medium	High		Low	Medium	High
Probability												

4.4.1.3 Climate risk supervisory responses

The majority of IAIS members that responded (23 out of 32 responses) have in place climate-related regulatory or supervisory initiatives, and six members are currently developing them. Only three members (13% of respondents) are not undertaking measures to address climate-related risks. This is an improvement compared to last year, when 20% of members indicated that they had not undertaken any steps or were only in the very early stages of developing their thinking in this area.

TABLE 5: SUMMARY OF RESPONSES BY IAIS MEMBERS

Question	Yes	Planned	No
Are any supervisory measures taken to address climate-related risks?	23	6	3
Do you currently conduct, or have plans to conduct, a scenario analysis or stress test related to climate change?	15	12	5
Have you identified any firm-specific concentration of transition risk exposure in your jurisdiction?	4	6	22

The majority of IAIS members that responded have in place climate-related regulatory or supervisory initiatives.

4.4.2 Initiatives by insurers

Based on responses received by insurers, the vast majority have undertaken comprehensive climate-related actions or are in the process of doing so, such as:

- Using forward-looking measures (or tools) to monitor climate-related risks or, for some insurers, indicating plans to do so in the near future;
- Disclosing climate-related information;
- Undertaking or planning to undertake a climate-related scenario analysis; and
- Using climate-related scenario analysis to inform their strategies.

At the same time, there are still a few insurers that responded that they have no or limited initiatives to incorporate climate change in their operations. Also, while insurers have started considering climate change in their strategy, the responses provided do not indicate that it is fully embedded in their strategy-setting process.

TABLE 6: SUMMARY OF RESPONSES BY INSURERS

Question	Yes	Planned	No
Do you currently disclose any climate-related information?	49	–	2
Do you use any forward-looking measures (or tools) to monitor climate-related risks?	39	7	4
Does your organisation use climate-related scenario analysis to inform its strategy?	38	7	5

Based on responses received by insurers, the vast majority have undertaken comprehensive climate-related actions or are in the process of doing so.

4.5 NEXT STEPS

Climate data elements have become a regular feature of the GME and provide a global baseline of climate risk data for the insurance sector. This year's data collection from IAIS members continues to set the groundwork for enhanced data collection and analysis moving forward. In time, this will be complemented by improved climate and sustainability data reporting and disclosures from insurers, other financial institutions and corporates and businesses.

The IAIS will continue to refine and explore how best to collect and analyse asset and liability data from its members and from individual insurers to enable enhanced quantitative analysis on the impact of climate change on the resilience of the global insurance sector. In parallel and to complement this data collected through the GME, the IAIS will aim to obtain further data from external sources on the impact of climate change on NatCat.

The IAIS will also continue analysing the different responses of insurers and supervisors towards climate risk in order to determine the potential need for more coordinated supervisory actions in this area.

The IAIS will continue to refine and explore how best to collect and analyse asset and liability data from its members and from individual insurers to enable enhanced quantitative analysis on the impact of climate change on the resilience of the global insurance sector.



5. Individual insurer monitoring 2023

In addition to monitoring potential systemic risk arising from sector-wide trends related to specific activities and exposures, the GME includes an assessment of the possible concentration of systemic risks at an individual insurer level arising from these activities and exposures through the IIM.

This section covers public disclosures on specific aspects of the IIM, as outlined in paragraphs 109–111 of the GME document. These include:

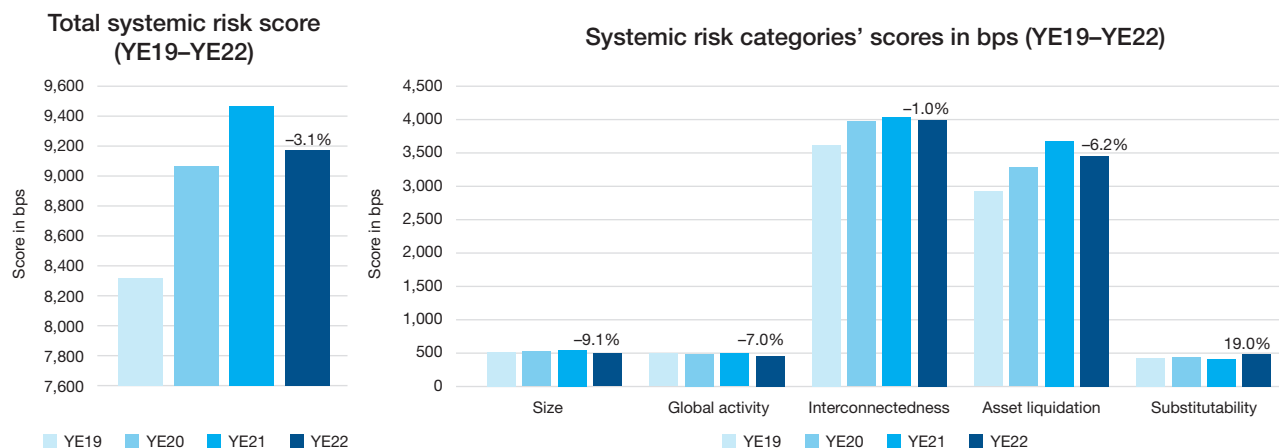
- An analysis of aggregate trends in the Insurer Pool;
- The aggregate totals for each indicator;
- Formulae used to calculate indicator scores;
- The absolute reference values used for the indicators; and
- The data template and instructions used in the assessment process.

5.1 AN ANALYSIS OF AGGREGATE TRENDS IN THE INSURER POOL

As in previous years, the IAIS performed trend analysis on data from the Insurer Pool and used the outcomes for the overall assessment of the possible concentration and evolution of systemic risk at the level of the individual insurers. Trend analysis includes developments in denominators (for each quantitative indicator used in the current IIM Methodology), drivers of those developments, identification of outliers and data issues, and the impact of foreign exchange rates or sample fluctuations. Trend analysis also covers a comparison of individual insurers versus Insurer Pool developments. Sample controls are applied to keep the sample stable over time.

The GME includes an assessment of the possible concentration of systemic risks at an individual insurer level.

FIGURE 28

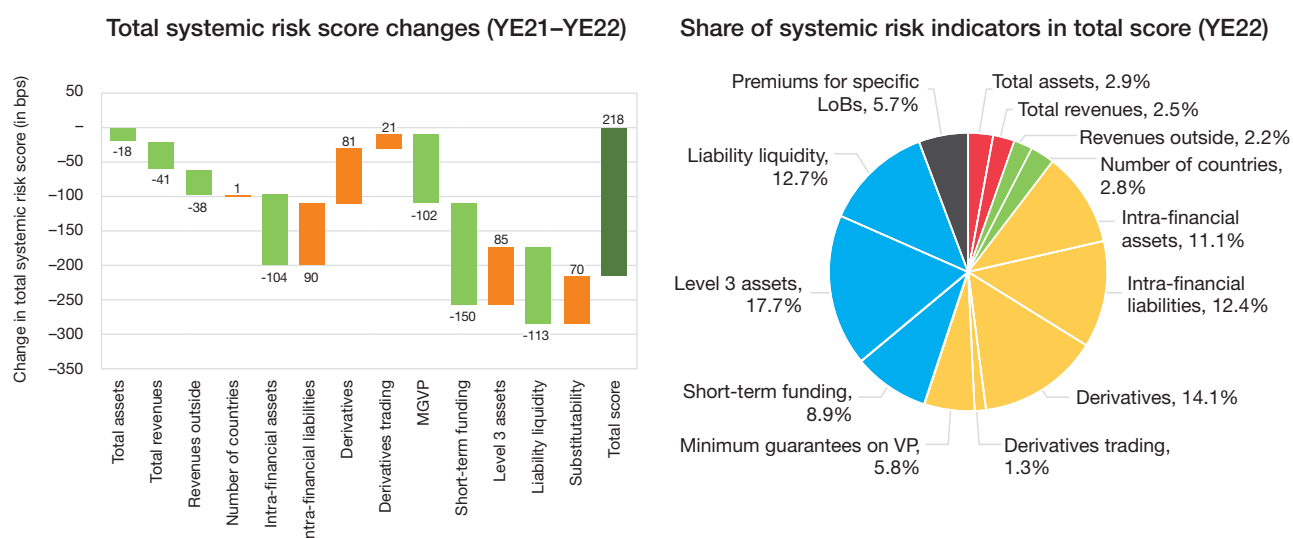


Source: IAIS IIM 2023

For the Insurer Pool, the aggregate systemic risk score has decreased by 3.1% at year-end 2022 compared to year-end 2021 (see Figure 28). Key drivers for this were decreases in the systemic risk categories of size (-9.1%), global activity (-7.0%) and asset liquidation (-6.2%). The substitutability category increased year-over-year, driven by increases in GWP for specific lines of business such as aviation and marine coverage.

