AON

ILS Annual Report 2022

Alternative Capital: Growing Markets

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Foreword

It is my pleasure to bring to you the fifteenth edition of Aon Securities' annual Insurance-Linked Securities (ILS) report.

The report aims to offer an authoritative, insightful review and analysis of the ILS asset class and related developments in the market. This report is intended to be an important and useful reference document, both for ILS market participants and those with an active interest in the sector. Unless otherwise stated, its analysis covers the 12-month period ending June 30, 2022.

The ILS market was tested by a number of events during the period under review. These were across Asia-Pacific, Europe, the U.S. and Australia (e.g. China Seasonal Floods, Japan Fukushima Earthquake, Wind and Wildfires in the U.S. and Australian Floods), Western and Central Europe Flooding and Windstorm damages as well as the after effects of the COVID-19 Global pandemic.

ILS markets have shown resilience, with record issuances of $12.7 billion[1] in the 12-month period ending December 2021. For comparison, issuances for the 12-month period ending June 30, 2022, were $12 billion.

Aon's Weather, Climate & Catastrophe Insight 2021 Annual Report[2] summarizes:

Direct economic losses and physical damage resulting from natural disasters were estimated at $343 billion in 2021. This marked the seventh-costliest year on record after adjusting actual incurred damage to today's dollars using the U.S. Consumer Price Index. While not a record-breaking year – far below the peak loss years seen in 2011 ($615 billion) and 2017 ($532 billion) – it was above the average ($271 billion) and median ($265 billion) of the 21st century. When compared to the last decade (2011-2020), the economic losses were four percent higher than average and 15 percent higher than the median.

Aon's Global Catastrophe recap first half of 2022 report[3] summarizes:

Global economic losses from natural disaster events were below the 21st century average, preliminarily down 24 percent in H1 2022. It is anticipated that there will be robust loss development in most regions, as the cost(s) associated with Seasonal Monsoon Flooding, Drought and Severe Convective Storm events are fully realized. In total, H1 2022 registered 21 individual billion-dollar economic loss events. All but one of the events were weather-related, with the exception being the March 16 Earthquake near the coast of Japan. The billion-dollar events were led by the U.S. (9) and EMEA (7), followed by APAC (3) and the Americas (2).

In the period under review, $12 billion of catastrophe bond (cat bond) issuance was secured (including Life, Accident and Health), a small decrease of $0.7 billion year on year. During this significant time in the market, ILS capital has remained relatively stable at $95 billion, a reduction of approximately 2% relative to the $97 billion recorded last year.

By June 30, 2022, catastrophe bonds outstanding were $36 billion, 8% greater than June 30, 2021 at $33 billion.

The period under review witnessed both new issuers and repeat issuers coming to the cat bond market, along with new geographical coverages and innovations in the market. At $8 billion, H1 2022 was marginally smaller by $0.5 billion than the largest six-month period of primary issuance on record, which

[1] Note, where "$" is used in this report, USD is being referred to

[2] Aon – Impact Forecasting – Weather, Climate & Catastrophe Insight – 2021 Annual Report

[3] Aon's Global Catastrophe recap first half of 2022 report

was observed in H1 2021. The primary market in Q2 2022 was also busy, with the issuance pipeline momentum continuing through into the second half of the year.

The market has continued to be supported by new and repeat sponsors and has reacted in a positive orderly manner, notwithstanding H1 2022 headwinds in the market, the war in Ukraine, inflationary pressures, and rising interest rates, there was near record issuance of approximately $12 billion in the year ending June 2022.

With approximately $2 billion of cat bonds set to mature before the end of the year, we expect this market's momentum to continue through the second half of 2022 striving to match the 2021 record full-year issuance – an impressive feat given the headwinds experienced in the space at times throughout the first half of 2022. We expect an orderly market to continue and momentum to carry into 2023.

The 2022 edition of this annual ILS report, "Alternative Capital: Growing Markets", covers a wide range of topics in the ILS market, including:

- Aon Securities' Annual Review of the Catastrophe Bond Market;
- A review of ILS Transaction Activity;
- An overview of ILS Related Markets, including trends in ILW, Sidecars and Direct Placements;
- Growth Areas within ILS;
- A review of North America, Europe and Asia-Pacific activity; and
- A review of Model Updates.

We hope you will find this report useful and informative and if you have any questions relating to the data herein, or any queries regarding any aspect of the ILS sector, please contact me or my colleagues.

Paul Schultz

Paul Schultz,

Chairman and CEO, Aon Securities

Executive Summary

As the ILS market approaches its 26th annual North Atlantic hurricane season, the space is delicately poised. As with all markets, one's perspective is largely determined by its strategic position, however the prevailing observation at present is one of fine balance between ILS sponsors and investors.

From an investors' perspective, the overall landscape has evolved positively in 2022. Despite the current uncertainties around inflationary trends and its potential impact on post-event claim payments, the market finds itself in a higher total return environment. This is driven by material increases in overall pricing, which is being complimented by higher collateral returns as interest rates increase. The sum of the two components enables investors to generate expected returns that the market has not sustained for the past decade or so. This is a welcome adjustment for many in the aftermath of the loss events observed across the last five years – with investors now able to deliver notable returns on portfolios that have displayed mixed results in the recent past.

In addition to higher returns, ILS investors are able to again point to the diversification benefits of the asset class. Global equity, fixed income and credit markets have struggled year to date, while the ILS markets have seen relatively modest catastrophe frequency and severity. Nonetheless, ILS funds have faced headwinds through mark-to-market losses in the cat bond portfolio (which is relatively short-lived given the short duration of securities) driven by broader rate hardening and have also had to contend with significant foreign currency movement. Despite this, the overall theme remains that diversification is playing out well compared to prior "bull years" of the broader financial markets. With the space continuing to display its ability to offer a source of diversification from the volatility so far observed in the broader capital markets this year – one can reasonably expect further capital to seek to benefit from this trait.

From an ILS sponsors' perspective, the increasing prices seen in traditional reinsurance and retrocession markets is increasing the demand for ILS based reinsurance capacity. The quest for more capacity from ILS markets is well under way, whether it be for proportional based sidecars, or non-proportional based reinsurance via cat bonds or collateralized reinsurance. We are now in a market where the demand for ILS capacity exceeds supply of ILS capital, and whilst this results in higher prices and tighter terms and conditions, regular sponsors of ILS products are increasingly grateful for this alternative source of capital, forging strong relationships with the capital markets in the process.

So, what does this all mean for the future of insurance-linked securities? Historically, higher margins and further evidence that ILS is a diversifying asset class has resulted in meaningful market growth. If we go back a decade or so when margins were at similar levels, during the period of 2012 to 2016, we witnessed annual compounding market growth rates of approximately 15%. With higher margins and the higher ILS returns that theoretically follow, it is reasonable to project longer-term robust growth in ILS capital. This is likely to only occur once the world better understands inflationary trends, interest rates and the overall geopolitical uncertainties that have pervaded the broader financial markets so far in 2022.

Richard Pennay,

CEO Insurance-Linked Securities, Aon Securities

Aon Securities' Annual Review of the Catastrophe Bond Market

Overview

The July 1, 2021 to June 30, 2022 year in review saw continued growth in the catastrophe bond market, with consistent quarterly issuances and a near record issuance year of approximately $12 billion placed in the period under review including Life, Accident and Health, versus $13 billion in the prior record year.

A selection of new and diverse issuers and new transactions during the period were:

- Orange Capital Re DAC, domiciled in Ireland, provided first-time sponsor NN Re with indemnity reinsurance protection on a per occurrence basis across a three-year term. The single €75 million tranche of Notes offers protection against European Windstorms and Severe Thunderstorms in the Netherlands and Belgium.
- Montoya Re Ltd, domiciled in Bermuda, provided Inigo Re with a three-year source of retro reinsurance for its Lloyd's Syndicate 1301 operation. The single $115 million tranche of Notes covers Named Storm or Earthquake losses in the U.S., Canada Earthquake, Japan Typhoon and Japan Earthquake.
- Claveau Re Ltd domiciled in Bermuda came to market with a $150 million retrocessional reinsurance catastrophe bond for Arch Reinsurance and related entities for a four-year term. The Notes provide protection on an annual aggregate index basis, covering losses from global peak peril events.
- World Bank IBRD CAR 130 Note issuance on behalf of first-time issuer, the Government of Jamaica, came to market with a $185 million bond. The Notes provide protection against losses from Named Storms on a parametric trigger and per-occurrence basis, across three Atlantic Hurricane seasons ending in December 2023.

A selection of repeat issuers during the period were:

- Allstate returned to the market with 3 transactions during our review period, each listed below:
  - For its second transaction of 2021, Bermuda based Sanders Re II Ltd. achieved $400 million of cover in November on both a per-occurrence and aggregate basis. It provides cover against losses from named U.S. multi-perils across all states except for Florida, all on an indemnity trigger basis, for just over a three-year term.
  - For a first transaction in 2022 with Bermuda based Sanders Re III Ltd. attaining $550 million of cover on a per-occurrence and aggregate basis. It provides cover against losses from named U.S. multi-perils across all states except for Florida, all on an indemnity trigger basis for a four-year term.
  - In addition, for its second transaction in 2022 with Bermuda based Sanders Re III Ltd, Allstate achieved $287.5 million of cover across two tranches operating on an indemnity cascading per-occurrence basis, and the third a one year, per occurrence discount note. It provides cover against losses from named US multi-perils across the state of Florida, for a three-year term.
- State Farm also returned to the market for its first transaction of 2022 in April, with Bermuda based Merna Re II Ltd. achieving $300 million of cover on a per-occurrence basis. It provides cover against losses from named Earthquake perils across all 50 U.S. states plus the District of Columbia, excluding California, Florida and Texas, all on an indemnity trigger basis for a three-year term.

- State Farm returned to the market for their second issuance of 2022 with Merna Re II Ltd, seeking and securing $200 million (2022-2 series) and $300 million (2022-3 series) of cover on a per occurrence basis. The 2022-2 series provides cover against losses from Named Storm and Severe Convective Storm perils across the U.S. state of Florida. The 2022-3 series provides cover against losses from Named Storm across the U.S. state of Texas, both on an indemnity trigger basis for a three-year term.
- Zenkyoren, the Japanese National Mutual Insurance Federation of Agricultural Cooperatives completed its largest transaction ever, using a new Singapore based Nakama Re Pte. Ltd. issuer. The $775 million issuance provides reinsurance protection on a three-year term aggregate, indemnity triggered basis, covering against Japan Earthquake risks for a period of five years.
- Everest Re Group returned to the market with Kilimanjaro III Re Ltd domiciled in Bermuda, with a $300 million single note issuance, seeking retrocessional reinsurance cover on an annual aggregate index basis, covering losses from U.S., Puerto Rico, U.S. Virgin Islands and Canada Named Storm and Earthquake events for a three-year term.
- Validus Holdings returned to the market with Bermuda domiciled Tailwind Re, achieving $400 million across a multi note issue, providing cover for annual aggregate retrocessional protection for losses from Named Storm and Earthquake events on an industry loss basis, covering U.S., Canada, Puerto Rico and U.S. Virgin Islands, for a three-year term.

The ILS market has continued growth momentum with $36.5 billion in outstanding issuances, as the average transaction size for H1 2022 was $234 million over thirty-four different issuances; twenty-four of those issuances came in Q2, equaling the Q2 2017 record for the most issuances in a quarter. As a comparison, the average deal size for H1 2021 was $283 million. Index cat bond issuance for the entirety of 2021 is virtually identical to index issuance in H1 2022 ($2.3 billion in 2021 and $2.225 billion in H1 2022), underlining continued demand for the product and the growth of the market.

Geopolitical factors such as the war in Ukraine in the first half of 2022, alongside higher global inflation, interest rates and currency volatility, all impacted transaction flows and sizes, and with sponsor demand remaining high, the overall effect was an observable increase in spreads as most H1 transactions priced at the wide end of guidance.

Despite the price widening, demand for the cat bond product from cedents has remained robust, with 30 sponsors successfully completing transactions in H1 2022. Q4 2021 was the second largest ever issuance quarter with $2.8 billion in notional issuance, finishing 2021 strongly.

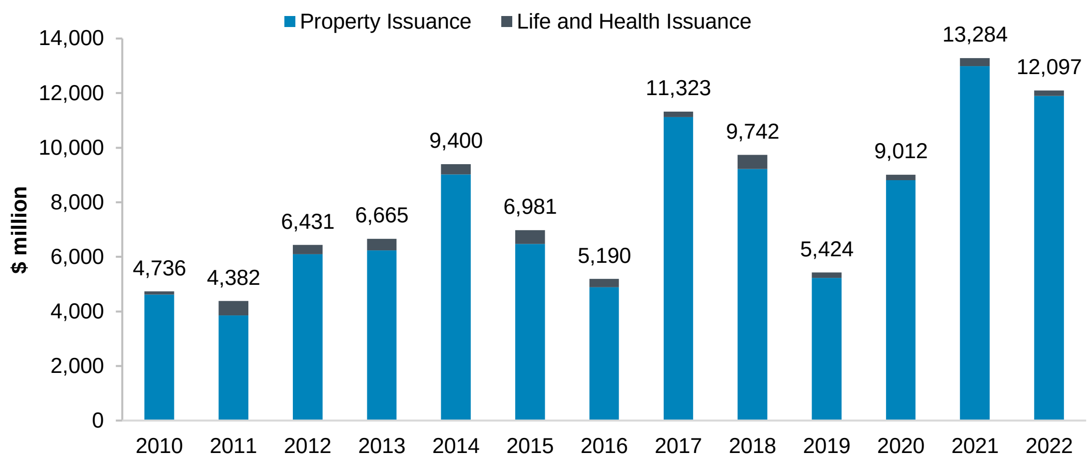
The market continues to foster innovation through broadening geographic coverage and structural development. One such example being Kilimanjaro III Re Ltd 2022-1, where the first inflation control mechanism was inserted in the above mentioned $300 million transaction. The mechanism was well received by investors and represented an effort from the sponsor side to alleviate contemporary inflationary pressures.

The market saw the continuance of Environmental, Social and Governance (ESG) and Socially Responsible Investment (SRI) cat bond collateral components in the first issuance for the NN Re sponsored Orange Capital Re DAC €75 million European Wind transaction, via EBRD (European Bank for Reconstruction and Development) collateral cover, a future growth area. Corporate activity is increasing and under active consideration. In addition, LADWP, the first municipal utility to access the catastrophe bond market in 2021, came to market with a second transaction during the period under review.

Whilst the cat bond market has observed rate hardening, it continues to diversify and attract both new and repeat sponsors, with relatively larger increases in traditional (re)insurance pricing placing the ILS market in a more competitive position year on year. Investors have appetite for new and repeat transactions with appropriate structure and pricing. The continued increase in demand for capital from sponsors of ILS and supply of capital from the investor side has ensured that outstanding capacity has increased by approximately $3 billion year on year.

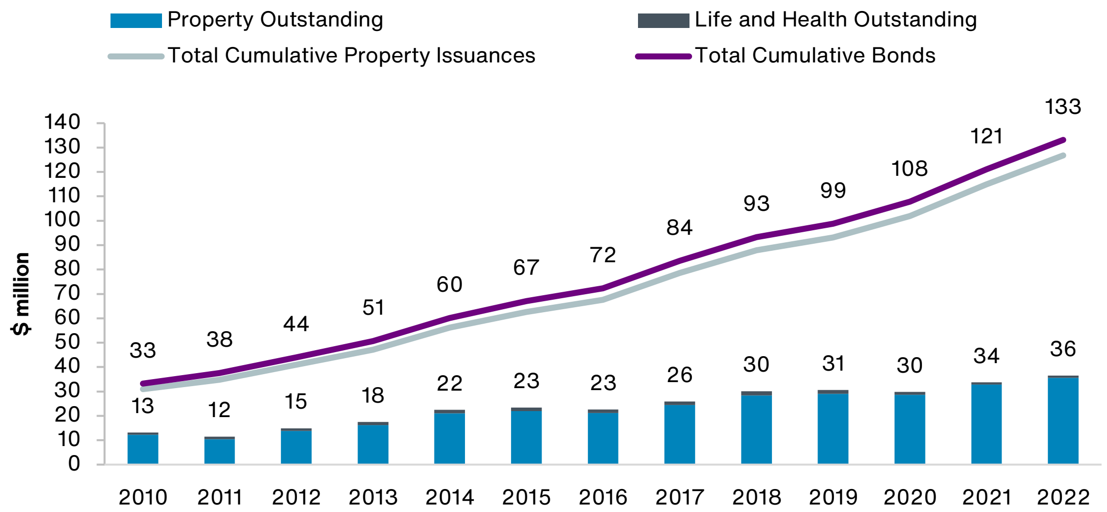
Traditional low ILS market volatility and its lack of correlation to financial markets comes to the fore in times of wider macroeconomic instability, including the emergence and proliferation of COVID-19, geopolitical issues and interest rates and currency volatility. The inherent values of the asset class therefore support the fundamentals of a growing market – a theme we expect to continue into the latter half of 2022 and beyond into 2023.