Looking at the breakdown of total systemic risk score changes from year-end 2021 to year-end 2022 by systemic risk indicator (see Figure 29), key drivers for these declines are the decrease in short-term funding (-150 basis points), liability liquidity (-113 basis points), intra-financial assets (-104 basis points) and minimum guarantees on variable products (-102 basis points). These declines were partially offset by increases in

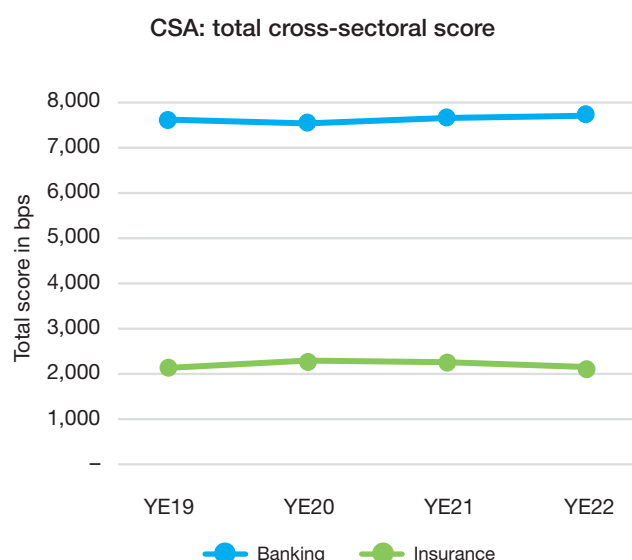
FIGURE 29



Source: IAIS IIM 2023

intra-financial liabilities (90 basis points), level 3 assets (85 basis points), derivatives (81 basis points) and premiums for specific business lines (substitutability) (70 basis points). On aggregate, the most material systemic risk indicators are level 3 assets (accounting for 17.7% of the total systemic risk score), derivatives (14.1%), liability liquidity (12.7%), intra-financial liabilities (12.4%) and intra-financial assets (11.1%).

FIGURE 30



Source: IAIS IIM 2023, BCBS 2023

Cross-sectoral analysis

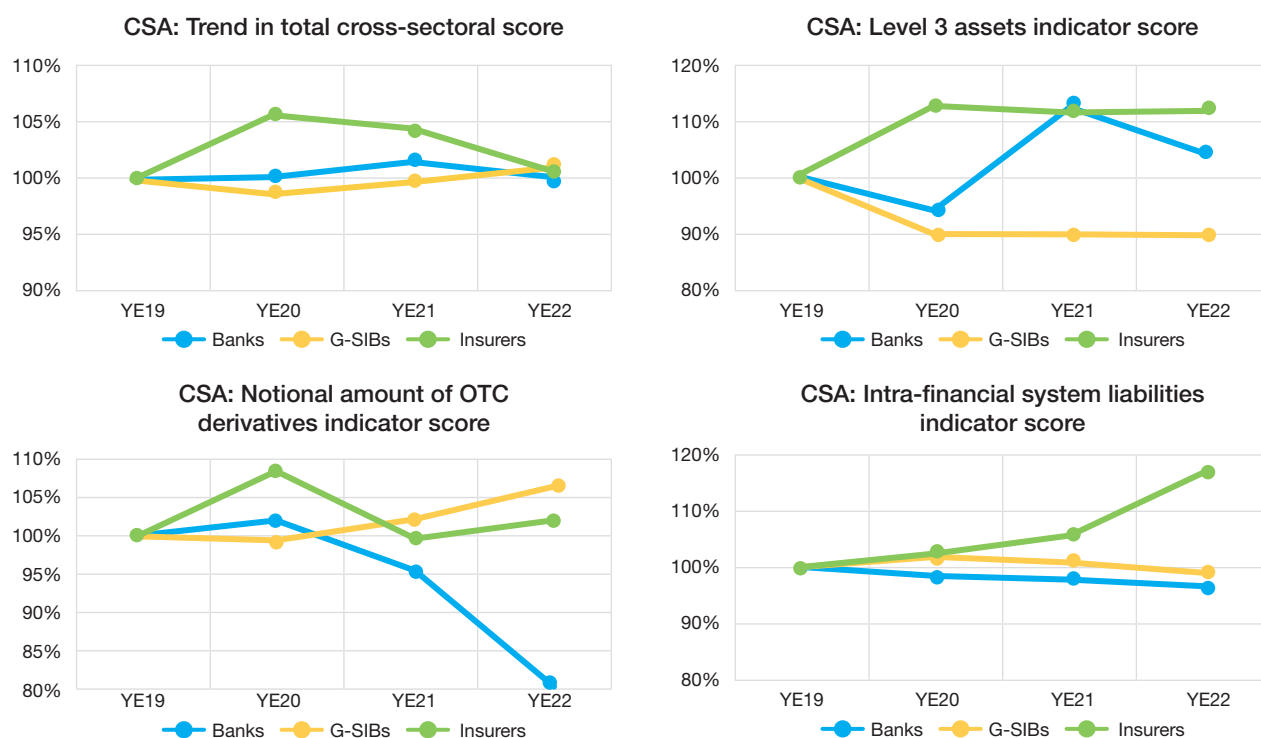
Cross-sectoral analysis (CSA) is performed to compare the systemic footprint of insurers with banks using a systemic risk scoring methodology based on indicators that are common to both the Global Systemically Important Bank methodology developed by the Basel Committee on Banking Supervision (BCBS) and the IAIS' IIM methodology. The cross-sectoral methodology was developed by the joint IAIS-BCBS Task Force on Banks and Insurers in 2019.

The results in Figure 30 show that, keeping the pool of banks and insurers stable over time, the total cross-sectoral scores for banks are still significantly higher than for insurers.

Figure 31 shows an increasing systemic risk score for insurers compared to banks from year-end 2019 to year-end 2020, followed by a declining trend the years thereafter. Three out of six CSA indicators increased for insurers at year-end 2022 compared to year-end 2021: Level 3 assets, notional amount of over-the-counter (OTC) derivatives and intra-financial system liabilities. Regarding the level 3 assets, the IAIS is analysing the difference in trends for insurers and banks. This may be related to accounting differences (banks keeping a higher relative share of their assets, notably loans and mortgages, at cost than insurers, which may result in a higher level 3 assets indicator score for insurers relative to banks as assets held at cost are excluded from the level 3 assets indicator).

Keeping the pool of banks and insurers stable over time, the total cross-sectoral scores for banks are still significantly higher than for insurers.

FIGURE 31



Source: IAIS IIM 2023, BCBS 2023

5.2 THE IIM TECHNICAL DETAILS, DATA TEMPLATE AND TECHNICAL SPECIFICATIONS

In line with paragraph 110 of the GME document, the GIMAR also contains the following information:

- The aggregate totals (denominators) for each IIM methodology indicator: Annex 1;
- Formulae used to calculate IIM indicator scores: Annex 2;
- The absolute reference values used for the indicators: Annex 3;
- IIM 2023 data template and technical specifications which can be found [here](#).

6. Global Reinsurance Market

6.1 IAIS REINSURANCE DATA COLLECTIONS

From 2003 to 2019, the IAIS collected data on the global reinsurance market through its annual Global Reinsurance Market Survey (GRMS). The GRMS covered about 50 reinsurers based in nine jurisdictions: Bermuda, France, Germany, Japan, Luxembourg, Spain, Switzerland, the UK and the US. The GRMS collected data from reinsurers with gross unaffiliated reinsurance premiums of more than \$800 million or unaffiliated gross technical provisions of more than \$2 billion. The pool of participating reinsurers remained largely the same throughout this period.

The GRMS was discontinued with the adoption of the Holistic Framework in 2019, including the launch of the GME. Reinsurance data was then collected as part of the SWM (as the SWM reinsurance component). This has the benefit of improving both the regional balance and the completeness of reinsurance data collection. One downside of collecting this data through the SWM is that it reduced the granularity of data, as it was based on reinsurance data already collected in the supervisory frameworks.⁵¹ As a result, in 2023, the IAIS decided to revive the GRMS as a more granular complement to the

SWM reinsurance component. The GRMS focuses on collecting data from a pool of reinsurers that meet the GRMS criteria, while the SWM reinsurance component provides data on the total reinsurance business in a jurisdiction (total reinsurance premiums) conducted by both reinsurers and insurers. The reinsurance business captured through the GRMS data collection is therefore a subset of the scope of reinsurance business captured through the SWM reinsurance component.

The revived GRMS collects data from a pool of reinsurers that meet the following updated selection criteria:

- Gross unaffiliated reinsurance premiums assumed of at least \$800 million (\$20 million for monolines);
- Gross unaffiliated technical reserves of at least \$2 billion (not applied to monolines); or
- Aggregate gross notional amount in (re)insurance-related derivatives of at least \$500 million (for example in longevity or mortality swaps).

⁵¹ For the majority of participating jurisdictions.

In the 2023 GRMS, data was collected from 29 jurisdictions in the following regions:

- Americas: Bermuda, Brazil, Canada, Cayman Islands, Mexico and US.
- Asia and Oceania: China, Hong Kong; Japan and Singapore.
- Europe and Africa: Austria, Belgium, Bulgaria, Croatia, Czech Republic, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Luxembourg, Netherlands, Romania, Slovak Republic, Slovenia, Spain, Sweden and Switzerland.

This represents an increase of 20 jurisdictions compared to the 2019 GRMS. Of the nine original GRMS participants, all except the UK also provided data in the 2023 GRMS. The UK instead provided the SWM reinsurance component.

In the 2023 SWM reinsurance component, data was collected from 35 jurisdictions in the following regions:

- Americas: Argentina, Bermuda, Brazil, Canada, Cayman Islands and Colombia.
- Asia and Oceania: Australia; China; China, Hong Kong; Chinese Taipei; Japan; Malaysia and Singapore.
- Europe and Africa: Austria, Belgium, Bulgaria, Croatia, Czech Republic, Finland France, Germany, Hungary, Iceland, Ireland, Italy, Morocco, Netherlands, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Switzerland and UK.

This represents an increase of 13 jurisdictions compared to the 2022 SWM reinsurance component, with new participating jurisdictions especially from Europe and the Americas.

As per the above, the reinsurance data in this chapter consists of a combination of sector-wide reinsurance data reported via the SWM reinsurance component by some jurisdictions and a sample of reinsurers' data reported via the GRMS by other jurisdictions and should not be interpreted as representing the full reinsurance market in each of the jurisdictions.

For jurisdictions which have changed the completeness of the reported reinsurance data over time, historical data was also provided to avoid that when showing trends, these are affected by changes in the sample over time. In addition, when showing trends, sample controls were applied, ie data was only taken from jurisdictions that provided consistent data across all years.

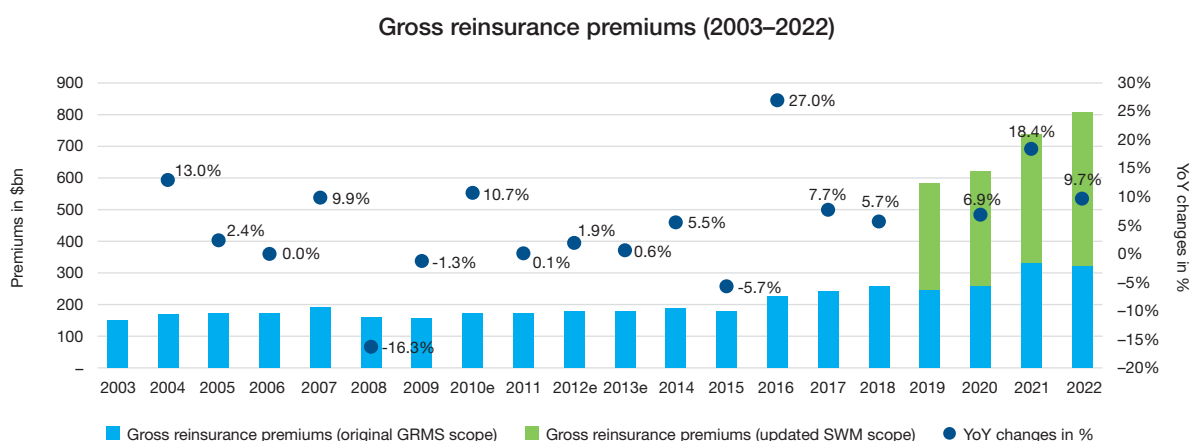
6.2 REINSURANCE MARKET SIZE: GROSS AND NET PREMIUMS

The nine jurisdictions originally participating in the GRMS and the original scope of insurers in these jurisdictions are labelled in this chapter as "original GRMS scope".⁵² As can be seen in Figure 32, the gross reinsurance premiums reported by the expanded list of jurisdictions and insurers in the scope (updated SWM scope) is now larger than the gross reinsurance premiums reported by the original GRMS scope.

The outcomes of both IAIS reinsurance data collections, the GRMS and the SWM reinsurance component, were analysed jointly. The two reinsurance data collections provide useful information for different purposes. Analysis focusing on premiums and retention ratios benefited from the wider SWM coverage. Specifically, this provides greater insight into the significant amount of reinsurance premiums assumed by composite insurers that also underwrite direct (primary) insurance. On the other hand, more in-depth exploration of, for example, the profitability and capital resources of reinsurers relied on the more granular GRMS data collection.

⁵² With simulated results for the scope of reinsurers in the GRMS for the UK from 2019 to 2022.

FIGURE 32



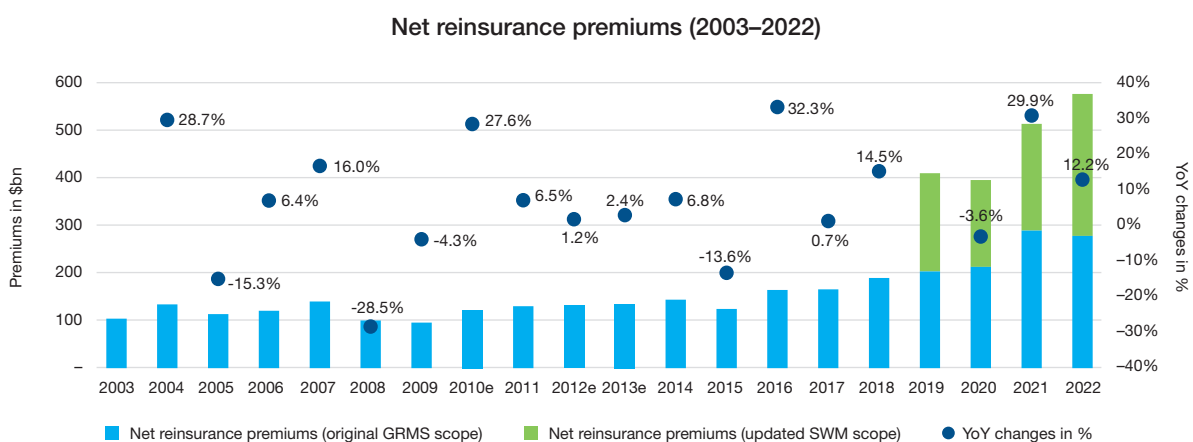
Source: IAIS SWM 2023 (GRMS + SWM reinsurance component)

As can be seen in Figure 32, reported gross reinsurance premiums continued the growth trajectory of recent years to increase by almost 10% in 2022. Sample controls are applied, ie data was only taken from jurisdictions that provided consistent data across all years (YE19–YE22). This is a materially different trend to the one reported for the global insurance market (covering both primary and reinsurance markets) which saw a slight decrease of 0.3% in GWP in the SWM 2023. Reinsurance market growth can also be observed in net premiums. As can be seen in Figure 33, the increase in

net reinsurance written premiums reported for 2022 was more than 12%, after strong growth in 2021 as well.