Exhibit 1: Catastrophe bond issuance by year, 2010 to 2022 (years ending June 30)



Source: Aon Securities LLC

Exhibit 2: Outstanding and cumulative catastrophe bond volume, 2010 to 2022 (years ending June 30)



Source: Aon Securities LLC

Issuer Domicile Summary

With cat bond issuance count remaining largely stable year on year, Bermuda remains as the largest issuer domicile for the 12-month period under review, with 41 issuances using the jurisdiction. Away from Bermuda, Singapore accounted for 5, the Cayman Islands 3, Ireland 2, whilst the UK, U.S and Hong Kong all accounted for a single issuance each (excluding direct placements).

Overall, as was the case in the prior year, Bermuda continues to attract the majority of issuer domicile selection for the period under review, even expanding their proportional share of total issuance count.

A notable development is that, after the passing of the Insurance (Amendment) Bill in 2020, June 2022 saw the Hong Kong ILS regime act as the domicile for its first public 144A cat bond transaction. With sponsors starting to utilize the regime and the continuation of the 2-year pilot ILS Grant Scheme currently in effect in the jurisdiction, growth prospects for the region and the Asian market more broadly look to be positive for the year ahead.

Exhibit 3: Number of 144A transactions per issuer domicile

Domicile	Period ending June 30, 2021	Period ending June 30, 2022
Bermuda	38	41
Singapore	7	5
Cayman	3	3
Ireland	2	2
UK	1	1
USA	0	1
Hong Kong	0	1
Grand Total	**51**	**54**

Source: Aon Securities LLC

Regional Market Analysis for APAC Domiciles

Hong Kong

In 2020, the Hong Kong Legislative Council, introduced changes to the Insurance (Amendment) Bill 2020 with the intention of creating new growth opportunities to the insurance sector.

This allowed for the Hong Kong Insurance Authority (IA) to authorize Special Purpose Insurers (SPI) for the purpose of issuing ILS.

To further develop the ILS market in the region, a 2-year pilot Insurance-Linked Securities Grant Scheme of up to HKD 12 million ($1.6 million) per issuance has been approved by the Hong Kong Government.

Since then, two catastrophe bonds have been issued out of Hong Kong.

The first catastrophe bond issued of out Hong Kong in October 2021 was Greater Bay Re Limited (Series 2021-1), by state-owned sponsor, China Property & Casualty Reinsurance Company Limited. The first authorized SPI, Greater Bay Re Limited secured $30 million against losses from Chinese Typhoons.

The second, Black Kite Re Limited (Series 2022-1) was issued in June 2022 by the locally headquartered reinsurer, Peak Reinsurance Company Limited. The Notes managed to raise $150 million of capacity to deliver protection against Japanese Typhoon retrocession.

The number of transactions in Hong Kong is similar to that experienced by Singapore during the first two years of launching an ILS regime, with an increase in interest from sponsors in the region to follow. Similarly, investors have also gradually gained comfort and confidence in the jurisdictions now that initial transactions have been proven to be a success.

The grant scheme continues to be an attractive incentive for potential sponsors to use Hong Kong as a domicile.

Though still in the early stages, the IA have indicated their flexibility in improving their processes in a bid to emulate the success of Bermuda.

As the experiences of the regulator and service providers in the domicile develop, we can expect Hong Kong continuing to serve an important role in connecting Chinese sponsors to capital markets as a viable alternative to traditional reinsurance capital.

Singapore

Singapore has seen success in implementing an ILS framework necessary since its first catastrophe bond issued in February 2019. To date, the domicile has had 18 transactions launched from both Asian sponsors and non-Asian sponsors alike.

One of the reasons behind the success of the domicile is the Monetary Authority of Singapore (MAS) willingness to improve the regulatory environment and enhancing the requirements around ILS and catastrophe bond issuances. In the past year, the MAS have made proposals to grant special purpose reinsurance vehicles (“SPRVs”) exemption from insurance regulatory requirements pertaining to investments policies. The other proposal relates to SPRVs being excluded from full public disclosure which are typically required of an insurance or reinsurance business domiciled in Singapore.

Such initiatives are received positively by sponsors and investors as evidenced in the Catahoula II Re Pte Ltd transaction becoming the first cat bond listed on the SGX in June 2022.

MAS have committed to build on Singapore’s capabilities as the hub for ILS by refining their regulatory, tax and corporate infrastructure and to accommodate emerging risks beyond natural catastrophes, such as cyber and pandemic based risks.

Exhibit 4: Domiciles comparison

	Bermuda	Singapore	Hong Kong
SPI/SPRV Approval Timeline	• 3 days to obtain in-principal approval	• 6-8 weeks to obtain in-principal approval (one-month preliminary review process and two weeks for in-principal approval)	• 6-8 weeks to obtain in-principal approval (done by a monthly board meeting)
SPI/SPRV Requirements	• Three Authorized Officers for the Board of Directors • Possibility of waiving the requirement to prepare audited financial statements and statutory financial return, and instead file unaudited management accounts	• Three Authorized Officers (two must be independent directors approved by MAS) • Annual audits required for the SPRV • Although the initial SPRV set-up costs will be covered by the MAS, ongoing expenses are more expensive than in other domiciles such as Bermuda due to Service Provider costs	• Two or more directors (at least one must be a Hong Kong resident) and one administrator • Annual audits required for the SPI • SPI must be fully funded; meaning that its full liabilities must be fully backed by assets including funds raised through debt or other financing arrangements
Series Issuance	• Series issuance under the same vehicle is available	• Series issuance is available however multiple issuance under the same vehicle would not be subsidized by the ILS grant scheme	• Series issuance is available however multiple issuances under the same vehicle would not be subsidized by the ILS grant scheme
Sponsors involvement in the application process	• SPI application form (“SAF”) to be completed and signed by the applicant (i.e. Administrator or Corporate Secretary) • Bermuda regulator will contact the sponsor’s local regulator for a background check	• SPRV application will have to be submitted by a senior executive of the sponsor (i.e. CEO or representative of the board of directors) • Proforma analysis will have to be reviewed by a certified inhouse actuary • The Singapore regulator will contact the sponsor’s local regulator for a background check	• SPI application form to be completed and signed by the applicant (i.e. Administrator or Corporate Secretary) • May require to obtain CBRIC certificate of eligibility • The Hong Kong regulator will contact the sponsor’s local regulator for a background check
Expense reimbursement	• N/A	• SGD $2M • Approx. USD $1.5M • The current grant scheme is due to expire at the end of 2022 The MAS is currently discussing whether to extend the maturity	• HKD $12M (dependent on term) • Approx. USD $1.5M

Source: Aon Securities LLC

Global Catastrophic Loss Activity in H2 2021 and H1 2022

H2 2021

The 2021 calendar year saw $130 billion in insured losses, which represents a 34% increase from 2020 and is 76% above the 21st century average, with numerous industry records broken across the global market. The global protection gap continues to expand, with economic losses ($343 billion) significantly outstripping insured losses ($130 billion) across the year.

2021 represented the seventh costliest year on record in terms of economic losses, whilst there were 20 billion-dollar insured loss events – the fourth highest on record. Further, four $20+ billion events were recorded – Hurricane Ida, Flooding caused by Storm Bernd in Europe, summer Flooding in China and the U.S. Polar Vortex (Uri) in North America (H1 2021 event). This was the first time that four $20+ billion events had been registered in a calendar year that were solely weather/climate related.

Global insured losses surpassed $100 billion for the fourth time in five years in 2021, as the domestic German, Belgium, Austrian, Luxembourg and Chinese markets recorded their costliest insurance industry events on record. The year saw an above average Atlantic Hurricane season, with 21 Named Storms – making 2021 the third most active Wind season recorded since 1851. Of these, four reached major Hurricane status, as Hurricane Ida caused $36 billion worth of insured losses, becoming one of the costliest Tropical Cyclone events ever for insurers.

“Secondary perils” continue to drive a significant proportion of annual loss years. Severe Convective Storms (SCS) were responsible for $27 billion of U.S. insured losses – with Hail events in Texas and Oklahoma, followed by Tornados and Derechos in December, contributing to the majority of this total. Meanwhile, the Dixie Fire was the second largest Fire event in California in the modern era (back to 1932) whilst the Marshall Fire in late December became the costliest and most destructive Fire ever recorded in Colorado.

In Europe, Storm Bernd resulted in more than $13 billion of insured losses through heavy Rainfall and Flood damage – making it the costliest event on record in Europe, contributing to more than half of the incurred insured losses on the continent throughout 2021.

As economic and insured losses continue to grow annually and catastrophes become both more frequent and severe, there is increasing focus upon developing a coordinated combative and mitigatory strategy to climate related events across the public and private sectors. The United Nations Climate Change Conference (COP26) displayed promising levels of collaboration, showing how public and private actors can effectively advance new plans to minimize climate change impact and reduce future climate risk.

H1 2022

The first six months of 2022 were marked by an above average loss experience for the insurance industry, with frequency and severity of events surpassing historical average benchmarks. Whilst H1 2022 failed to surpass H1 2021’s loss experience, the $39 billion of insured losses was 18% above the 21st Century average – with further loss development anticipated over the coming months as the impact of events continue to be realized across the industry.

From a frequency perspective, at least 20 events were recorded with at least $500 million in insured losses – tying 2011 as the second highest H1 total since 2000, and only marginally behind the record of 24 set in 2020. The most significant contributor in terms of peril to this severe event frequency has been severe convective storm – which generated three billion-dollar events in the U.S. and a further two through hailstorms in France.

The costliest event this year to date was the prolonged flooding observed in eastern Australia throughout February and March, with unprecedented rainfall observed across Queensland and New South Wales. Indeed, the Sydney metropolitan area experienced some of its heaviest rainfall year-to-date on record. The financial impact was significant, with a current estimate of $3.5 billion in insured losses attributable to the flooding, which has the potential to develop further as losses continue to mature. In Europe, first half severe convective storm losses exceeded $5 billion for the second year in a row – a trend unseen within the historical record, highlighting the impact that climate change amongst other factors are having upon natural catastrophe events.

Catastrophe Bond Transaction Review by Quarter

Q3 2021

Q3 2021 saw roughly 55% increase in cat bond issuances compared to Q3 2020, bolstered by Zenkyoren's $775 million Nakama Re 2021-1 issuance. In total, four sponsors came to market, of which included government entities, insurers and reinsurers. Notably, new sponsors, Arch Reinsurance Ltd. and the Government of Jamaica secured $150 million and $185 million of protection from the ILS market, respectively. Repeat sponsors, Frontline Insurance and Zenkyoren, leveraged Singapore's developing ILS Grant Scheme, both issuing out of a Singapore-domiciled vehicle.

Claveau Re Ltd.

Similar to the 2021 Herbie Re series, Arch's inaugural issuance provides effectively world-wide protection against multiple perils on a territory-weighted insured industry loss index basis. The novel $150 million, 4-year transaction utilizes an annual aggregate structure, has an annualized expected loss of 7.95% and priced at 17.25%.

Astro Re Pte. Ltd.

Frontline Insurance returned to the cat bond market in 2021 with Astro Re, a newly created Special Purpose Vehicle (SPV) domiciled in Singapore. The $40 million issuance provides Frontline with indemnity, per-occurrence protection against Named Storms covering Frontline's exposures in Alabama, Florida, Georgia and the Carolinas across a 4-year risk period. The Notes have an annualized expected loss of 2.59% and ultimately priced at the wide end of guidance, being 8.00%.

IBRD CAR 130

The Government of Jamaica joined the growing list of countries who have secured material ILS capacity via the IBRD CAR program, sponsoring the $185 million IBRD CAR 130 Notes. The transaction was the 17th catastrophe-linked capital at risk Note issued by the IBRD, providing the Government of Jamaica with protection against Named Storm events on a parametric basis across a three-year risk period. The Notes have an annualized expected loss of 1.79% and priced at 4.40%.

Nakama Re Pte. Ltd.

The National Mutual Insurance Federation of Agricultural Cooperatives ("Zenkyoren") returned to the cat bond market for their largest issuance to date, totaling $775 million across two tranches of Notes via the Nakama Re program. The 2021-1 and 2021-2 Notes, $550 million and $225 million in size, respectively, each provide Zenkyoren with five years of collateralized protection on an annual aggregate basis for Earthquake risks in Japan. Notably, Zenkyoren opted to utilize the Singapore ILS Grant Scheme, choosing to issue the Notes out of Singapore, a trend observed across H2 2021 – H1 2022 for many cat bond sponsors.

Exhibit 5: Q3 2021 catastrophe bond issuance

Beneficiary	Issuer	Series	Class	Issue Size ($ million)	Covered Perils	Trigger	Recovery	Collateral
Frontline Insurance	Astro Re Pte. Ltd.	Series 2021-1	Class A	$40.00	US NS: AL, FL, GA, NC, SC	Indemnity	Occurrence	MMF
Arch Reinsurance Ltd.	Claveau Re Ltd.	Series 2021-1	Class A	$150.00	NA: NS, EQ; US: ST, WF, WS; US CARBN: EQ; JP: TY, EQ; CAN: ST, WS; EU: Wind; IT: EQ; TKY: EQ; AU: EQ, TC; NZ: EQ	Industry Index	Aggregate	MMF
The Government of Jamaica	IBRD CAR	Series 130	Class A	$185.00	Jamaica NS	Parametric	Occurrence	MTN
National Mutual Insurance Federation of Agricultural Cooperatives	Nakama Re Pte. Ltd.	Series 2021-1	Class 1	$550.00	JP EQ	Indemnity	Aggregate	MMF
National Mutual Insurance Federation of Agricultural Cooperatives	Nakama Re Pte. Ltd.	Series 2021-1	Class 2	$225.00	JP EQ	Indemnity	Aggregate	MMF
Total				**$1,150.00**				

Source: Aon Securities LLC

Q4 2021

Fourth quarter of 2021 observed the second highest levels of quarterly issuance volumes historically as $2.8 billion of catastrophe bonds were placed into the market across 15 different transactions. Pleasingly, three new sponsors entered the market; Farmers Insurance Group, Prologis and NN Re successfully executed their first ILS transactions and took advantage of a favorable issuance environment in advance of the January 1 renewal.

Titania Re Ltd

Syndicate 1910 (Ariel Re) successfully returned to the cat bond market with their second transaction having established their cat bond program in 2020. The deal provides Ariel Re with retrocession coverage on an industry loss index basis, delivering annual aggregate protection for U.S., Puerto Rico, U.S. Virgin Islands, D.C., Canada Named Storms and Earthquakes with losses reported by PCS.

The transaction was marketed with a $150 million target size and a price guidance of 6.75% - 7.25% (expected loss of 3.32%). After a successful marketing period, Ariel Re was able to price the transaction below initial guidance at 6.50%. Further, there was additional demand from the investor community allowing for an upsized transaction to $175 million.

Four Lakes Re Ltd

American Family Mutual Insurance (AmFam) secured $125 million of capacity to provide protection against U.S. multi-perils on an indemnity, per occurrence basis. The transaction was successfully executed approximately 12 months after the inaugural Four Lakes Re Ltd issuance in 2020 which saw the mutual insurer obtain $175 million from the cat bond market; the Four Lakes Re program now represents $300 million of limit which will remain outstanding until 2023 and 2024.

In a similar fashion to the 2020 issuance, the deal was well received by investors which provided AmFam the opportunity to upsize the transaction by $25 million from an initial target of $100 million. The Class A Notes, with an expected loss of 1.37% priced at 4.75%, slightly below the midpoint of the 4.50% - 5.25% guidance.

Orange Capital Re DAC

NN Group and specifically their internal reinsurance subsidiary NN Re executed their first catastrophe bond, Orange Capital Re, in the fourth quarter of 2021. The transaction provides NN Re with indemnity per occurrence protection covering Windstorm and Severe Thunderstorm events causing losses to part of Property, Motor Hull and Engineering insurance policies offered to private lines and/or Commercial Lines customers, in the Netherlands and Belgium. With limited diversifying opportunities for investors, the deal was well received as it provided exposure to non-U.S. peak perils. Having announced with price guidance of 3.25% - 3.75% and target size of EUR 75 million the final pricing was reflective of investor demand, allowing NN Re to execute the transaction at 3.25%.

Exhibit 6: Q4 2021 catastrophe bond issuance

Beneficiary	Issuer	Series	Class	Issue Size ($ million)	Covered Perils	Trigger	Recovery	Collateral
Hannover Ruck SE	3264 Re Ltd.	Series 2022-1	Class A	$100.00	NA: NS, EQ; US: ST, WF, WTS, EQ; JP: NS, EQ; CAN: ST, WTS; EU: WS, Italy EQ, Turkey EQ, Australia EQ, NS, NZ EQ	Industry Index	Aggregate	MMF
Oak Tree Assurance	Acorn Re Ltd.	Series 2021-1	Class A	$475.00	Westcoast EQ	Parametric	Occurrence	MMF
American Strategic Insurance Group	Bonanza Re Ltd.	Series 2021-1	Class B	$80.00	US NS, WS, WF, EQ, ST	Indemnity	Aggregate	MMF
American Family Mutual Insurance Company	Four Lakes Re Ltd.	Series 2021-1	Class A	$125.00	US: NS, EQ, ST, WTS, WF, VE, MI	Indemnity	Occurrence	MMF
Covea Group	Hexagon III Re Pte.	Series 2021-1	Class A	$113.19[4]	France: Wind, Hail, OP	Indemnity	Occurrence	MTN

[4] FX conversion correct as of time of issuance

Exhibit 6: Q4 2021 catastrophe bond issuance (continued)

Beneficiary	Issuer	Series	Class	Issue Size ($ million)	Covered Perils	Trigger	Recovery	Collateral
Covea Group	Hexagon III Re Pte.	Series 2021-2	Class B	$59.99[4]	France Wind	Indemnity	Occurrence	MTN
Prologis, Inc.	Logistics Re Ltd.	Series 2021-1	Class A	$95.00	US EQ	Indemnity	Occurrence	MMF
Swiss Reinsurance Company Ltd.	Matterhorn Re Ltd.	Series 2021-1	Class A	$150.00	US: NS, EQ	Industry Index	Occurrence	MTN
NN Re (Netherlands) N.V.	Orange Capital Re DAC	Series 2021-1	Class A	$84.78[4]	Belgium and Netherlands: WS, ST	Indemnity	Occurrence	MTN
Alphabet, Inc.	Phoenician Re Ltd.	Series 2021-1	Class A	$275.50	CA EQ	Indemnity	Occurrence	MMF
LADWP	Power Protective Re Ltd.	Series 2021-1	Class A	$30.00	CAL WF	Indemnity	Occurrence	MMF
United Services Automobile Association	Residential Reinsurance 2021 Limited	Series 2021-2	Class 2	$175.00	US: TC, EQ, ST, WTS, WF, VE, MI, OP	Indemnity	Occurrence	MMF
United Services Automobile Association	Residential Reinsurance 2021 Limited	Series 2021-2	Class 3	$125.00	US: TC, EQ, ST, WTS, WF, VE, MI, OP	Indemnity	Occurrence	MMF
Allstate Insurance Company	Sanders Re II Ltd.	Series 2021-2	Class A	$250.00	US: NS EQ SCS WF VE MI	Indemnity	Occurrence	MMF
Allstate Insurance Company	Sanders Re II Ltd.	Series 2021-2	Class B	$150.00	US: NS EQ SCS WF VE MI	Indemnity	Dual Trigger	MMF
Sempra Energy	SD Re Ltd.	Series 2021-1	Class A	$45.00	CAL WF	Indemnity	Aggregate	MMF
Sempra Energy	SD Re Ltd.	Series 2021-1	Class B	$135.00	CAL WF	Indemnity	Aggregate	MMF
Syndicate 1910	Titania Re Ltd.	Series 2021-2	Class A	$175.00	NA: NS, EQ	Industry Index	Aggregate	MMF
Farmers Insurance Group	Topanga Re Ltd.	Series 2021-1	Class A	$100.00	US: NS, EQ, ST, WF	Indemnity	Occurrence	MMF
Farmers Insurance Group	Topanga Re Ltd.	Series 2021-1	Class B	$60.00	US: NS, EQ, ST, WF	Indemnity	Aggregate	MMF
Total				**$2,803.46**				

Source: Aon Securities LLC

[4] FX conversion correct as of time of issuance

Q1 2022

Q1 2022 represented the third largest Q1 in terms of total cat bond capacity issued, with a total of $3.08 billion. Demand for the index product remained strong, as the market continued the momentum observed throughout 2021.

Tailwind Re Ltd 2022-1

Validus Holdings returned to the cat bond market with the second edition of their Tailwind Re series at the end of Q4 2021, with the transaction closing in January 2022. The 2022 iteration, a replacement of the 2017 Tailwind series, sought to deliver Validus with protection from North American Named Storm and Earthquake on an annual aggregate basis, utilizing a PCS based industry index trigger for a three-year period.

The transaction consisted of four classes of Notes which received strong support through the marketing period. Two of the four classes upsized relative to the initially announced size, whilst all four classes priced below the mid-point of pricing guidance. Whilst the issuance initially targeted $325 million of capacity – the positive market response allowed Validus to secure $400 million of protection from the capital markets.

Blue Halo Re Ltd 2022-1

Allianz Risk Transfer (ART) came to the cat bond market with the Blue Halo Series 2022-1 in February 2022. ARTs fourth visit to the cat bond market and third with the Blue Halo series, sought to deliver three years' worth of annual aggregate protection against U.S. Named Storm and Earthquake risk, using an industry index trigger.

The issuance originally targeted $100m worth of cat bond backed protection, split evenly across two tranches, with initial pricing guidance of 10.00% to 11.00% and 15.50% to 16.50% for the Class A and Class B Notes respectively. Through the marketing period, both classes of Notes upsized, by 20% for the Class A Notes and 30% for the Class B Notes, whilst both tranches priced below guidance, at 9.75% for the Class A's and 15.25% for the Class B's. ART therefore successfully placed $125 million through this latest iteration of Blue Halo Re.

Tomoni Re Pte Ltd 2022-1

Aioi Nissay Dowa Insurance (ADI) returned to the cat bond market for the first time since 2018, alongside Mitsui Sumitomo Insurance (MSI) – for whom Tomoni Re was their sixth placement into the cat bond market and first away from the Akibare series.

Looking to replace the expiring 2018 Akibare series, MSI and ADI again sought protection across a four-year period, on an indemnity, per occurrence basis, against Japanese Wind and Flood. As was the case with the 2020 series of Akibare issued Notes, Tomoni Re is domiciled in Singapore – maintaining MSI's relationship with the jurisdiction now across multiple issuances.

The two tranches of Notes – providing cover to MSI and ADI respectively – were well received through the marketing phase, with the Class A Notes increasing by 66.6% in size and the Class B Notes doubling overall. The result was a total placement of $220 million – with both tranches pricing within the originally announced guidance.

Montoya Re Ltd 2022-1

Montoya Re Ltd's $115 million catastrophe bond is the first issuance sponsored by Inigo Insurance (on behalf of their Lloyd's syndicate, Syndicate 1301). Working with Hannover Re as the fronting carrier, Montoya Re provides Inigo with annual aggregate protection for three years, on an industry index basis, against U.S. Wind, U.S. Earthquake, Japanese Wind and Japanese Earthquake perils.

Exhibit 7: Q1 2022 catastrophe bond issuance

Beneficiary	Issuer	Series	Class	Issue Size ($ million)	Covered Perils	Trigger	Recovery	Collateral
Pool Reinsurance Company Limited	Baltic PCC Limited	Series 2022-1	Class A	$131.00[5]	TR	Indemnity	Aggregate	MMF
Allianz Risk Transfer (Bermuda) Limited	Blue Halo Re Ltd.	Series 2022-1	Class A	$60.00	US: NS, EQ	Industry Index	Aggregate	MMF
Allianz Risk Transfer (Bermuda) Limited	Blue Halo Re Ltd.	Series 2022-1	Class B	$65.00	US: NS, EQ	Industry Index	Aggregate	MMF
American Strategic Insurance Group	Bonanza Re Ltd.	Series 2022-1	Class A	$135.00	US HU	Indemnity	Occurrence	MMF
North Carolina Insurance Underwriting Association	Cape Lookout Re Ltd.	Series 2022-1	Class A	$330.00	NC: NS, ST	Indemnity	Aggregate	MMF
Federal Emergency Management Agency	FloodSmart Re Ltd.	Series 2022-1	Class A	$325.00	US, DC, PR, VI: FL	Indemnity	Occurrence	MMF
Federal Emergency Management Agency	FloodSmart Re Ltd.	Series 2022-1	Class B	$100.00	US, DC, PR, VI: FL	Indemnity	Occurrence	MMF
Federal Emergency Management Agency	FloodSmart Re Ltd.	Series 2022-1	Class C	$25.00	US, DC, PR, VI: FL	Indemnity	Occurrence	MMF
Swiss Reinsurance Company Ltd.	Matterhorn Re Ltd.	Series 2022-1	Class A	$175.00	US, DC, PR, US VI, CAN: EQ, NS	Industry Index	Aggregate	MTN
Swiss Reinsurance Company Ltd.	Matterhorn Re Ltd.	Series 2022-1	Class B	$150.00	US, DC, PR, US VI, CAN: EQ, NS	Industry Index	Aggregate	MTN
State Farm Fire and Casualty Company	Merna Re II Ltd.	Series 2022-1	Class A	$300.00	US (ex. CA, FL, TX), DC: EQ	Indemnity	Occurrence	MMF
Inigo Insurance (Syndicate 1301)	Montoya Re Ltd.	Series 2022-1	Class A	$115.00	US: NS, NA: EQ, JP: TY, EQ	Industry Index	Aggregate	MMF
Allstate Insurance Company	Sanders Re III Ltd.	Series 2022-1	Class A	$200.00	US (ex. FL), DC: NS, EQ, SW, Fire, VE, MI	Indemnity	Occurrence	MMF

[5] FX conversion correct as of time of issuance

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Exhibit 7: Q1 2022 catastrophe bond issuance (continued)

Beneficiary	Issuer	Series	Class	Issue Size ($ million)	Covered Perils	Trigger	Recovery	Collateral
Allstate Insurance Company	Sanders Re III Ltd.	Series 2022-1	Class B	$175.00	US (ex. FL), DC: NS, EQ, SW, Fire, VE, MI	Indemnity	Dual Trigger	MMF
Allstate Insurance Company	Sanders Re III Ltd.	Series 2022-1	Class C	$175.00	US (ex. FL), DC: NS, EQ, SW, Fire, VE, MI	Indemnity	Aggregate	MMF
Validus Holdings	Tailwind Re Ltd.	Series 2022-1	Class A	$100.00	NA: NS, EQ	Industry Index	Aggregate	MMF
Validus Holdings	Tailwind Re Ltd.	Series 2022-1	Class B	$150.00	NA: NS, EQ	Industry Index	Aggregate	MMF
Validus Holdings	Tailwind Re Ltd.	Series 2022-1	Class C	$100.00	NA: NS, EQ	Industry Index	Aggregate	MMF
Validus Holdings	Tailwind Re Ltd.	Series 2022-1	Class D	$50.00	NA: NS, EQ	Industry Index	Aggregate	MMF
Aloi Nissay Dowa Insurance Co., Ltd.	Tomoni Re Pte.	Series 2022-1	Class B	$120.00	JP: TY, FL	Indemnity	Occurrence	MMF
Mitsui Sumitomo Insurance Co., Ltd.	Tomoni Re Pte.	Series 2022-1	Class A	$100.00	JP: TY, FL	Indemnity	Occurrence	MMF
Aetna Life Insurance Company	Vitality Re XIII Limited	Series 2022	Class A	$140.00	US MBR	Indemnity	Aggregate	MMF
Aetna Life Insurance Company	Vitality Re XIII Limited	Series 2022	Class B	$60.00	US MBR	Indemnity	Aggregate	MMF
Total				**$3,281.00**				

Source: Aon Securities LLC

Q2 2022

Bowline Re Ltd 2022-1

Transatlantic Re (Trans Re) returned to the cat bond market for the first time since 2019 with its Bowline Re Ltd 2022-1 series. Whilst previous issuances have focused on either a single, or two tranches – the 2022 edition utilized three tranches, with there being slight differentiation across the offering.

The Class A and Class B Notes provide coverage on an annual aggregate basis, utilizing an industry index trigger and protecting Trans Re against U.S., Puerto Rico, U.S. Virgin Islands and Canada Wind and Earthquake for three years.

In line with the Class A and Class B Notes, the Class C Notes will also utilize an industry index trigger across three years of cover, but will instead operate on a per occurrence basis, providing a shared limit for U.S. and Japanese Wind and Earthquake. This is the first time that Trans Re have sought protection from the cat bond market for a territory outside of North America.

At announcement – the three tranches were all unsized, acting as a reverse enquiry to the market. At close, Trans Re achieved a total of $165 million of cat bond protection across the three classes of Notes.

Ursa Re II Ltd 2022-1

The California Earthquake Authority (CEA) returned to the cat bond market for their fifteenth cat bond transaction since their inaugural entry into the market with the Embarcadero series in 2011.

Ursa Re II Ltd 2022-1 will provide the CEA with a total of $245 million of cat bond backed cover across two tranches, for a three-year period. This is the CEA's fifth issuance in the past two years, ensuring that they now sponsor just shy of $2 billion worth of cat bond capacity – underlining their commitment to and strong relationship with the ILS market.

Kilimanjaro III Re Ltd 2022-1

Everest Re returned to the cat bond market to maintain its status as the largest sponsor of retrocessional bonds globally.

However, in a departure from the style of multiple classes, triggers and risk levels that have been used for more recent Everest Re cat bond issuances, this 2022 edition consisted of a single tranche, initially targeting $250 million of cover. The Class A Notes sought to provide Everest Re with protection against U.S., Puerto Rico, U.S. Virgin Islands and Canada Wind and Earthquake perils on an annual aggregate, indemnity basis for three years.

The offering was well received by investors – with the Notes pricing at the mid-point of the originally announced guidance, whilst size increased by 20%, ensuring Kilimanjaro III Re 2022-1 $300 million of cover to Everest Re. This is the largest amount of cover issued in a single tranche for transaction utilizing an industry index trigger in 2022 so far.

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Exhibit 8: Q2 2022 catastrophe bond issuance

Beneficiary	Issuer	Series	Class	Issue Size ($ million)	Covered Perils	Trigger	Recovery	Collateral
Texas Windstorm Insurance Association	Alamo Re Ltd.	Series 2022-1	Class A	$200.00	TX NS, ST	Indemnity	Aggregate	MMF
SCOR Global P&C SE	Atlas Capital Re Ltd.	Series 2022-1	Class A	$240.00	US, PR, USVI: NS; US, PR, USVI: EQ; EU: WS	Industry Index	Aggregate	MMF
Peak Reinsurance Company	Black Kite Re Ltd.	Series 2022-1	Class A	$150.00	JP TY	Industry Index	Occurrence	MMF
Transatlantic Reinsurance Company	Bowline Re Ltd.	Series 2022-1	Class A	$40.00	US, CAN, PR, USVI: NS, EQ	Industry Index	Aggregate	MMF
Transatlantic Reinsurance Company	Bowline Re Ltd.	Series 2022-1	Class B	$75.00	US, CAN, PR, USVI: NS, EQ	Industry Index	Aggregate	MMF
Transatlantic Reinsurance Company	Bowline Re Ltd.	Series 2022-1	Class C	$50.00	US/JP: NS, EQ	Industry Index	Occurrence	MMF
Louisiana Citizens Property Insurance Corporation	Catahoula Re Pte. Ltd.	Series 2022-1	Class A	$120.00	LA NS	Indemnity	Occurrence	MMF
Louisiana Citizens Property Insurance Corporation	Catahoula Re Pte. Ltd.	Series 2022-1	Class B	$55.00	LA NS	Indemnity	Occurrence	MMF
Heritage Property & Casualty Insurance Company	Citrus Re Ltd.	Series 2022-1	Class A	$100.00	US: NS	Indemnity	Occurrence	MMF
The Hanover Insurance Company	Commonwealth Re Ltd.	Series 2022-1	Class A	$150.00	US NS: CT, DE, DC, ME, MD, MA, NH, NJ, NY, PA, RI, VE, VI	Indemnity	Occurrence	MMF
Citizens Property Insurance Corporation	Everglades Re Ltd.	Series 2022-1	Class A	$200.00	FL NS	Indemnity	Aggregate	MMF

Exhibit 8: Q2 2022 catastrophe bond issuance (continued)