Reported gross reinsurance premiums continued the growth trajectory of recent years to increase by almost 10% in 2022.

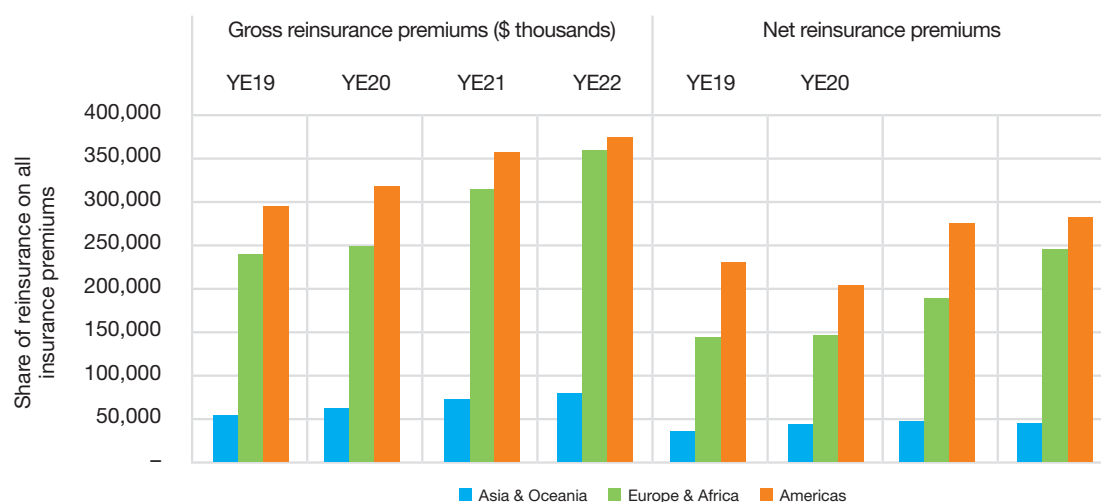
FIGURE 33



Source: IAIS SWM 2023 (GRMS + SWM reinsurance component)

FIGURE 34

Regional view on net and gross reinsurance premiums (YE19–YE22)



Source: IAIS SWM 2023 (GRMS + SWM reinsurance component)

Figure 34 shows regional developments in gross and net reinsurance premiums, based on SWM data. The 2022 increase in net reinsurance premiums was driven mainly by the Europe region. However, all regions experienced growth in both gross and net reinsurance premiums.

The IAIS also monitors the size of the global insurance and reinsurance market, in particular the share of reinsurance in the global insurance market. For the purpose of this monitoring, the global insurance market estimate covers both direct insurance and reinsurance premiums, whereas the reinsurance market estimate covers reinsurance premiums only.

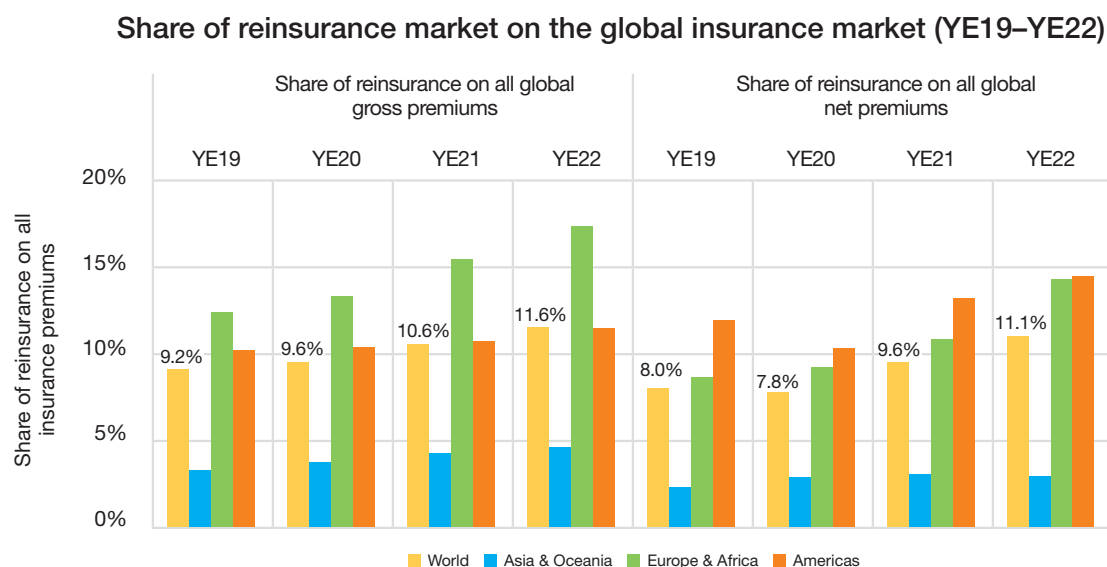
In 2022, the global gross insurance market covered by the SWM data was approximately \$6.975 trillion, with approximately 46% located in the Americas region. The size of the global gross reinsurance market covered by the SWM was approximately \$809 billion, with approximately 46% located

in the Americas. In total, reinsurance accounts for about 12% of all global gross insurance premiums covered by the SWM (see Figure 35).

The usage of reinsurance differs across regions, with the lowest levels reported in Asia and Oceania (approximately 4.6% of gross insurance premiums in 2022, although increasing over time) and the highest levels reported in Europe and Africa (approximately 17.5% of gross insurance premiums in 2022). The reinsurance market grew much more quickly than the global insurance market in terms of GWP in 2022 (10% compared to –0.3%). A similar trend can be observed when looking at net written premiums.

The global net insurance market covered by the SWM is approximately \$5.150 trillion in 2022. The size of the global net reinsurance market covered by the SWM is approximately \$570 billion. In total, reinsurance accounts for about 11.1% of all global net insurance premiums covered by the SWM (see Figure 35).

FIGURE 35

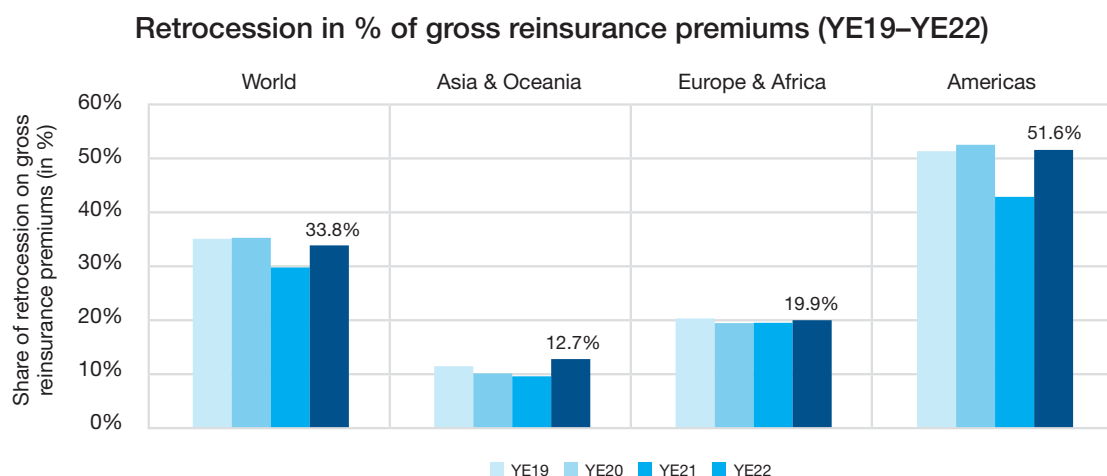


Source: IAIS SWM 2023 (GRMS + SWM reinsurance component)