Beneficiary	Issuer	Series	Class	Issue Size ($ million)	Covered Perils	Trigger	Recovery	Collateral
SureChoice Underwriters Reciprocal Exchange	Gateway Re Ltd.	Series 2022-1	Class A	$150.00	NS: TX, LA, AL, MS	Indemnity	Occurrence	MMF
Kin Interinsurance Network	Hestia Re Ltd.	Series 2022-1	Class A	$175.00	FL NS	Indemnity	Occurrence	MMF
American Integrity Insurance Company of Florida	Integrity Re Ltd.	Series 2022-1	Class A	$75.00	US NS: FL, GA, SC	Indemnity	Occurrence	MMF
Everest Reinsurance Company	Kilimanjaro Re Ltd.	Series 2022-1	Class A	$300.00	US, PR, USVI, CAN: NS and EQ	Industry Index	Aggregate	MMF
The Travelers Indemnity Company	Long Point Re IV Ltd.	Series 2022-1	Class A	$575.00	US TC, EQ, STS, WTS	Indemnity	Occurrence	MMF
Swiss Reinsurance Company	Matterhorn Re Ltd.	Series 2022-2	Class A	$125.00	US NS	Industry Index	Occurrence	MMF
Swiss Reinsurance Company	Matterhorn Re Ltd.	Series 2022-2	Class C	$75.00	US NS	Industry Index	Occurrence	MMF
State Farm Florida Insurance Company	Merna Re II Ltd.	Series 2022-2	Class A	$200.00	FL NS, SCS	Indemnity	Occurrence	MMF
State Farm Lloyds	Merna Re II Ltd.	Series 2022-3	Class A	$300.00	TX NS	Indemnity	Occurrence	MMF
Axis Capital	Northshore Re Ltd.	Series 2022-1	Class A	$140.00	US (NA): NS, EQ	Industry Index	Aggregate	MMF
United Services Automobile Association	Residential Re Limited	Series 2022-1	Class 11	$35.00	US: TC, EQ, ST, WTS, WF, VE, MI, OP	Indemnity	Aggregate	MMF
United Services Automobile Association	Residential Re Limited	Series 2022-1	Class 12	$60.00	US: TC, EQ, ST, WTS, WF, VE, MI, OP	Indemnity	Aggregate	MMF
United Services Automobile Association	Residential Re Limited	Series 2022-1	Class 13	$155.00	US: TC, EQ, ST, WTS, WF, VE, MI, OP	Indemnity	Aggregate	MMF
United Services Automobile Association	Residential Re Limited	Series 2022-1	Class 14	$180.00	US: TC, EQ, ST, WTS, WF, VE, MI, OP	Indemnity	Aggregate	MMF

Exhibit 8: Q2 2022 catastrophe bond issuance (continued)

Beneficiary	Issuer	Series	Class	Issue Size ($ million)	Covered Perils	Trigger	Recovery	Collateral
Castle Key Insurance Company and Castle Key Indemnity Company	Sanders Re Ltd.	Series 2022-2	Class A	$150.00	FL NS, EQ, SW, Fire, VE, MI	Indemnity	Occurrence	MMF
Castle Key Insurance Company and Castle Key Indemnity Company	Sanders Re Ltd.	Series 2022-2	Class B	$100.00	FL NS, EQ, SW, Fire, VE, MI	Indemnity	Occurrence	MMF
Castle Key Insurance Company and Castle Key Indemnity Company	Sanders Re Ltd.	Series 2022-2	Class C	$37.50	FL NS, EQ, SW, Fire, VE, MI	Indemnity	Occurrence	MMF
Palomar Specialty Insurance Company	Torrey Pines Re Ltd.	Series 2022-1	Class A	$200.00	US EQ	Indemnity	Occurrence	MMF
Palomar Specialty Insurance Company	Torrey Pines Re Ltd.	Series 2022-1	Class B	$75.00	US EQ	Indemnity	Occurrence	MMF
California Earthquake Authority	Ursa Re Ltd.	Series 2022-1	Class A	$175.00	CAL EQ	Indemnity	Aggregate	MMF
California Earthquake Authority	Ursa Re Ltd.	Series 2022-1	Class B	$70.00	CAL EQ	Indemnity	Aggregate	MMF
Vantage Group Holdings	Vista Re Ltd.	Series 2022-1	Class A	$65.00	US, DC, PR, USVI: NS; US, DC, PR, USVI, CAN: EQ	Industry Index	Aggregate	MMF
Core Specialty Insurance Holdings, Inc.	Yosemite Re Ltd.	Series 2022-1	Class A	$65.00	US: NS, EQ	Indemnity	Occurrence	MMF
Total				**$4,862.50**				

Source: Aon Securities LLC

Secondary Market Overview

Q3 2021

The third quarter is historically a light trading period as the cat bond market endures the U.S. Wind season. Only 128 trades crossed for an average of 13 per week while the rest of year averages about 18. Hurricane Ida caused some short-term mark-to-market fluctuations in the secondary market, but many bond investors did not feel that the hurricane would be a market moving event. Some bonds with the greatest exposure to the affected area as well as lower layer aggregate bonds saw offers but very few trades were executed. The market remained calm and orderly following landfall though trading was extremely light. Most trades were done in names unassociated with the hurricane.

Q4 2021

Trading was dynamic in the fourth quarter with over 220 trades, supporting the active primary market. Some riskier U.S. Wind and multi-peril bonds traded at discounts as the picture on Hurricane Ida became clearer. As losses developed, investors traded into less-risky index bonds and demand for occurrence structures also continued to grow. Over the course of the quarter, aggregate Notes remained less liquid as the market took in the loss reports. Diversifying perils and regions showed strong demand while Florida bonds received few bids. As the quarter progressed, some bonds rebounded from the heavily discounted trades seen in the third quarter and approached pre-Ida levels.

Q1 2022

The secondary market was more active in Q1 2022 than previous first quarters. We saw heightened market activity in the secondary as investors kept up with primary issuances which outpaced maturities to the tune of approximately $1.5 billion for the quarter. As the war in Ukraine impacted global financial markets, some investors reviewed their overall risk exposure. Despite headwinds, trading remained dynamic, providing investors quick access to liquidity. Investors' views of risk elevated with increased inflation, leading to some spread widening towards the end of the quarter. Pricing indications in the secondary widened approximately 5 to 10 percent in Q1 2022, with some perils expanding further.

Q2 2022

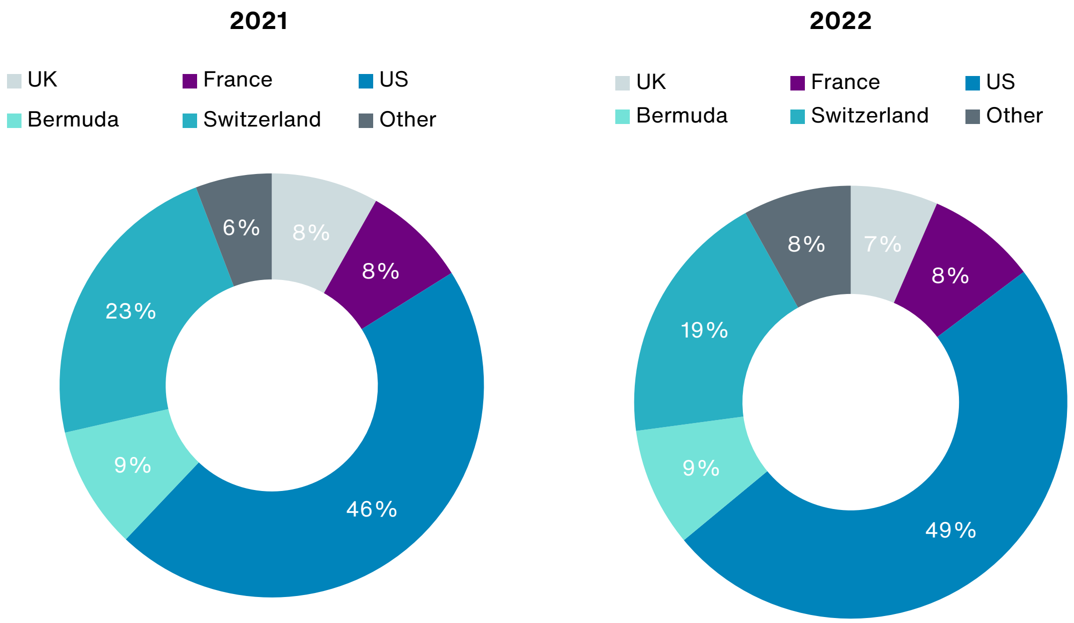
Given the consistent and heavy flow of new issuance over the course of Q2 2022, the secondary market was less active than previous quarters. In April and May, few trades were completed as investors focused on the new issuances at hand; at one point there were 20 concurrently marketed classes of Notes. As the quarter progressed and cash positions slimmed, we saw increasing amounts of offers, though bids only crossed on occasion as spreads remained wider for primary issuances. On average there were 12 trades a week up until the last of the transactions priced, in which bidding activity increased with end-of-quarter rebalancing efforts. The last two weeks of the month saw 60 trades cross. Despite the increase in bidding, offers still greatly outweighed bids and spreads began to widen towards levels similar to those transactions completed in the primary.

ILS Transaction Activity

Capital Sources[6]

Although many Swiss investors saw continued success in their capital raising efforts, Switzerland, the second largest source of capital for cat bonds, saw their contribution to new issuances brought to market by Aon Securities decrease as many European UCITS funds, and other non-USD denominated funds, faced increasing currency hedging costs, limiting their investments into U.S. Dollar denominated bonds. Meanwhile, the share of total investments from the U.S. in cat bonds grew year-over-year. Contribution from Bermuda and France remained stable while the "Other" bucket of countries grew slightly largely due to increased activity out of Canada and Japan.

Exhibit 9a and 9b: Investors by country/region (years ending June 30)



Source: Aon Securities LLC

[6] The information here concerns the domicile of the home office and not the domicile or location of the individual funds or the end investors

Aon ILS Indices

The Aon ILS Indices are calculated by Bloomberg using month end price sheet data provided by Aon Securities. Both the ILS All Bond Index and the Aon US Hurricane Bond Index posted their fourth consecutive year of positive returns with 5.15% and 5.27% respectively for the year ending June 30. The 5 and 10-year average annual returns of the Aon All Bond Index – 5.27% and 6.16% respectively – compare well to other fixed income benchmarks, particularly the 3-5 Year BB US High Yield Index, the Asset Backed Securities 3-5 Year Fixed Rate Index, and the Collateralized Mortgage-Backed Securities 3-5 Year Fixed Rate Index.

The twelve-month performance of the Aon Indices was quite impressive, particularly compared to the performance of their peers who saw notable growth for the majority of the year, instigated by historically low interest rates. As Q1 closed and Q2 2022 commenced, inflationary pressures forced central banks to begin raising interest rates at record breaking paces. The fear of stagflation and economic slowdown swept across many economies and caused broader indices to swiftly correct. While this was occurring, the ILS market faced some capital constraints, leading to secondary spreads widening. This slowed the growth of both ILS indices, however their performance continued to compare favorably relative to the best performers of their peers, with the broader ILS market seeing minimal impact from macroeconomic headwinds due to their limited correlation to the broader financial markets.

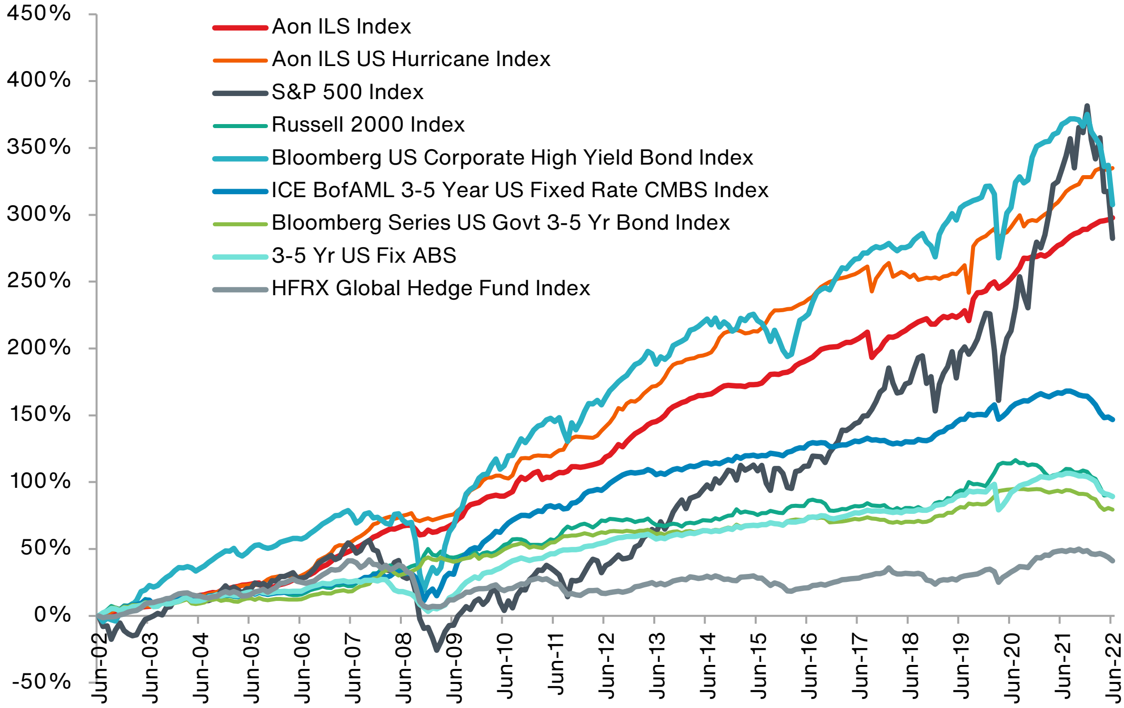
It is important to note that the Aon All Bond Index continues to be the least volatile of its comparable indexes over the past twelve months and consistently posts some of the largest twelve-month returns compared to its peers. The strength of the Aon All Bond Index's consistent growth is even more apparent when reviewing its return over the past twenty years compared to its peers as shown in Exhibit 12a. As volatility continues to spread across markets, investment into the ILS Market could be a valuable consideration around portfolio construction as it regularly produces competitive returns, diversification benefits and reduced volatility.

Exhibit 10: Aon ILS Indices

Index Title	Return for Monthly Period Ended June 30		Return for Quarterly Period Ended June 30		Return for Year-to-Date Ended June 30		Return for Annual Period Ended June 30		5 yr Avg Annual Return	10 yr Avg Annual Return
Aon ILS Indices	**2022**	**2021**	**2022**	**2021**	**2022**	**2021**	**2022**	**2021**	**2017 2022**	**2012 2022**
All Bond Bloomberg Ticker (AONCILS)	0.38%	0.37%	0.68%	1.99%	2.22%	2.60%	5.15%	7.32%	5.27%	6.16%
U.S. Hurricane Bond Bloomberg Ticker (AONCUSHU)	0.35%	0.97%	0.08%	2.69%	1.57%	4.49%	5.27%	5.75%	4.02%	6.05%
Benchmarks										
3-5 Year U.S. Treasury Notes	-0.70%	-0.40%	-1.38%	0.30%	-5.99%	-1.04%	-6.94%	-0.91%	0.83%	1.02%
3-5 Year BB US High Yield Index	-5.37%	0.89%	-6.39%	2.15%	-9.27%	3.19%	-8.07%	12.41%	2.73%	4.49%
S&P 500	-8.39%	2.22%	-16.45%	8.17%	-20.58%	14.41%	-11.92%	38.62%	9.33%	10.76%
ABS 3-5 Year, Fixed Rate	-0.80%	-0.13%	-2.47%	1.03%	-7.35%	1.54%	-7.83%	6.81%	1.35%	2.01%
CMBS 3-5 Year, Fixed Rate	-0.78%	-0.20%	-2.11%	0.98%	-6.64%	0.67%	-7.42%	4.15%	1.39%	2.31%

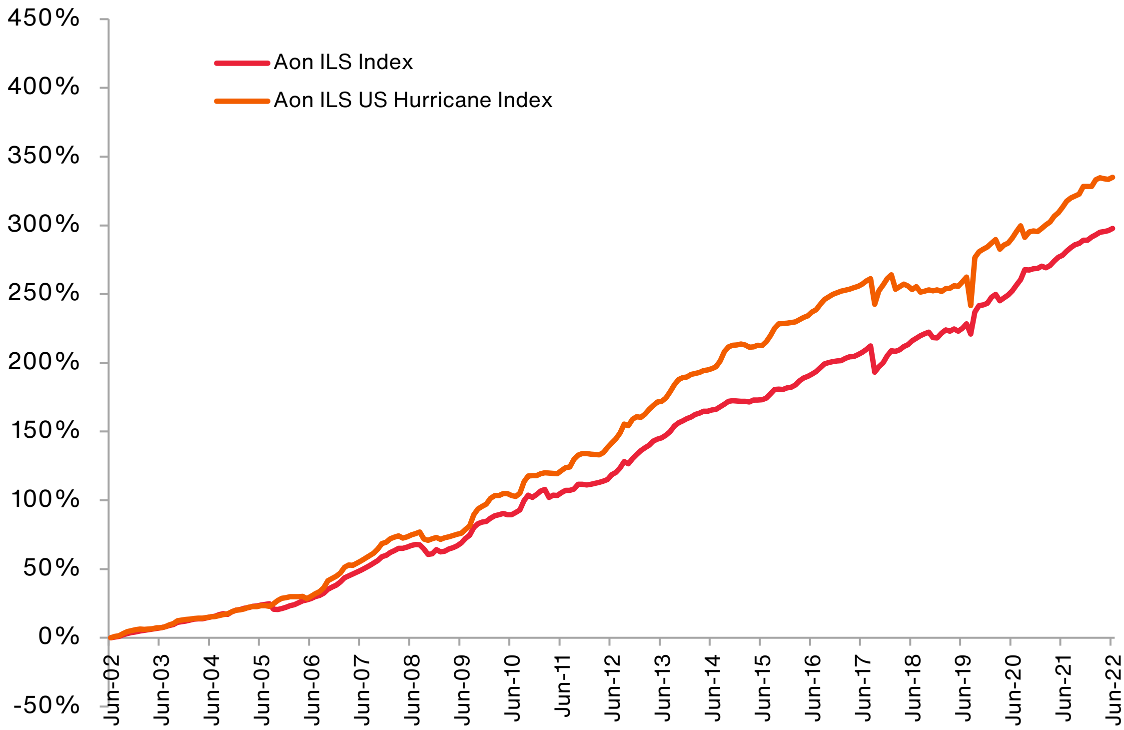
Source: Aon Securities LLC and Bloomberg