6.3 RETROCESSION AND RETENTION

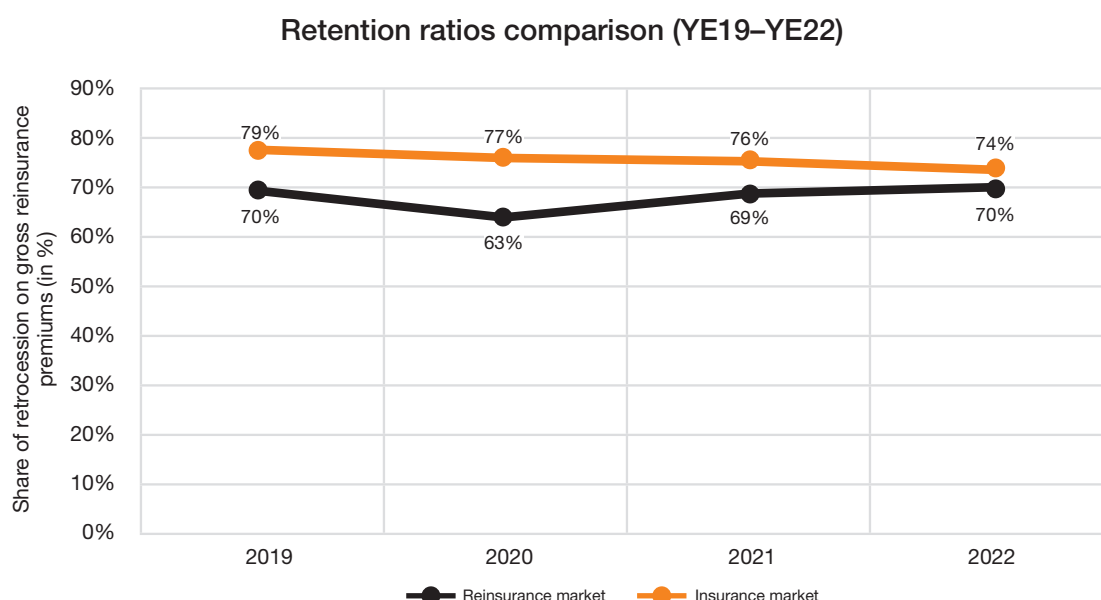
The IAIS also monitors the amount of retrocession in the global reinsurance market. Retrocession is a contract between a retrocession provider (the reinsurer) and an original reinsurer (the reinsured) that assumed premiums in a contract with a primary insurer (the insured). Retrocession is placed to provide additional capacity to the original reinsurer or to reduce the original reinsurer's risk of loss. Approximately 34% of all reinsurance gross premiums originate from retrocession contracts. There are material differences in the use of retrocession across regions (see Figure 36).

FIGURE 36



Source: IAIS SWM 2023 (GRMS + SWM reinsurance component)

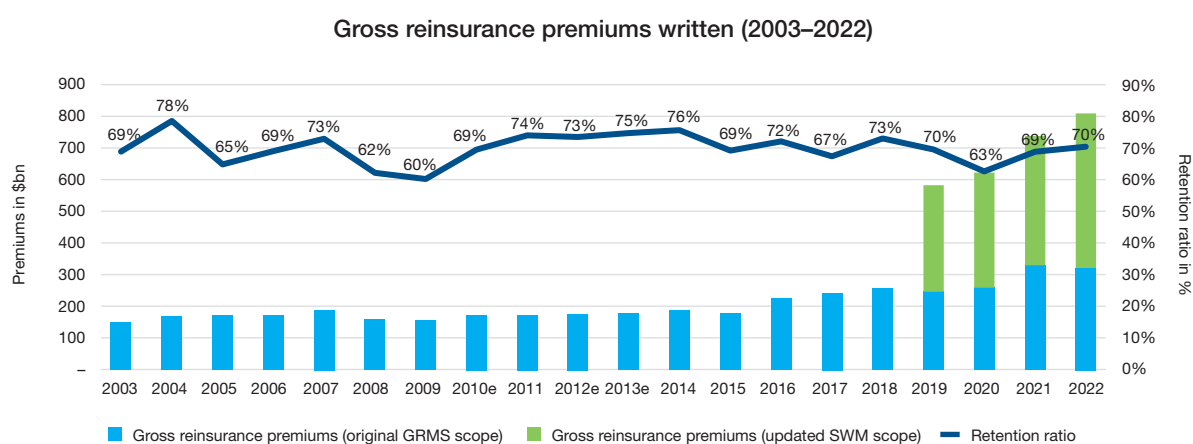
FIGURE 37



Source: IAIS SWM 2023 (GRMS + SWM reinsurance component)

Retention ratios indicate the percentage of gross premiums that are not reinsured or retroceded. It is the ratio of net premiums to gross premiums. In 2022, for the SWM sample, reinsurance retention ratios were comparable for the reinsurance market and the overall insurance market (70% for the reinsurance market compared with 74% for the insurance market). Reinsurance retention ratios indicate the extent to which reinsurers retain risks rather than buying insurance. Figure 37 shows a convergence of retention ratios in reinsurance and insurance markets. Figure 38 includes a longer time series, showing fluctuating reinsurance retention ratios, which indicates varying degrees of retrocession by reinsurers over time.

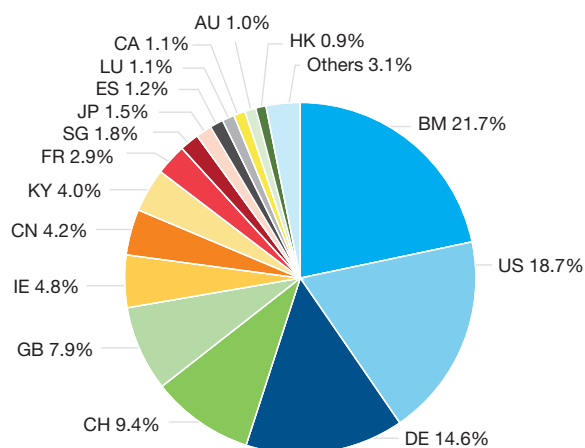
FIGURE 38



Source: IAIS SWM 2023 (GRMS + SWM reinsurance component)

FIGURE 39

Share of reinsurance gross premiums by jurisdiction (YE22)



Source: IAIS SWM 2023 (GRMS + SWM reinsurance component)

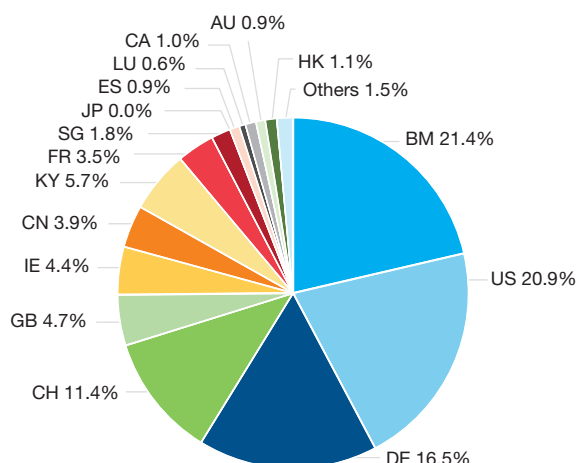
6.4 REGIONAL DISTRIBUTION OF THE REINSURANCE MARKET

Figure 39 shows the regional distribution of reinsurance gross premiums in 2022. Based on the IAIS reinsurance data collections, the five largest reinsurance markets are Bermuda, the US, Germany, Switzerland and the UK. Importantly, however, different reporting approaches are applied across jurisdictions, whereby some jurisdictions do not report all of the reinsurance market activity to the IAIS (eg the US and Luxembourg). Several jurisdictions enhanced the completeness of their reinsurance data coverage in the IAIS reinsurance data collections conducted in 2023, capturing all of the reinsurance market activity in 2022 (eg Cayman Islands, France, Germany, Spain and Switzerland).

Several jurisdictions enhanced the completeness of their reinsurance data coverage in the IAIS reinsurance data collections conducted in 2023.