Exhibit 11a: Aon All Bond Index versus financial benchmarks



Source: Aon Securities LLC and Bloomberg

Exhibit 11b: Historical performance of Aon ILS Indices



Source: Aon Securities LLC and Bloomberg

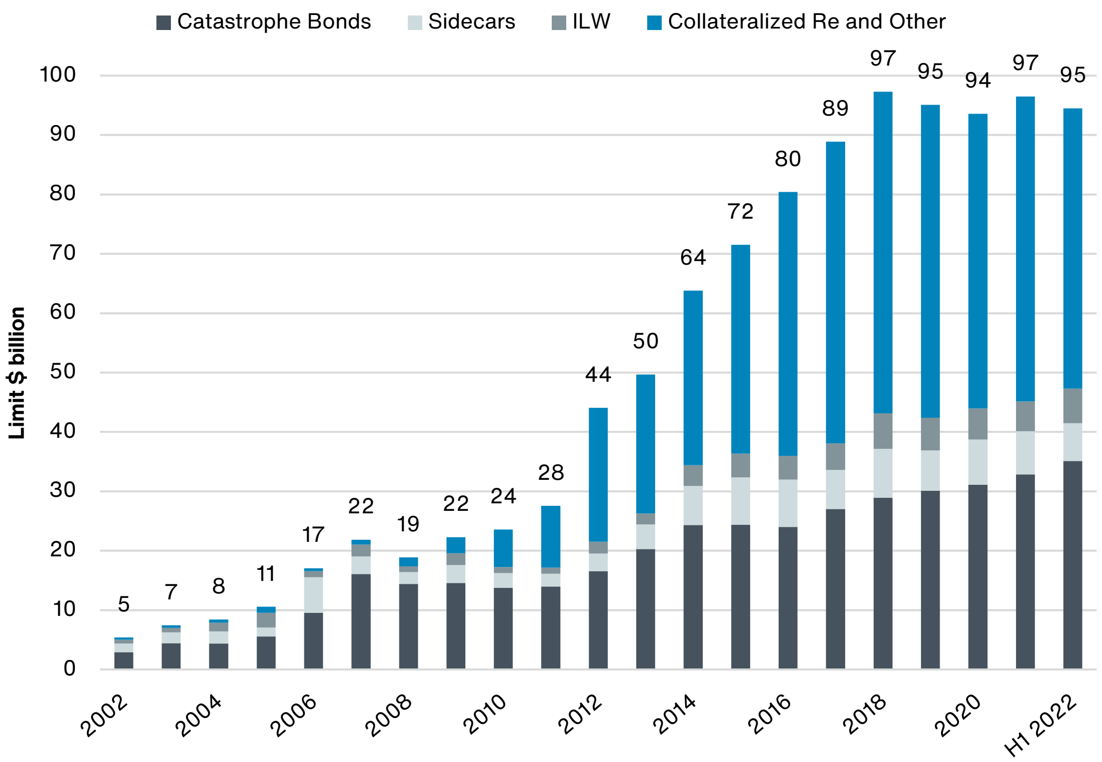
ILS Related Markets

As of H1 2022, Aon estimates the total ILS capital markets capacity to be $95 billion, composed of collateralized reinsurance, catastrophe bonds, ILWs and sidecars. This represents a slight decrease (-2%) from last year's total value estimate following the market headwinds experienced in the first half of 2022. The robustness and resilience of the ILS space limited the fall in total capacity and leaves the market in a strong position for the remainder of the year.

H2 2021 and early Q1 2022 were categorised by positive momentum and capital inflows within the ILS space, particularly where the cat bond product is concerned, as the liquidity and structure of the instrument continues to be favored by ILS investors, resulting in an increase in capital allocated to the cat bond market.

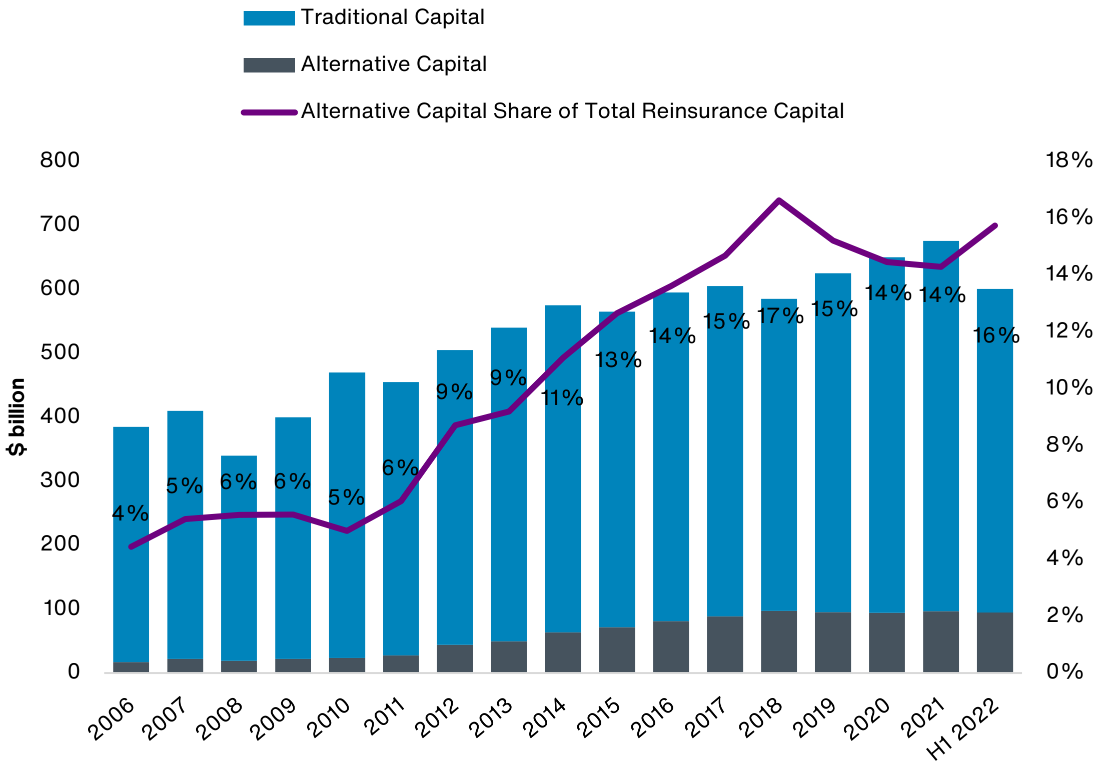
However, the headwinds that have characterized both late Q1 2022 and Q2 2022, for example current inflationary pressure, broader macroeconomic fluctuations and the conflict in Ukraine, has resulted in the ILS market experiencing a level of rate hardening. The pipeline for cat bonds in particular remains robust and with investors now able to enjoy higher margins, capital inflows are certainly possible throughout the remainder of the year.

Exhibit 12: Alternative market development



Source: Aon Securities LLC

Exhibit 13: Global reinsurer capital



Source: Individual Company Reports, Aon Reinsurance Solutions, Aon Securities LLC

Collateralized Reinsurance Market Trends

Aon expects the collateralized reinsurance segment to remain stable as outstanding capital may largely be reinvested for traditional reinsurance transactions. Investors may continue to largely allocate new and additional capital into more liquid, tradeable instruments.

Investor appetite for collateralized reinsurance will be measured and more sensitive to frequency loss activity than catastrophe bonds, due to the propensity for losses at lower return periods.

Funds looking to deploy reinsurance and retrocession capacity continue to target fronters or establish their own rated platform with high quality credit ratings, to leverage the strength of these balance sheets.

Sidecars

From H1 2021 to H1 2022, Aon Securities estimates that the sidecar market has experienced a slight retraction, falling from $8 billion in size to around $7.3 billion. As has been the case in previous years, demand from cedents continues to outmatch capital supply from investors.

The sidecar market continues to be hamstrung by a few factors – which can be broadly characterized by structural concerns and general loss experience. Neither are new to the sidecar space, with the former characterizing the period immediately preceding the COVID-19 outbreak, where investors and sponsors alike attempted to understand the impact the pandemic would have upon ceded portfolios. Whilst loss positions around COVID-19 have stabilized somewhat, concerns around the impact that material unmodeled losses can have upon portfolios remain. This structural uncertainty, triggered again after the losses caused by Tornados and Derechos that heavily impacted the U.S. in late 2021, other global secondary perils losses (Australian floods) as well as the emerging risk in the aviation market from the Russian-Ukraine conflict, is of persistent concern to ILS investors and their fund managers alike.

The result is investors and capacity providers becoming increasingly more stringent in their selection of sidecar ceded risk. Overall supply continues to be focussed upon select trades – prioritising those structures and portfolios which have a profitable historical track record alongside regular reporting. Investors continue to show preference for the establishment of long-term relationships – with the maintenance of bilateral partnership protecting from any year-to-year disruption.

Sidecars continue to offer strategic value to (re)insurer sponsors by providing a third-party capital platform with increasing benefits over the medium to long term. Given the ongoing potential pricing dislocation through recent loss experience and the current market headwinds, leveraging all capital sources has become increasingly important to sponsors. This is especially the case as the majority of market signals point towards hardening in upcoming renewals, suggesting that the sidecar product will see its popularity increase in the second half of 2022. Rate rises are likely to drive an improved return profile for most sponsors, which could lure additional capacity back into the proportional market.

AON

Exhibit 14: Publicly known sidecars launched during 12 months to June 30, 2022

Sidecar	Launch Date	(Re)Insurer	Size ($m)
Socium Re Ltd. (2021)	Jul-21	Fidelis	Not disclosed
Gibson Re	Sep-21	Randall & Quilter	$300.00
Socium Re Ltd. (2022)	Dec-21	Fidelis	Not disclosed
Thopas Re Ltd. (2022-1)	Dec-21	Chaucer	Not disclosed
Phoenix 2 Re Pte. Ltd. (2022-1)	Dec-21	MS Amlin Asia Pacific Pte. Ltd.	$37.50
Alturas Re Ltd. (2022-2 R)	Dec-21	AXIS Capital	Not disclosed
Eden Re II (2022-1 A)	Dec-21	Munich Re	$42.10
Voussoir Re Ltd. (2021-9)	Dec-21	Arch Capital	Not disclosed
Atlas Re	Jan-22	SCOR	$200.00
157 Re (2022)	Jan-22	CCR Re	Not disclosed
Sussex Re 2022-1	Jan-22	Brit plc	Not disclosed
Pangaea Re 2022-1	Jan-22	TransRe	Not disclosed
Eden Re II (2022-1 B)	Jan-22	Munich Re	$147.90
Voussoir Re Ltd. (2022-1 & 2022-2)	Mar-22	Arch Capital	Not disclosed

Source: Artemis.bm, company filings and press releases

Industry Loss Warranties (ILW)

Through the 2022 renewal cycle, Aon has seen a significant increase in trading in the ILW market as clients sought to make the most of the availability of capacity.

ILW purchasing motivation was driven by many factors, including increased retentions in the traditional UNL retro market, pricing considerations across the curve (but focussed on the tail), additional demand for capital related limit (for example - LCM5 metrics for Lloyd's syndicates) and hedging strategies from ILS funds and assumed reinsurance portfolio managers.

In Q1 there was sustained interest post 1/1 that was mostly attributed to renewal transactions and price discovery. However, the bid/ask spread that carried from Q4 2021 remained too large for some new trades to get bound.

In early Q2, the availability of the alternative capacity that the ILW market presented, caused a reduction in the above bid/ask spread as demand for capacity increased. Trading began to increase as clients sought the most effective solution for their overall purchasing strategy. PCS also released a Hurricane Ida estimate which was considered modest relative to industry expectations. This resulted in the release of previously "trapped" capacity becoming available for reinsurers to redeploy on other ILW trades.

This increased trading frequency and volume continued into Q3. Timing played an important role in successful execution of ILW strategies, not delaying execution resulted in reduced year-on-year pricing increases (between 30-40%).

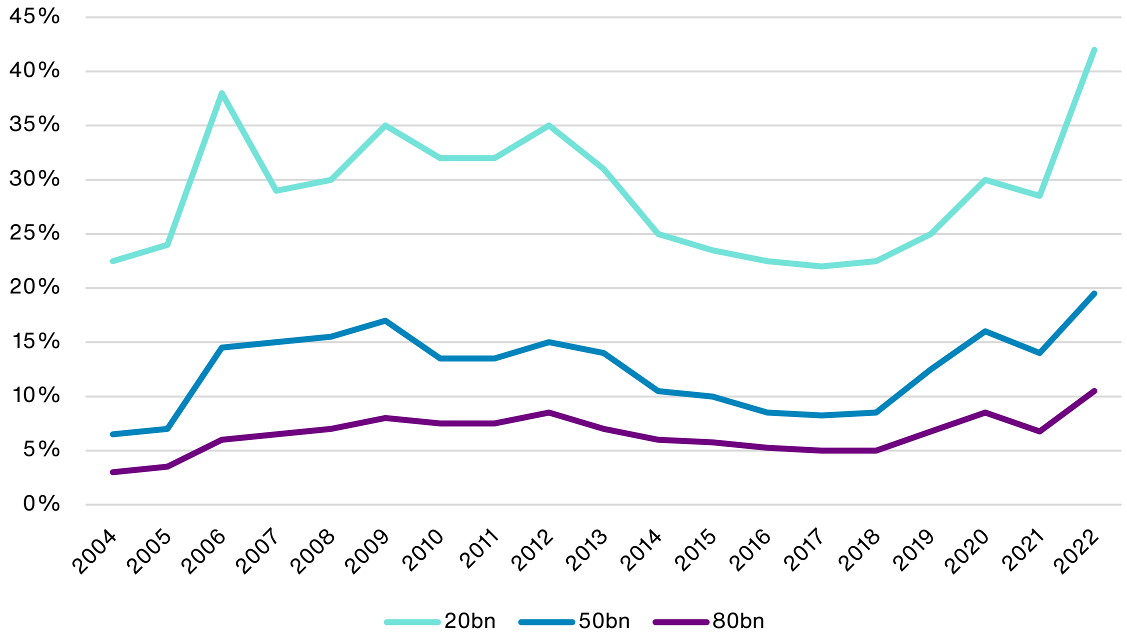
Approaching July 1, 2022, ILW pricing widened across the curve as capacity became more limited.

Bond issuance in late Q2 and early Q3 was another contributing factor to ILW capacity and price movement. Bond pricing spreads increased due to several reasons mentioned in the catastrophe bond section of this report. With favorable rating conditions and liquidity, investors demonstrated a preference for catastrophe bonds as opposed to ILWs. This reduced supply especially in the tail end of the curve for Wind and Quake perils. Limitation of aggregate capacity continued with quick execution when available.

There has been a renewed interest in both the supply and demand for county weighted ILWs. This product segment was explored to supplement traditional reinsurance programs that experienced increased retentions and/or significant price increases with capacity related challenges. The market experienced increased trading activity for low attaching Floridian specific ILW's some of which were traded at significant prices.

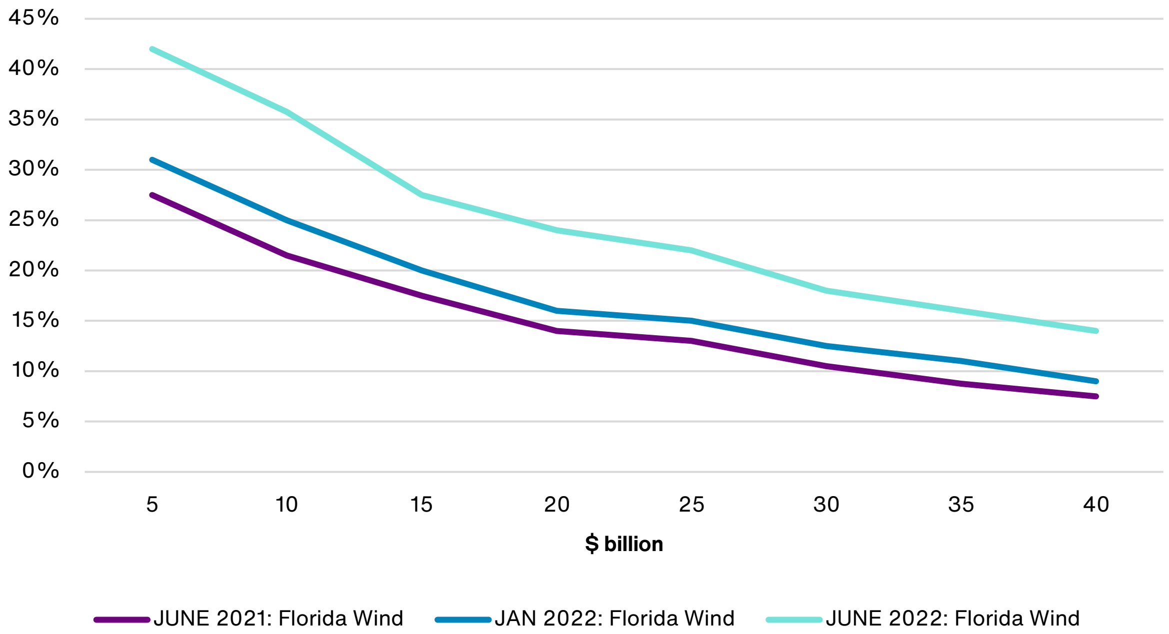
We expect continued momentum in the market throughout the Wind season and in preparation for the upcoming January 1 renewal season.