FIGURE 40

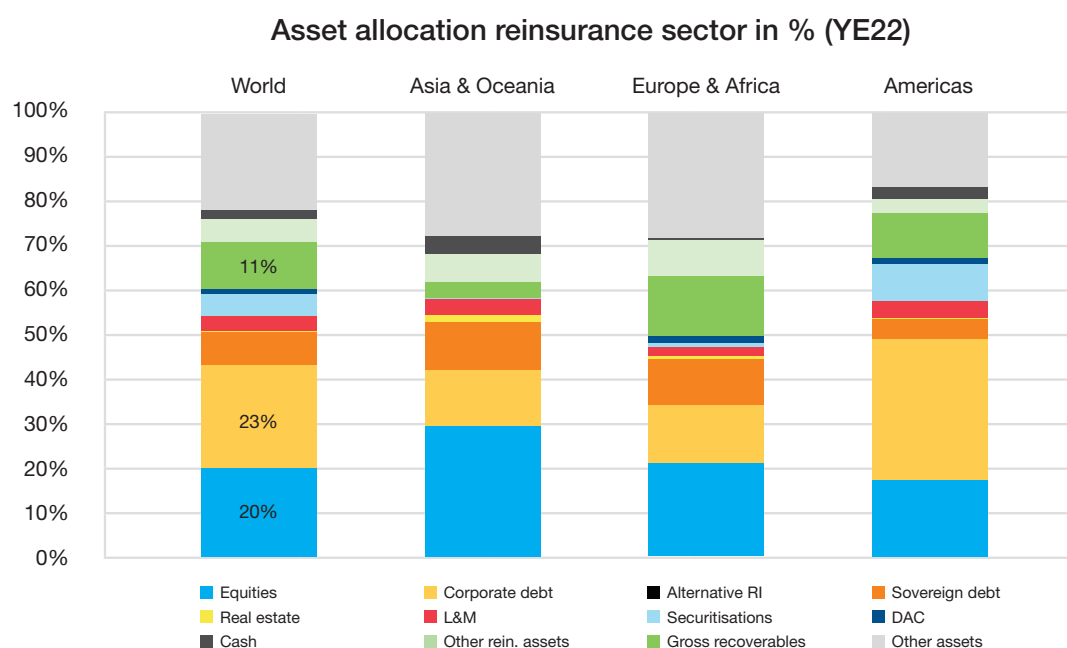
Share of reinsurance net premiums (YE22)



Source: IAIS SWM 2023 (GRMS + SWM reinsurance component)

Figure 40 shows the jurisdictional composition of net reinsurance premiums. The top-10 ranking jurisdictions based on net reinsurance premiums is comparable to that for gross reinsurance premiums, except for some slight differences for some jurisdictions (eg Switzerland, Germany or the UK). Bermuda and the US represent the largest reinsurance markets covered by the SWM, comprising more than 40% of all reported global net reinsurance premiums, although as previously mentioned, in the SWM 2023, Bermuda provided results for the totality of the market whereas the US provided data for only a sample. Accordingly, the total size of the US reinsurance market is underrepresented in the survey. These are followed by Germany, Switzerland and the UK, which make up the top five reinsurance markets, based on both net and gross reported reinsurance premiums.

FIGURE 41



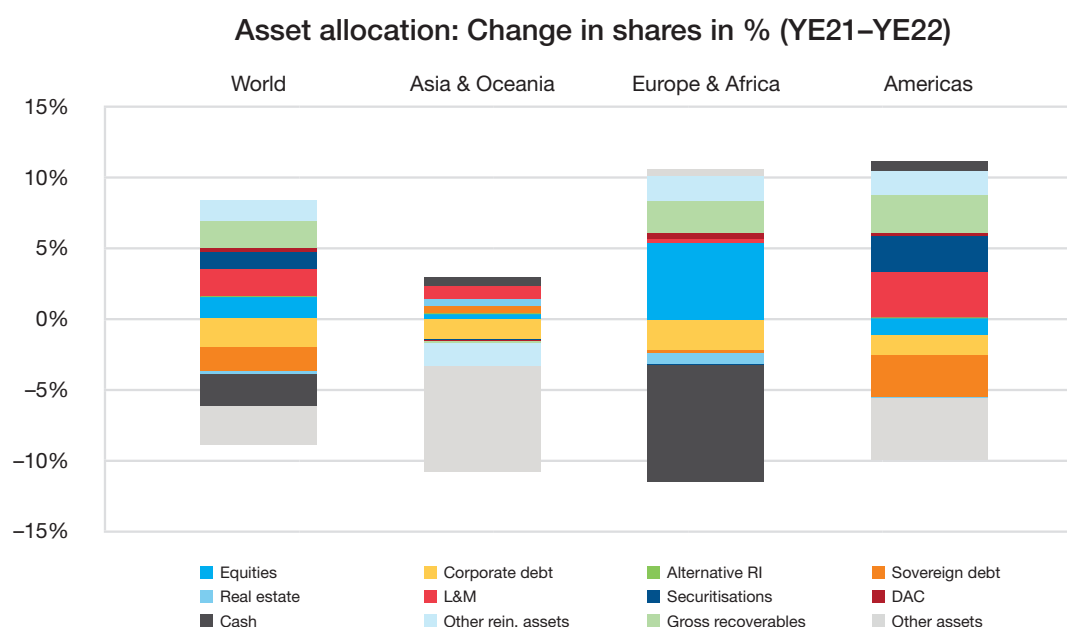
Source: IAIS SWM 2023 (GRMS + SWM reinsurance component)

6.5 REINSURANCE ASSET ALLOCATION

Figure 41 illustrates the regional split of reinsurance asset allocations, based on the IAIS reinsurance data collections. The distribution is roughly similar across regions. The key asset classes are corporate bonds (23%) and equities (20%) in all regions. The largest relative shares of asset allocations to sovereign debt securities are in the Europe and Africa regions. Reinsurers in the Americas region also have material investment exposures to securitisations, in contrast with other regions. Overall, reinsurers hold limited investments in loans and mortgages and real estate. In comparison to the insurance market, the following main differences at the year-end 2022 were identified:

- Higher shares of equities (20% of reinsurers' total assets, compared to 11% of insurers' total assets);
- Lower shares of sovereign debt (7% compared with 22%);
- Lower shares of loans and mortgages (3% compared with 6%); and
- Lower shares of real estate assets (0.4% compared with 2%).

FIGURE 42



Source: IAIS SWM 2023 (GRMS + SWM reinsurance component)

Comparing 2022 with 2021 (see Figure 42), the following main changes in the global aggregate figure (indicated as “World” in Figure 42) for reinsurers’ asset allocations can be identified:

- Slightly higher allocation⁵³ to equities (increased by 2 percentage points);
- Slightly higher allocation to loans and mortgages (increased by 2 percentage points); and
- Slightly lower allocation to corporate and sovereign debt instruments (both reduced by 2 percentage points).

In Asia and Oceania, more information was provided as part of the SWM in 2023, which resulted in the share of “other assets” decreasing by 8 percentage points.

In Europe, reported data points to an increased allocation to equities (by 5 percentage points) and reinsurance assets (by 2 percentage points) and a lower allocation to cash (by 8 percentage points) and corporate debt (by 2 percentage points).

In the Americas, reported data points to an increased allocation to loans and securitisations (by 3 percentage points) and to reinsurance assets (by 2 percentage points), combined with a lower allocation to sovereign bonds (–3 percentage points), equities (–1 percentage point) and corporate bonds (–1 percentage point).

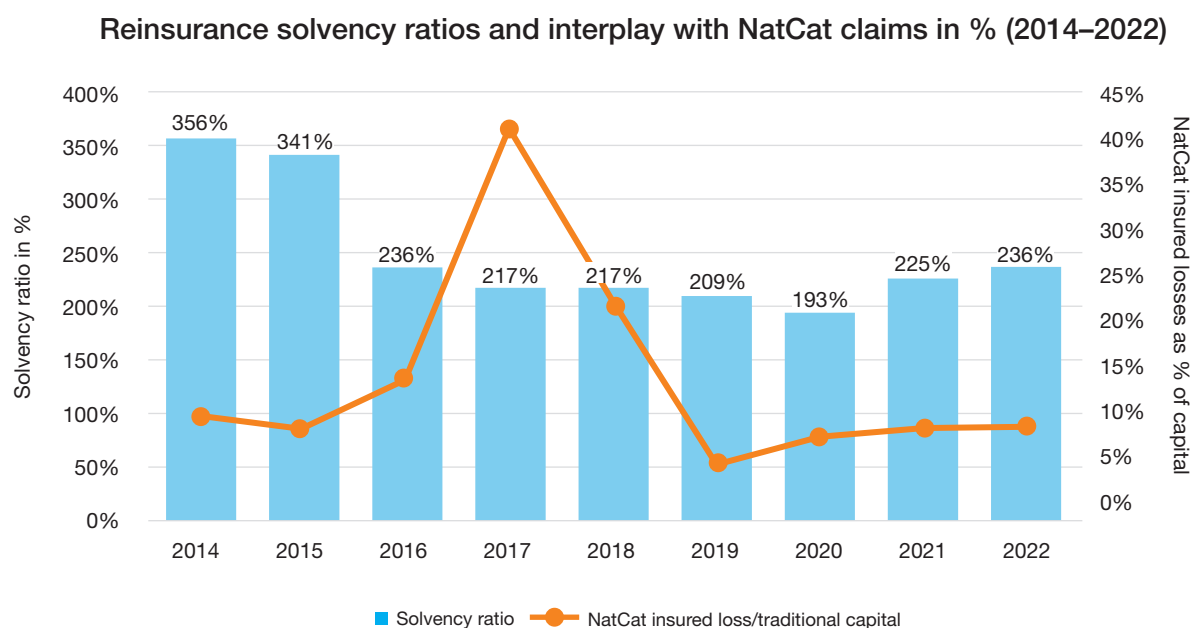
⁵³ Share on reinsurers’ total assets.