Exhibit 15: Historical U.S. Named Wind and Quake occurrence pricing 2004 – 2022



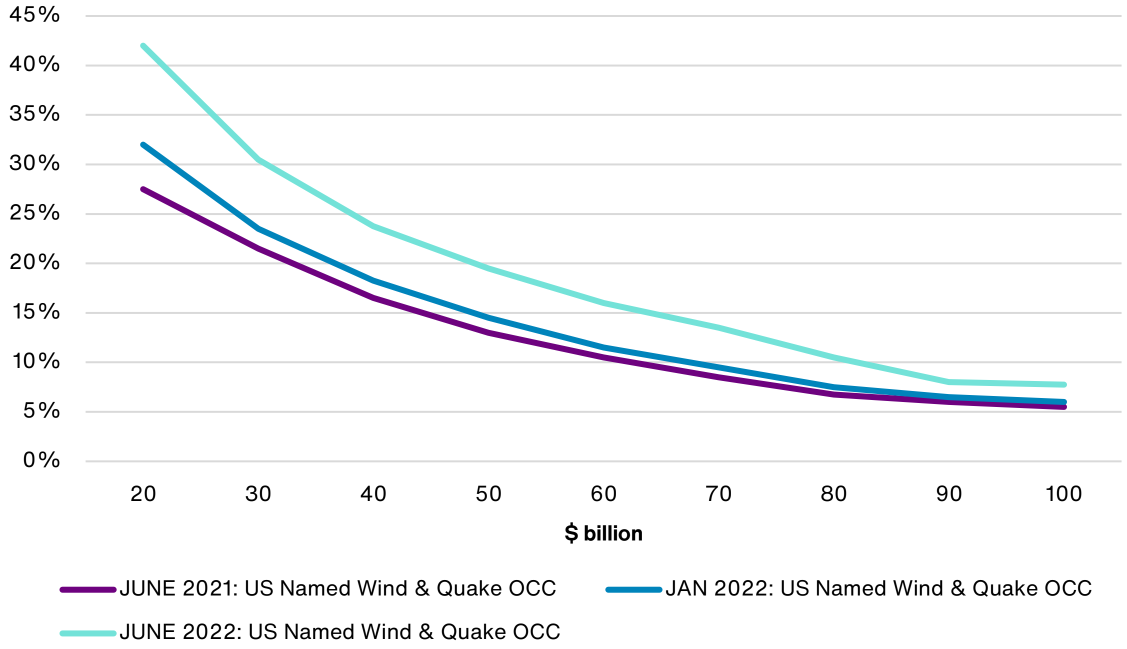
Source: Aon Reinsurance Solutions

Exhibit 16: Florida Wind occurrence rate comparison June 2021 – June 2022



Source: Aon Reinsurance Solutions

Exhibit 17: U.S. Named Wind and Quake occurrence rate comparison from June 2021 – June 2022



Source: Aon Reinsurance Solutions

Direct Placement 4(a)(2) Catastrophe Bonds

The direct placement market continues to gain momentum entering into Q3 2022. We are observing increased utilization of direct placements for larger, more broadly syndicated deal sizes than in years past. For the first time in a decade in the period under review, at least five known transactions were issued at sizes greater than $100m, signaling greater market acceptance of these products. In terms of deal count, 2022 is on pace to eclipse 2021, which was a record year for the product.

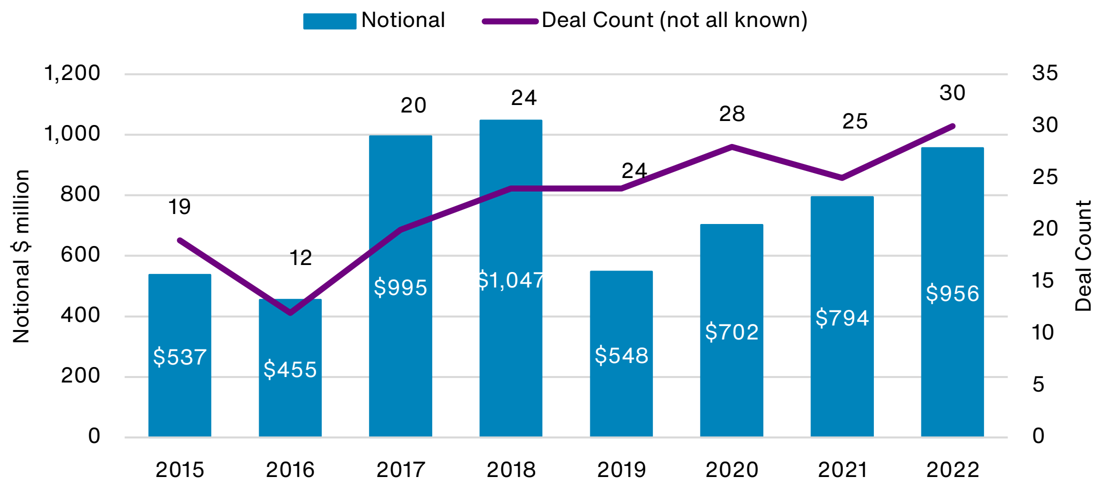
Compared to their 144A counterparts, direct placements have certain strategic benefits, such as lowering the limit threshold for clients, reduced third-party service provider costs and allowing for more bespoke risk-transfer.

Secondary perils are continuing to dominate the costliest H1 economic and insured loss perils during the last ten years[7]. Three primary perils, including Earthquake and Tropical Cyclone, have been moderately lighter through the peak of Tropical Cyclone season. There has been a consistent trend in accelerating losses that is tied to continued exposure growth and more impactful peril behavior globally.

Throughout 2021 and H1 2022, we are observing broader peril and geography coverages for what has historically been a Wind dominated product for niche, regional writers in the U.S. Notably, Greater Bay Re 2021-1, provides China Re with $30m of novel collateralized protection against Chinese Typhoon risks. Toa Re Europe sponsored the Silver Crane Notes, providing $25 million of retrocessional European Wind and Earthquake protection, as well as protection against Mediterranean (regional) Earthquakes. Mercury Insurance returned to the market to secure $50.7m of protection against Wildfire risks in the state of California, providing ILS investors with diversified risks in liquid format for their portfolios.

Other direct placement programs may have also offered ILS investors these kinds of risks, once again proving the growing value of the product to close the protection gap for those sponsors who want efficient access to alternative capital.

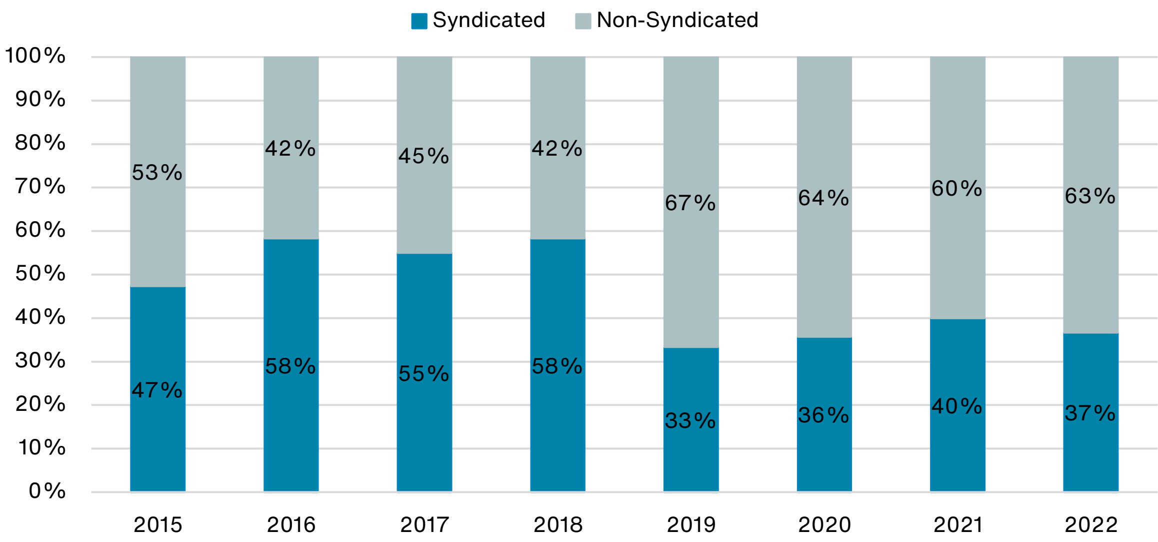
Exhibit 18: Known direct placement 4(a)(2) cat bonds notional and deal count (years ending June 30)



Source: Aon Securities LLC and Artemis.bm estimates

[7] Aon Global Catastrophe Recap: 1st Half 2022

Exhibit 19: Estimated syndication[8] of known direct placement cat bonds (years ending June 30)



Source: Aon Securities LLC and Artemis.bm estimates

Exhibit 20: Known direct placement 4(a)(2) catastrophe bond issuances (July 2021 – June 2022)[9]

Date	Issuer	Series	Perils	Issue Size ($ million)
Jul-21	Randolph Re	2021-1	California Wildfire	$50.70
Aug-21	Isosceles Insurance Ltd.	2021-A1	Property Catastrophe	$11.00
Aug-21		2021-C1	Property Catastrophe	$10.92
Aug-21		2021-E1	Property Catastrophe	$10.84
Sep-21	Greater Bay Re	2021-1	China Typhoon	$30.00
Oct-21	Eclipse Re Ltd.	2021-05A	Property Catastrophe	$5.10
Oct-21		2021-06A	Property Catastrophe	$29.30
Oct-21		2021-07A	Property Catastrophe	$2.90
Oct-21		2021-08A	Property Catastrophe	$7.90
Oct-21	Isosceles Insurance Ltd.	2021-H	Property Catastrophe	$21.50
Nov-21	Eclipse Re Ltd.	2021-03A	Property Catastrophe	$19.72
Nov-21		2021-04A	Property Catastrophe	$55.00
Nov-21		2021-09A	Property Catastrophe	$127.50
Nov-21		2021-11A	Property Catastrophe	$75.00

[8] Syndicated assumes unique series with notional amounts of $25 million or more
[9] Note that not all Private Placement transaction information is available

Exhibit 20: Known direct placement 4(a)(2) catastrophe bond issuances (July 2021 – June 2022)[9] (continued)

Date	Issuer	Series	Perils	Issue Size ($ million)
Jan-22	Seaside Re	2022-1	Property Catastrophe	$24.00
Jan-22	LI Re	2022-1	California Earthquake	$15.00
Jan-22	Seaside Re	2022-11	Property Catastrophe	$10.00
Jan-22		2022-12	Property Catastrophe	$10.00
Jan-22		2022-21	Property Catastrophe	$5.00
Jan-22		2022-22	Property Catastrophe	$5.00
Jan-22		2022-23	Property Catastrophe	$4.50
Jan-22		2022-31	Property Catastrophe	$30.00
Jan-22		2022-41	Property Catastrophe	$8.50
Jan-22		2022-42	Property Catastrophe	$11.50
Jan-22	Artex SAC Limited	Silver Crane	Europe Wind & Earthquake, Mediterranean Earthquake	$25.00
Mar-22	Eclipse Re Ltd.	2022-1A	Property Catastrophe	$75.00
Mar-22	White Rock Insurance (SAC) Ltd.	Asagao V	Japanese Earthquake	$16.20
Apr-22	Matterhorn Re Ltd.	Argon 2022-1	All Natural Perils	$150.00
May-22	Artex SAC Limited	Bricolage	Property Catastrophe	$100.00
Jun-22	Eclipse Re Ltd.	2022A	Property Catastrophe	$8.73

Source: Aon Securities LLC and Artemis.bm estimates

[9] Note that not all Private Placement transaction information is available

Growth Areas within ILS

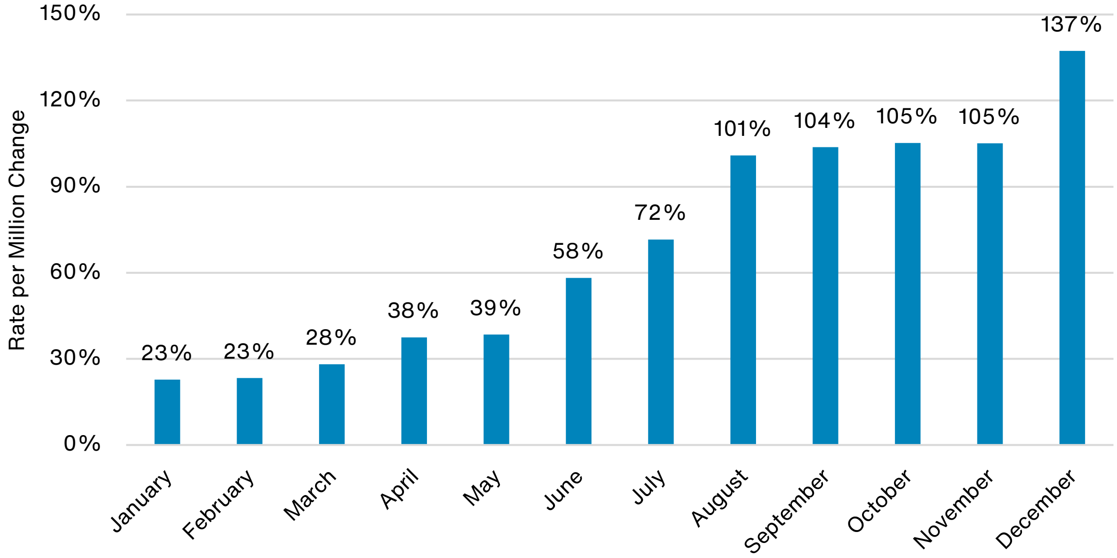
Cyber Risk

In the traditional markets, 2021 became progressively more difficult for protection buyers and underwriters.

Overall, protection buyers continued to see dramatic pricing increases, particularly in H2. These pricing adjustments, coupled with significant increases in retained risk and material reductions in available capacity put significant strain on buyers. In addition, growing supply chain disruptions and geopolitical tensions will likely drive a focus on specific exclusions (e.g., war, infrastructure, etc.).

Given these market trends, a number of protection buyers have been reducing overall limits. Below are the average year-over-year rate increases (entire program, constant insureds) across 2021.

Exhibit 21: 2021 E&O / Cyber pricing – all layers average year-over-year change



Source: Aon's 2022 E&O and Cyber Market Review

Rates are expected to continue to rise throughout 2022 as capacity remains scarce and the nature and frequency of events change. For instance, Ransomware activity has dramatically increased by 323% from Q1 2019 to Q4 2021[10], outpacing all other perils.

There is a clear need for additional capacity as the cyber market continues to harden and evolve. Development of cyber insurance demand will likely grow more quickly than traditional insurance and reinsurance capacity. Unlocking third-party capital solutions (e.g., collateralized reinsurance and catastrophe bonds) will come with innovation.

[10] Aon's 2022 E&O and Cyber Market Review

There are several challenges to overcome when developing a cyber ILS. The securitized nature of ILS transactions requires more rigid definitions than some traditional reinsurance products. First ILS supporters in the space will require a clear opportunity, e.g.:

1. A sponsor with a 'good brand';
2. Event clarity;
3. Accessible modeling;
4. A tailored plan for collateral release;
5. Event caps limiting tail-risk exposures; and
6. Non-proportional (CAT-like) structures.

Perhaps most importantly, analytics and industry exposure modeling are critical to the pricing and the marketing of potential cyber ILS structures. Successfully educating stakeholders on cyber exposures and modeling is paramount to the success of an ILS solution.

Cyber CAT – Case Study

Aon currently places the largest non-proportional cyber placement with (re)insurers and ILS participants.

The key features are:

Application of franchise to remove attritional losses from structure

Event-linked structure to compress the tail exposure

Novel and clear event definitions

Defined collateral release mechanism, consistent with traditional cat bonds

Event definitions tailored around core modeling exposure and agreed-upon IED

Analytics-heavy (re)insurers, including alternative markets, have been key to building capacity. Currently, there are a handful of ILS fund managers consistently writing cyber risk. We expect this appetite to expand as comfortability increases regarding exposures, modeling, structuring and event definitions.

It's important for protection buyers to develop and maintain a long-term vision and manage their insurance program strategy. This view may change the dialogue around certain decisions related to retentions, limit, insurer partners and key coverage debates to those best suited for ILS capacity in the short-term. The market will continue to be challenging; it's important for buyers to work closely with their advisors and risk-transfer partners and to think about various ways to develop an optimal program.

Environmental, Social and Governance (ESG) & Socially Responsible Investment (SRI)

ESG continues to be a leading agenda item of corporations, investors and insurers. While the effects of COVID-19, geopolitical uncertainty and inflationary as well as recessionary pressures may alter the probability of achieving corporate ESG goals within original timeframes, there continues to be an expectation from financial stakeholders that companies and their boards have an ability and willingness to navigate these forces while still making transparent progress on ESG. These expectations continue to be embedded within financial stakeholder risk management frameworks and related issuer engagement efforts.

Drivers of ESG

Investors

A recent Aon Survey, as well as other external surveys, show that ESG continues to grow in importance to institutional investors. Specifically, in Aon's most recent institutional investor survey for 2021[11], the overall findings indicate that responsible investing has meaningfully increased since Aon's last research study in 2019:

- Investors are now three times (3x) likelier to say that responsible investing will soon become the norm and indistinguishable from mainstream investing. Many are now pursuing responsible investments with actions that include establishing or reviewing responsible investment policies, hiring professionals dedicated to responsible investing and increasing allocations to responsible investments.
- Engagement with responsible investing through ESG integration has doubled since 2019 (from 41% to 80%).
- Over two-thirds (69%) of respondents with exposure to responsible investments are either satisfied or very satisfied with their returns to date.
- 66% have some of their portfolio allocated to responsible investments, with many more intending to increase future allocation.
- Among respondents, 56% say that ESG investing will soon become the norm. 55% believe responsible investments will lead to better risk-adjusted returns. Nearly half (47%) want to see more consistent data on ESG factors.
- Further surveys have indicated that there was an 18% jump in institutional investors implementing ESG between the 2019 and 2021 surveys, with the totals growing from 61 percent to 72 percent.[12]

The stated importance of ESG related policies and investment practices are also reflected in the United Nations Principles for Responsible Investment's (PRI's) datasets. Consistent with the prior year observations, there continues to be a steady year over year growth in asset owner signatories and assets under management.[13]

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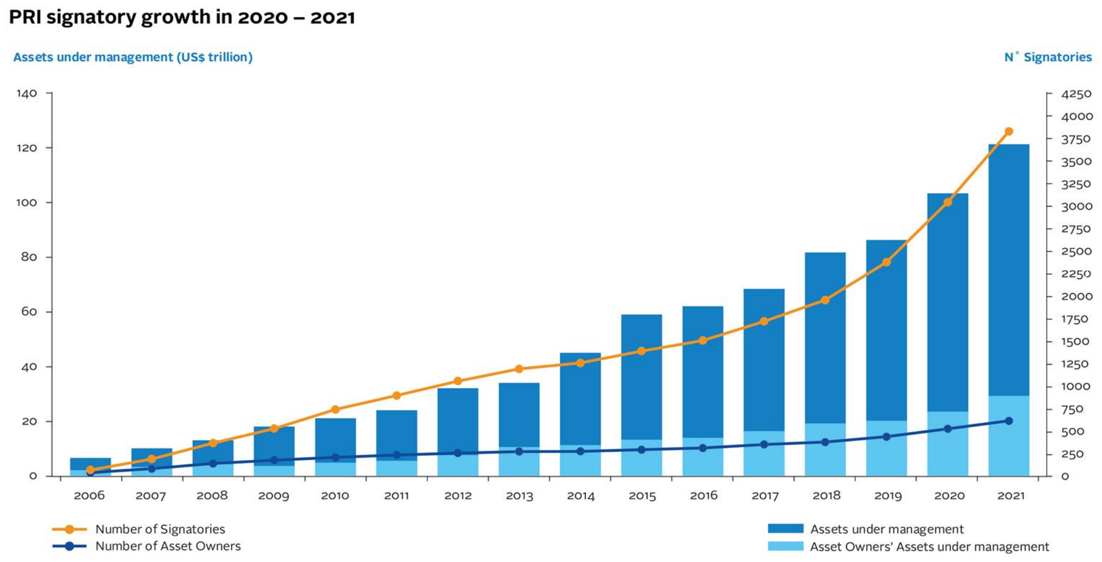
[11] Aon's Global Perspectives on Responsible Investing. Published January 2022

[12] Natixis, ESG investing survey insight report

[13] UN PRI regulation database (The PRI, a UN-supported network of investors, works to promote sustainable investment through the incorporation of Environmental, Social and Governance investment principles)

Exhibit 22: Growth of asset owner signatories to the UN PRI



Source: UN PRI

Insurers

Insurers are increasingly leveraging data and analytics to inform insurability related business decisions, from directors and officers (D&O) insurance to property & casualty (P&C) coverage and more. Similar to institutional investors, many insurers are starting to utilize ESG ratings and raw ESG data as components of the risk quantification process. However, given inherent limitations in existing ESG ratings and datasets, due in some degree to a lack of uniformity of global ESG reporting and regulation, insurers must also increasingly rely on sponsor engagement efforts and a thoughtful phasing of ESG related policies and datasets into their decision-making frameworks.

Additionally, as natural catastrophes and weather-related events continue to make headlines, they continue to highlight the effects of ESG risks on the insurance industry. 2021 marked the seventh straight year with more than ten weather and climate events surpassing $1 billion in economic losses, according to CoreLogic[14]. According to Aon's own 2021 Weather, Climate & Catastrophe Insight report, 23 individual events in the U.S. exceeded the $1 billion in economic loss mark for 2021.[15] This report also noted that natural disasters caused $343 billion in global economic losses in 2021, $130 billion of which was insured.[15] As a result of these events and other ESG related risks, ratings agencies including AM Best and DBRS Morningstar, among others, continue to evaluate the degree to which insurers incorporate ESG risk management protocols in their decision making processes.

Regulatory Bodies

Global regulatory bodies continue to focus on environmental, social and governance issues. Of the 868 policy tools and guidance identified by PRI, 96% have been developed since the year 2000, with 225 new or revised policy instruments in 2021 alone (which is more than double the number in any previous

[14] Corelogic, 2021 Climate Change Catastrophe Report

[15] Aon, 2021 Weather, Climate and Catastrophe Insight

year).[16] In many regions across the globe, much of the recently enacted or proposed regulation is to compel corporations to provide more transparency around ESG and specialized sub-categories, including human capital management and climate change risks and opportunities.

Asset Managers

In 2021 we saw the development and rolling out of the European Union's Sustainable Finance Disclosure Regulation (SFDR), which included three classifications for investment funds to help prevent greenwashing. However, the European Commission decided to delay the implementation of disclosure requirements under SFDR related to sustainable investment products to January 2023.

- Article 6 funds do not integrate sustainability practices into their investment structure
- Article 8 funds are classified as "environmental and socially promoting"
- Article 9 funds target sustainable investments

Given the increased interest in ESG and sustainability from investors, these classifications are an effort to promote transparency and governance for ESG related investment decisions.

Corporate Issuers

On top of the complexity of the current business operating environment, corporate issuers must also address the evolving expectations of numerous stakeholders — such as regulators, investors, insurance companies, customers, employees and even broader society. To properly navigate these complexities effectively, issuers should consider ESG risks while also capitalizing on ESG related opportunities — whether it is routine considerations on oversight, practices, policies and reporting, or on topics such as climate change, responsible investments, gender pay disparities or impacts to merger and acquisition (M&A) transactions. In addition to integrating ESG risks and opportunities into business operations, issuers should also monitor and optimize their profiles with ESG ratings providers and proxy advisory firms, which often influence financial stakeholder activities from investments and financing to insurability.

Insurance-linked Securities, Catastrophe Bonds and ESG

With financial stakeholders continuing to identify and quantify the impacts of ESG risks and opportunities, Insurance Linked Securities (ILS) and catastrophe bonds in particular are playing an increasingly important risk mitigation role. As climate change initiatives accelerate and global stakeholders look for ways to manage the volatility and impacts to corporations caused by climate change, ILS and cat bonds seem to have a natural role.

Environmental Factors

The linkage between ILS and cat bonds to environmental factors continues to be relevant in the current landscape. ILS sponsors must monitor changes to the climate (rising ocean temperature, for example) and evolving weather trends in order to determine the probability of natural catastrophes. Efforts to help insurers and reinsurers better understand their exposure to climate change have continued into the current year, with the UN Principles for Sustainable Insurance piloting a project to use the Task Force for Climate Related Financial Disclosure (TCFD) as a framework for assessing this evolving risk.[17]

The TCFD framework allows firms to focus on the environmental risks due to climate change by focusing on the following four pillars:

- Governance – how does the firm oversee and report on climate change risk?

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[16] Regulation database | Policy | PRI (unpri.org)

[17] UNEP FI, PSI TCFD global announcement

- Strategy – how do firms structure their risk management strategy to mitigate the physical and operational/transitional impacts of climate change, while also identifying business opportunities created in the transition?
- Risk management - how does the firm assess and manage climate change risks?
- Metrics and targets – what methodologies and data are behind disclosed statistics and metrics and how does the organization plan to manage into a new climate-resilient paradigm?

Social Factors

ILS and cat bonds have a "social" role to play as well. From protecting employees from the costs and disruptive effects of natural and human caused disasters to navigating the protection gaps that persist between developed and emerging economies, the expansion of instruments such as cat bonds, insurance-linked securities more broadly and parametric coverage are just some of the tools that can help to bridge these coverage gaps and provide much needed resilience to the local and global economy.

In a 2014 World Bank working paper,[18] it was concluded that the insurance sector had a key role to play in fostering inclusive economic growth. The paper concluded that "that the insurance sector contributes at a basic level to inclusive economic growth and the effectiveness of the credit function. It also shows that the latter impact may be particularly fundamental in assisting the poor to avoid poverty traps and to progress economically." The paper went on to provide a potential framework for natural disaster relief funding, with ILS and reinsurance playing a major role for lower frequency, higher severity events. Additionally use of cat bonds to protect employees from the potential negative effects of climate change can help attract and retain employees as part of a company's greater human capital management strategy.

Regulation

Taxonomy developments in Europe and the U.S. have more focus on Sustainable Finance Disclosure Requirements (SFDR). The objective being to provide more transparent disclosure to marketplace stakeholders.

Washington D.C., May 25, 2022 —

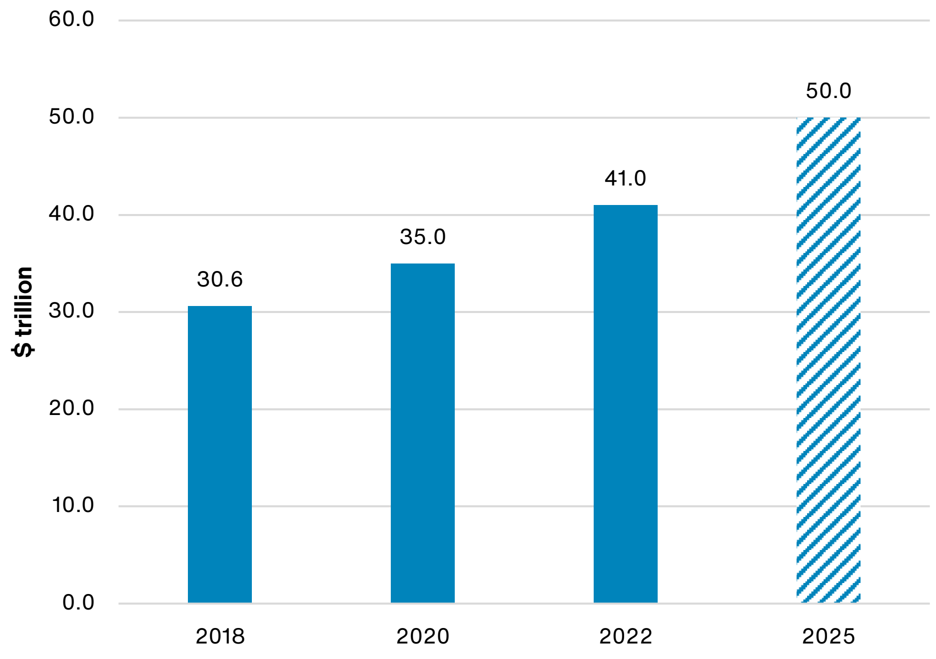
"The Securities and Exchange Commission today proposed amendments to rules and reporting forms to promote consistent, comparable and reliable information for investors concerning funds' and advisers' incorporation of environmental, social and governance (ESG) factors. The proposed changes would apply to certain registered investment advisers, advisers exempt from registration, registered investment companies and business development companies."

[18] World Bank, Insurance and Inclusive Growth

What Does the SFDR Mean for ESG Investors Outside the EU?

ILS fund managers from outside the EU who market their funds to investors within the EU will also need to be mindful of the SFDR's disclosure requirements. SFDR is the first significant attempt by a regulator to codify ESG disclosure requirements and it's reasonable to assume that regulators in other regions will follow suit using the European Supervisory Authorities' framework.[19]

Exhibit 23: ESG assets under management worldwide, 2018-2025



Source: Bloomberg as cited in company blog, 2022

Global ESG assets under management are projected to grow significantly up to $50 trillion over the next number of years supporting a growing asset class, which will influence the ILS asset class investors choices.

Summary

It is only natural for ESG focused end capital providers to be attracted to the ILS market as the strategy has inherent sustainability qualities, providing capital to rebuild after a catastrophic event. In just a few years, ESG in the ILS market has gone from a fledgling idea presented by a limited few European ILS funds, to an absolute necessity and driver of capacity among nearly all the investment funds in the space. However, there is still significant work to be done, as highlighted by the recent initiative formed by a group of six Swiss ILS investors, who are collaborating to develop a data transparency proposal to drive ESG in the ILS market by adopting a standard form. There is a clear desire among investors to develop a concrete, tangible and measurable framework for ESG classification, which is seen as paramount to allow progression with ESG within the space.

The industry needs to find a consensus among the markets as to ESG requirements and this aligned approach by the various participants driven by this group of investors will benefit the industry to move forward. Currently, each investor appears to have different requirements and different scoring

[19] www.mondaq.com/fund-management-reits/1079572/ils-f

methodologies. Standardization would streamline the process making it easier for sponsors to take the necessary steps towards compliance and in effect making the sector more ESG friendly, thus attracting additional investors to the space. In an effort to increase transparency and granularity, many sponsors are starting to include dedicated slides on ESG in their bond offering materials while others provide more public disclosures on their websites and their filings. In the current market where capacity is constrained, adequate and acceptable disclosure could mean the difference between a successful and a failed placement.

It seems logical that once the ESG proposition of the ILS market is solidified and potentially codified, we will see additional capital inflows. In fact, we believe that more granular information on ILS insurance and reinsurance underwriting criteria, exposures to certain industries e.g. fossil fuels and tobacco industries and how ESG is being implemented in businesses, can lead to one of the biggest drivers in growth in our market since much of the new capacity entering the space has been extremely focused on ESG.

Collateral Solutions

Debt securities from highly rated international institutions, as permitted investments, have historically been widely used in new catastrophe bond transactions, mainly in the form of putable floating rate notes issued by the International Bank for Reconstruction and Development (IBRD) and the European Bank for Reconstruction and Development (EBRD). These solutions offer ESG benefits, and in the past offered higher total yield than Money Market Funds (MMF), however this has converged in recent years, causing a greater take-up of traditional MMF, and likely ESG MMF in the near future. With U.S. and European interest rates increasing at a speed not seen in the recent past, both LIBOR and EURIBOR have displayed an increase over the past few months, putting an end to the period of negative EURIBOR rates over the past five years. The exhibit below shows the growth that LIBOR and EURIBOR have experienced in recent months.

We do however expect both investors and sponsors to continue to be incentivized to pursue innovative collateral solutions, in order to increase the overall yield of a transaction, while retaining a high level of credit worthiness, and ESG benefits. The positive movement of EURIBOR could prove beneficial however for European based sponsors in the second half of the year and beyond – with the cost of a collateral floor to compensate for negative rates of return now being removed.