6.6 REINSURANCE SOLVENCY AND CAPITAL

Figure 43 shows the aggregate solvency ratios for the reinsurers included in the IAIS reinsurance data collections over time. The declining trend in solvency ratios⁵⁴ observed in the global reinsurance sector between 2014 and 2020 was reversed in 2021. The trend in reinsurers' solvency ratios in 2019 to 2021 was consistent with the trend in solvency ratios in the insurance sector in that period. However, the growth of reinsurers' solvency ratios in 2022 does not match the overall insurance sector solvency ratios trend in 2022, which decreased slightly.

Figure 43 also compares the size of NatCat claims with the extent of available "traditional capital" (ie capital resources excluding alternative capital instruments) since 2014. For NatCat developments, data on insured losses from the Swiss Re Sigma database were utilised. The measure of available capital was based on SWM data. The comparison shows that even in 2017, which saw the highest amounts of NatCat claims in the last eight years (due to three major F4/F5⁵⁵ category hurricanes – Harvey, Maria and Irma), the claims reached a maximum of 42% of the total amount of traditional capital instruments.

FIGURE 43



Source: IAIS SWM 2023 (GRMS + SWM reinsurance component)

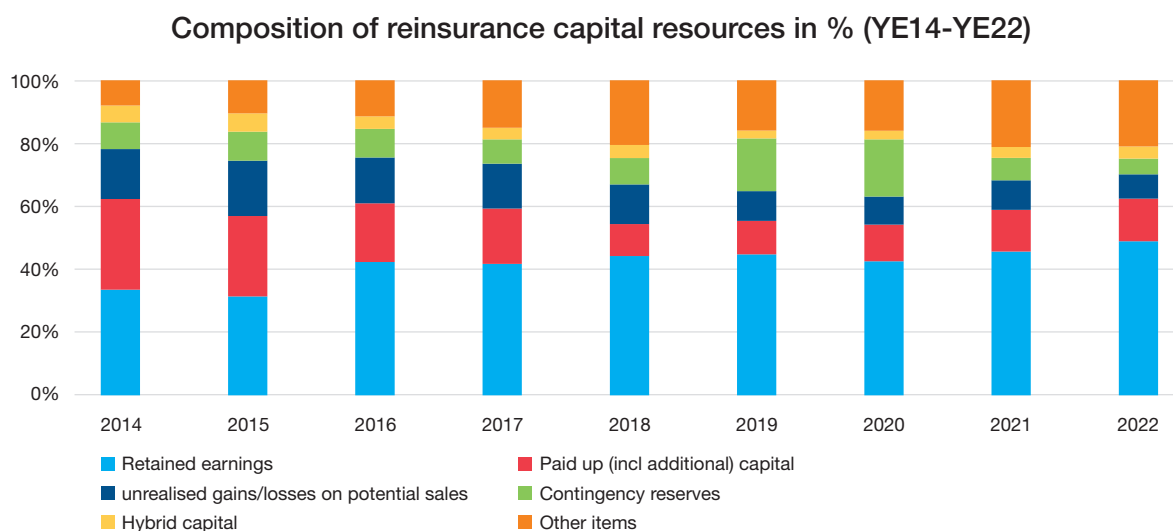
The time series in Figure 44 shows stability in the composition of reinsurers' capital resources since 2016, based on the GRMS for this year's analysis. In 2022, a small decrease in the share of contingency reserves was offset by an increase in the share of retained earnings.⁵⁶

⁵⁴ The solvency ratios are based on local solvency requirements and are simplified, which limits regional comparability.

⁵⁵ Based on the Saffir–Simpson hurricane wind scale, which classifies hurricanes that exceed the intensities of tropical depressions and tropical storms into five categories distinguished by the intensities of their sustained winds.

⁵⁶ Note that Figure 45 may slightly differ from its 2022 GIMAR version due to standardisation of the sample used for this analysis in order to improve comparability over time.

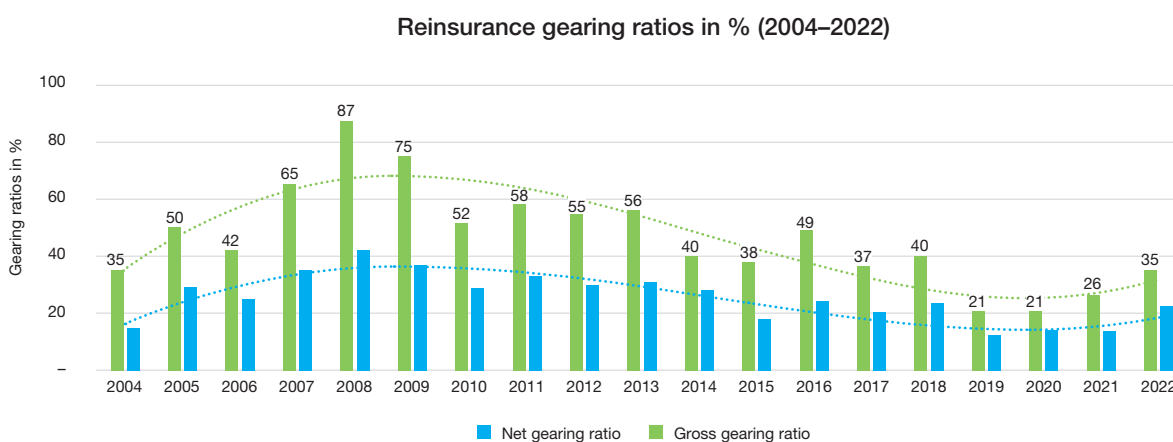
FIGURE 44



Source: IAIS SWM 2023 (GRMS⁵⁷)

Figure 45 illustrates declining gearing ratios⁵⁸ between 2008 and 2019, meaning capital resources were growing more rapidly than recoverables from retrocession in the SWM reinsurance component and GRMS data collections. Reported gross gearing ratios increased materially in 2021. This trend continued in 2022. The reporting sample excludes jurisdictions for which there is a lack of data on recoverables. The spread between the gross and net gearing ratios was on a declining trend up until 2017, indicating an increased use of collateral for retrocession. In recent years, this spread has remained relatively stable.

FIGURE 45



Source: IAIS IIM 2023

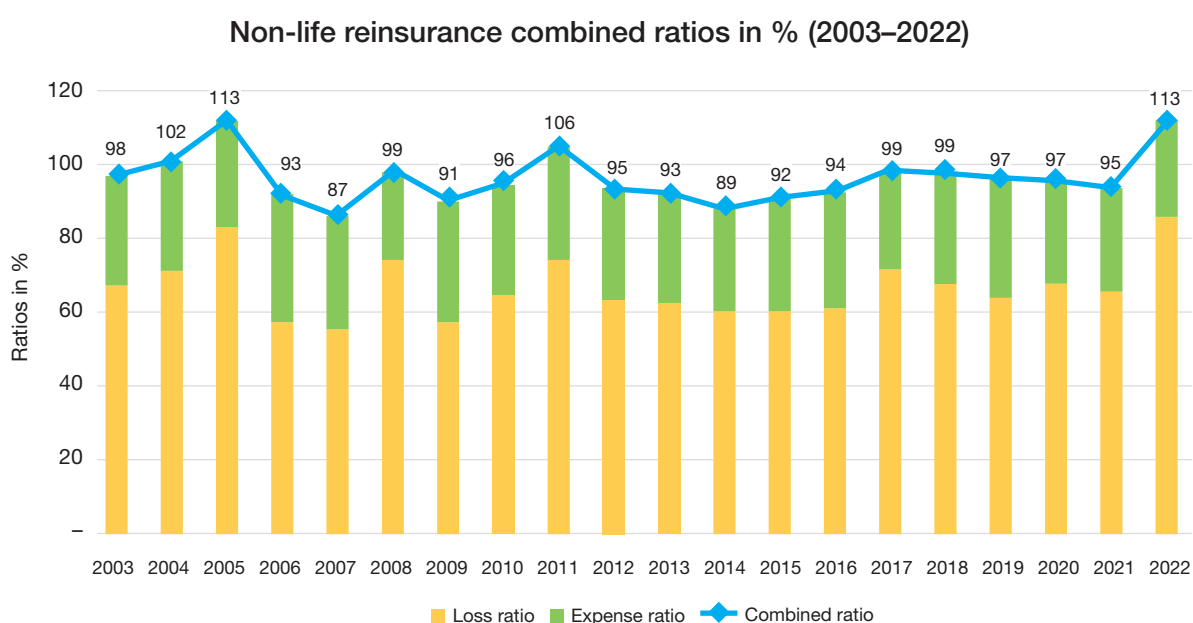
⁵⁷ From 2019 to 2021, this data was collected through the SWM reinsurance component.

⁵⁸ Gross gearing ratio = gross recoverables from reinsurance and retrocessions/total capital resources. The net gearing ratio = net recoverables from reinsurance and retrocessions/total capital resources, and net recoverables means net of collateral and offsetting items.

6.7 REINSURANCE PROFITABILITY

Figure 46 shows developments in the average combined ratio⁵⁹ of the global non-life reinsurance market covered by the SWM. After a slight decrease in combined ratios between 2018 and 2021, there was a material increase of 18 percentage points in 2022. This is the highest combined ratio reported since 2005.⁶⁰ The increase in combined ratio was observed across all regions and was driven by increasing insured losses from NatCat events. Economic insured losses from natural disasters amounted to \$125 billion in 2022, which is the fourth-worst result recorded in the last 18 years.⁶¹

FIGURE 46



Source: IAIS SWM 2023 (GRMS⁶²)

After a slight decrease in combined ratios between 2018 and 2021, there was a material increase of 18 percentage points in 2022. This is the highest combined ratio reported since 2005.

⁵⁹ The combined ratio = loss + expense ratio. The loss ratio = incurred claims including loss adjustment expenses/net earned premiums. The expense ratio = expenses other than loss adjustment expenses/net earned premiums.

⁶⁰ The 2005 combined ratio was driven by Hurricane Katrina in the US, which caused losses of \$82 billion. The high combined ratio in 2011 was driven by the severe tsunami in Japan and flooding in Thailand.

⁶¹ Swiss Re: www.swissre.com/institute/research/sigma-research/sigma-2023-01.html

⁶² From 2019 to 2021, this data was collected through the SWM reinsurance component.

Annex 1: The aggregate totals (denominators) for each IIM methodology indicator

In line with paragraph 110 of the GME document, the aggregate totals for each indicator, the formulae used to calculate indicator scores and the absolute reference values used for the indicators are disclosed in the following annexes.

Two types of denominators are calculated using no sample controls (meaning that all provided data are included after considering the data validation outcomes) as shown in Table 1:

1. **Denominators – absolute approach:** These are the denominators used to calculate the IIM systemic risk scores using the IIM Absolute methodology from 2023.¹
2. **Denominators – relative approach using year-end 2022 data:** These are the Insurer Pool aggregates at year-end 2022.

¹ As mentioned in paragraph 52 of the GME document, the base year for the IIM Absolute methodology is set using denominators from the data exercise year 2018.

TABLE 1: IIM 2023 DENOMINATORS

Category	Indicator	Denominators: absolute approach	Denominators: relative approach YE22
Size	Total assets	18,027,170	14,950,590
	Total revenues	2,517,164	2,082,015
Global activity	Revenues outside of home country	901,436	752,089
	Number of countries	1,144	1,144
Interconnectedness	Intra-financial assets	3,861,401	3,217,380
	Intra-financial liabilities	1,719,091	1,444,490
	Derivatives	4,162,248	3,466,696
	Derivatives Trading (CDS or similar derivatives instrument protection sold)	52,703	17,925
	Minimum guarantees on variable products	A. 1,374,140	A. 1,155,526
		B. 5,116,697	B. 4,260,773
Asset liquidation	Short term funding	671,449	555,545
	Level 3 assets	541,186	452,446
	Liability liquidity	4,838,260	3,969,882
Substitutability	Premiums for specific business lines	A. 5,065	A. 4,267
		B. 3,274	B. 2,754
		C. 6,204	C. 5,153
		D. 22,539	D. 18,630

Annex 2: Formulae used to calculate IIM indicator scores

Formulae used to calculate indicator scores are listed in Table 2.

TABLE 2: IIM 2023 FORMULAE USED TO CALCULATE INDICATOR SCORES

Indicator		Formulae ²
1	Total assets	$(9 - 9.3) / (\text{Denominator 1})$
2	Total revenues	$\text{Max}(((15 - 15.3) / (\text{Denominator 2})), 0)$
3	Revenues outside of home country	$16 / (\text{Denominator 3})$
4	Number of countries	$17 / (\text{Denominator 4})$
5	Intra-financial assets	$(20.2 + 21.2 + 22.1 - 22.1.P + 23.2 + 27.1.B + 27.1.C + 39.3.a.1 + 43.A + 40.B.1.a.1) / (\text{Denominator 5})$
6	Intra-financial liabilities	$(24 - 24.3.b - 24.3.d - 24.4.b - 24.4.d + 24.D.c + 27 + 27.1.A + 39.4.a.1 + 40.B.2.a.1 + 43.B + 12.1.c) / (\text{Denominator 6})$
7	Derivatives	$(40.A.1.a) / (\text{Denominator 7})$
8	Derivatives Trading (CDS or similar derivatives instrument protection sold)	$41.1 / (\text{Denominator 8})$
9	Minimum guarantees on variable products	$\text{MAX}(((31.1 + 31.2) / (\text{Denominator 9A}) - (40.A.H) / (\text{Denominator 9B})), 0)$
10	Short term funding	$((\{25 + 24.3 + (42.4 - 42.4.d) + (43.4 - 43.4.d) + (40.B.1 - 40.B.1.a + 40.B.2 - 40.B.2.a) * \sqrt{(252 / 10)}\}) / (\text{Denominator 10}))$
11	Level 3 assets	$30.3 / (\text{Denominator 11})$
12	Liability liquidity	$(100\% * 33.A.1.1 + 50\% * (33.A.1.2 + 33.A.2.1) + 25\% * 33.A.2.2 + 2.5\% * (33.A.1.3 + 33.A.3.1)) / (\text{Denominator 12})$
13	Premiums for specific business lines	$25\% * (45) / (\text{Denominator 14A}) + 25\% * (4) / (\text{Denominator 14B}) + 25\% * (4) / (\text{Denominator 13C}) + 25\% * (4) / (\text{Denominator 13D})$

² The number codes refer to the data rows in the IIM 2023 data template (see Annex 4 [here](#)).

Annex 3: The absolute reference values used for the indicators

In the 2023-2025 IIM methodology an absolute reference value (ARV) is used to calculate the derivatives trading indicator. This ARV is fixed and correspond to year-end 2017 values based on the following:

- Derivatives trading (credit default swap (CDS) or similar derivatives instrument protection sold):
This ARV is the ratio of the total current global CDS market (as of year-end 2017) to the total global CDS market in 2007. The IAIS used the Bank for International Settlements' statistics on derivatives (D10.1, total CDS contracts – notional amounts outstanding) for the respective years to establish the reference value by using the data as an approximation for the global market for CDS.

Data used to establish the ARVs reflect the result of a best effort search for an approximation of the respective markets. In selecting data to calculate an ARV for the GME, the IAIS researched a broad range of available sources and used the most suitable approach.

$$ARV_{CDS} = \frac{\$9,354\text{bn}}{\$58,244\text{bn}} = 16.06\%$$



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