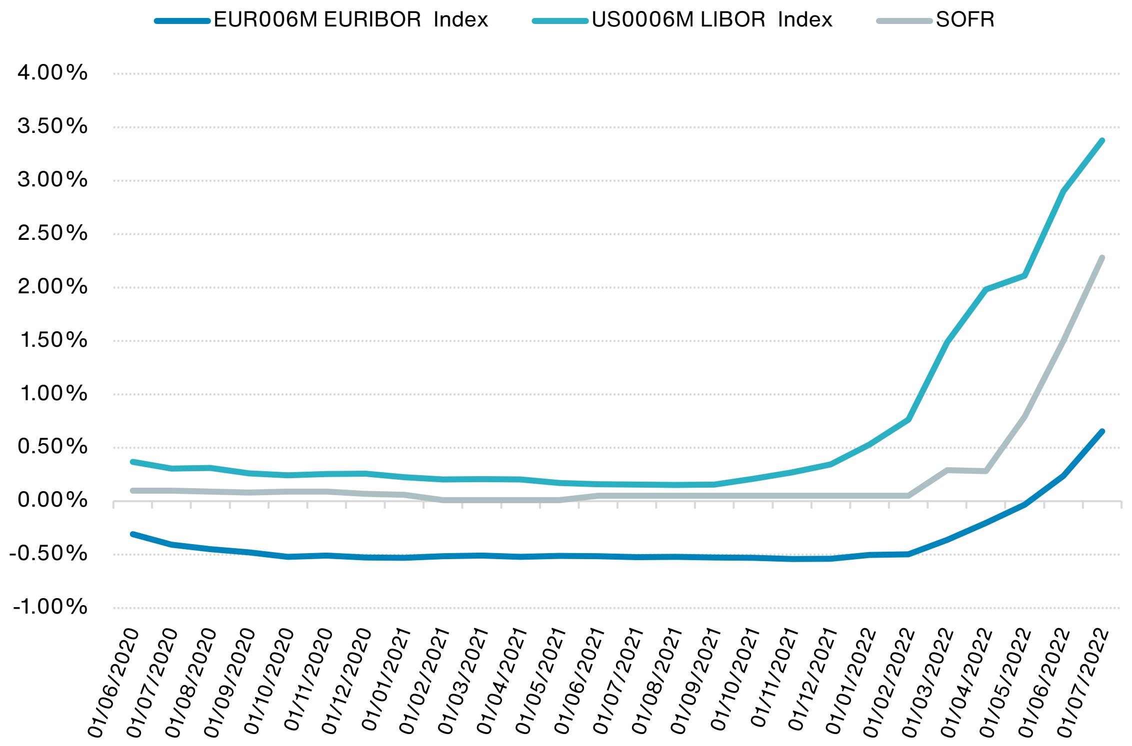
Secured Overnight Funding Rate (SOFR)

SOFR is a relatively new reference rate and its composition and characteristics are not the same as LIBOR. A number of mortgage cat bond transactions have begun using SOFR as a reference rate as well as the recent IBRD CAR 130 property and casualty transaction covering named storms which launched in June 2021.

On June 22, 2017, the Alternative Reference Rates Committee (ARRC) convened by the Board of Governors of the Federal Reserve System and the Federal Reserve Bank of New York (FRBNY) identifies SOFR as the rate that, in the consensus view of the AARC, represented best practice for use in certain new U.S. dollar derivatives and other financial contracts. SOFR is a broad measure of the cost of borrowing cash overnight collateralized by U.S. treasury securities and has been published by the FRBNY since April 2018. The FRBNY began publishing historical indicative SOFR in 2014.

The composition and characteristics of SOFR are not the same as those of LIBOR, and SOFR is fundamentally different for two key reasons. First, SOFR is a secured rate, while LIBOR is an unsecured rate. Second SOFR is an overnight rate, while LIBOR is a forward-looking rate that represents interbank funding over different maturities (e.g. 3 months). As a result, there can be no assurance that SOFR (including compounded SOFR) will perform in the same way as LIBOR would have at any time, as a result of changes in interest and yield rates in the market, market volatility or global or regional economic, financial, political, regulatory, judicial or other events.

Exhibit 24: EURIBOR, LIBOR and SOFR development



Source: Aon Securities LLC, Bloomberg

Exhibit 25: IBRD and EBRD Notes program description

IBRD notes	EBRD notes
The International Bank for Reconstruction and Development (IBRD) is a World Bank institution that provides loans and other assistance primarily to middle income countries. To fund development projects in member countries, the IBRD finances its loans from its own equity and from money borrowed in the capital markets through the issuance of IBRD notes. IBRD notes are unsubordinated, unsecured notes persuant to the IBRD's existing Global Debt Issuance Facility. The IBRD is rated Aaa by Moody's and AAA by Standard & Poor's.	The European Bank for Reconstruction and Development (EBRD) was founded in 1991 to create a new post-Cold War era in Central and Eastern Europe. It is owned by 65 countries, as well as the European Union and European Investment Bank. The EBRD helps finance its development goals through the issuance of unsecured notes pursuant to its Global Medium Term Note Programme. The EBRD is rated Aaa by Moody's, AAA by Standard & Poor's and AAA by Fitch.

Source: International Bank for Reconstruction and Development, European Bank for Reconstruction and Development

Public Sector/Residual Markets and Corporate Sponsors

While the last several years saw the emergence of corporates and governments pursuing capital markets capacity to support their risk transfer strategies, the most recent period saw the building of more robust cat bond programs. In the last 12 months, $2.5 billion of corporate and government-sponsored cat bonds were issued across 12 transactions. Having already established programs allowed a flurry of repeat sponsors come to market in the trailing 12 months. In some instances, capital markets capacity was more competitive in terms of price; however, the motivations around securing multi-year capacity amidst volatility across the insurance, reinsurance and retrocessional market was a key driver. The sponsorship continues to come from a variety of different type of large commercial entities and some of the most well-known global institutions, including technology conglomerates, large private equity firms and utility companies serving some of the largest populations.

The uncertainty around inflation has become a challenge across all types of sponsors, with corporates perhaps hit the hardest. As valuations have increased and total insured values have soared, the ability to meet the same level of protection as prior years has become challenging in the market. In many cases this has been a critical driver of accessing the capital markets. As the ecosystem of insurance and risk transfer capacity continues to blur its lines, expectations for corporate sponsors to become a more material part of the cat bond market continues to grow.

Whether it be closing the protection gap, additional limit or replacement limit both these (historically) non-traditional sponsors are likely to become more regular market participants.

Exhibit 26: Public Sector/Residual Markets and Corporate Sponsors[20]

Cedent	Trailing 12 months ($ million)	Total Outstanding ($ million)	Total Issued ($ million)
Amtrak	-	-	$275.00
Bayview	-	$425.00	**$425.00**
Blackstone	-	$50.00	$50.00
CEA	$245.00	$1,970.00	**$5,660.00**
Citizens Property	$200.00	$1,260.00	**$4,610.00**
Dominion Resources	**-**	-	$50.00
East Japan Railway	-	-	$260.00
ERDF	-	-	**$451.07**
FEMA	$450.00	$1,425.00	**$2,225.00**
FONDEN	-	-	**$765.00**
IBRD	$185.00	$895.00	**$2,935.00**
Kaiser Permanente	-	-	**$700.00**
LA Citizens	$175.00	$360.00	**$925.00**
LADWP	$30.00	$80.00	**$80.00**
MA Property	-	-	**$746.00**
MTA	-	$100.00	**$425.00**

[20] Repeat cedents are highlighted in bold

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Exhibit 26: Public Sector/Residual Markets and Corporate Sponsors[20] (continued)

Cedent	Trailing 12 months ($ million)	Total Outstanding ($ million)	Total Issued ($ million)
NCIUA	$330.00	$580.00	**$2,336.84**
Oriental Land	-	-	$100.00
PG&E	-	-	$200.00
Pool Re	$131.00	$131.00	**$229.25**
Prologis	$95.00	$95.00	$95.00
Sempra	$180.00	$270.00	**$395.00**
State Compensation	-	$210.00	**$660.00**
Turkish Cat Pool	-	-	**$500.00**
TWIA	$200.00	$1,100.00	**$3,200.00**
Vivendi Universal	-	-	**$175.00**
Grand Total	$2,496.50	$9,559.00	$29,081.16

Source: Aon Securities LLC

Non-Property Cat (Casualty & Specialty LOBs)

Successfully completing the securitization of specialty business and grappling with the nuances of the class on a more regular basis has come closer to fruition within the ILS space in recent times. This has largely been instigated through the mixed experience ILS investors have borne over the past 5 years in the property cat space, with mandates now exploring a level of diversity beyond standard Nat Cat portfolios.

There are, however, barriers and potential stumbling blocks to unlocking the potential of this side of the market. For instance, the long-tail risk and associated concerns about collateral trapping and an inability to commute in a timely manner, are likely to depress investor IRR. Additionally, whilst the property space copes with rising construction costs and the subsequent inflationary impact upon PMLs, social inflation lingers with longer tail business. This has received notably less coverage within the media and yet, has the potential to have a far more significant medium to long term effect upon (re)insurer balance sheets.

Despite the hurdles, the ILS market has exhibited a demand for exploring longer tail lines, continuing to push the frontier of the ILS market. Renaissance Re for instance launched reinsurance capital backed joint venture Fontana Holdings L.P in April 2022, with $475 million worth of capital, dedicated to writing casualty and specialty risk on Ren Re's behalf. This was an early indication of the potential cooperation that is possible for casualty-based business, which is likely to continue to manifest as understanding of modeling, long tail risk and collateral commutation improves.

[20] Repeat cedents are highlighted in bold

Market Analysis by Region

North America

The first half of 2022 was a challenging environment for the property catastrophe reinsurance and ILS markets. Generally speaking, we observed reinsurers shifting their capacity to mid-to-upper cat layers where possible, with reduced appetite for lower, frequency layers and aggregates. This put pressure on retentions, loss-impacted layers and ultimately insurers' balance sheets. Structurally, reinsurers and ILS markets pushed to remove cascading coverage from programs and required accelerated deposit schedules for many Demotech-rated companies and those who were viewed to have increased credit risk. Social and economic inflation were key topics among reinsurers and ILS funds, which found their way into pricing models.

Mounting geopolitical and broader macroeconomic factors stemmed uncertainty across a variety of asset classes, including ILS; throughout the first half of the year, the market observed more diligent underwriting and a shift towards conservative strategies, e.g., higher-yielding Wind and Earthquake deals with heightened scrutiny for deals with secondary or attritional perils.

Heading into the Atlantic Hurricane season, property cat bond sponsors had a more challenging time clearing the market due to significant price widening and less capacity. The bond market did see five Florida issuances, four from perennial issuers Florida Citizens, State Farm Florida, Allstate, American Integrity and one from a new sponsor, KIN.

From a relative value perspective, cat bond spreads were not as attractive as (widening) spreads in other, less risky non cat asset classes given the increased natural catastrophe activity over the past 5 years. In addition, increased FX hedging costs for European investors put further pressure on cat bond spreads. These factors, and others, led some more prominent investors to peg their orders at the wide end of price guidance at small(er) order sizes due to de-risking into cash/treasuries or redemptions. This has led to deals pricing at the wide end of guidance, a decrease in average deal sizes and in severe cases, transactions getting pulled from the market.

This provides a stark contrast with H2 2021, where we observed a robust issuance volume of $3.9 billion, slightly exceeding scheduled redemptions of $3.8 billion.

Overall, capacity has been constrained in the cat bond market. H1 2022 saw $7.9 billion of new issuances of property catastrophe bonds (e.g., non-life), trailing 2021's record year by only $600 million. To meet this demand, investors had to come up with ~$2.3 billion of fresh capital, as only $5.6 billion of cash was returned to investors from scheduled maturities.

Merna Re II 2022-1, -2 and -3

State Farm and its affiliates secured $800 million of capacity across three series of Notes. The 2022-1 issuance provided State Farm Fire and Casualty with $300 million of collateralized protection against Earthquake events on a nationwide basis. The series 2022-2 notes provided the Florida insurance company with $200 million of collateralized capacity covering Wind and Severe Weather events in Florida. New to the market this year, State Farm Texas secured $300 million of protection against Named Storms in the state of Texas. ILS investors received these transactions positively, as they provide diversified, peak-peril exposures across State Farm's portfolios.

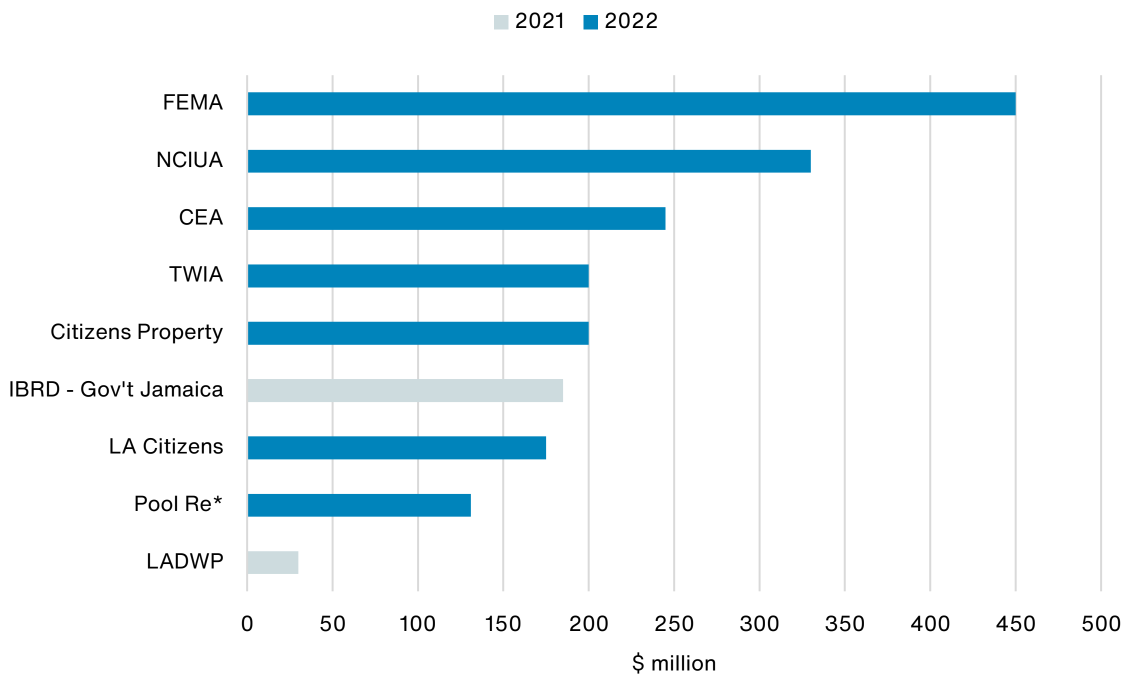
Tailwind Re 2022-1

Validus, who last sponsored a deal in 2017, returned to the cat bond market this year, sponsoring the $400 million issuances of Tailwind Re Ltd. Series 2022-1. The series 2022 notes provide Validus with three years of collateralized protection on an insured industry index basis against North American Named Storms and Earthquake risks at varying expected losses. Validus was able to maximize investor capacity by offering four classes of Notes, each with an individual risk-profile which caters to investors' varying fund mandates.

Kilimanjaro III Re 2022-1

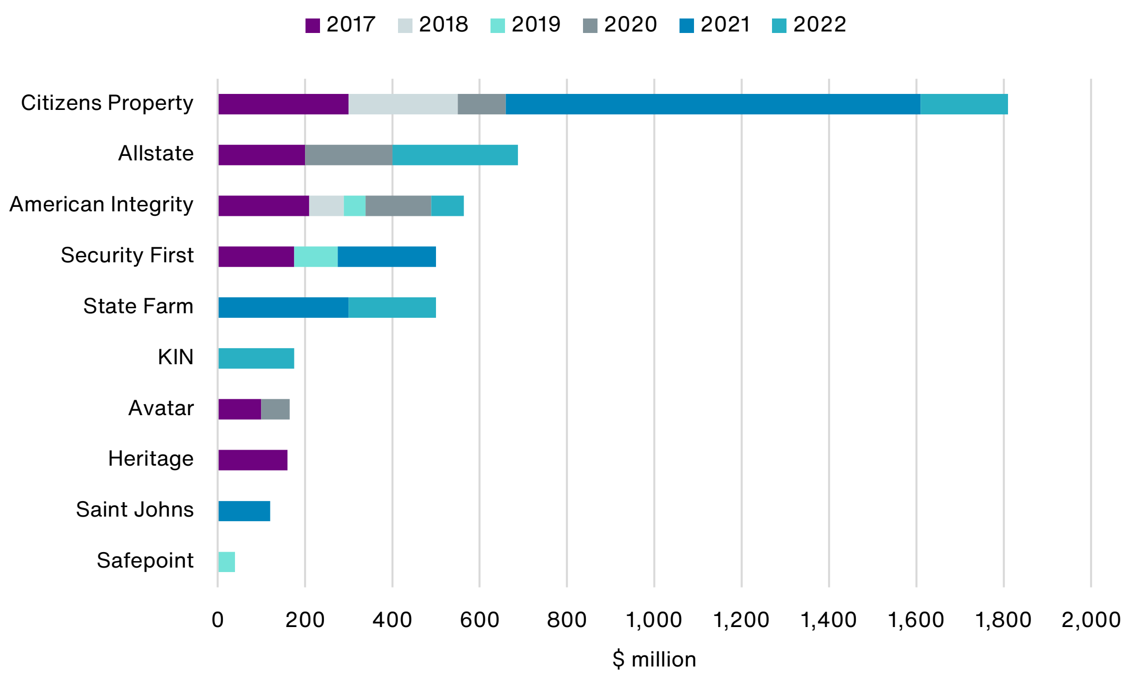
Everest Re returned to the cat bond market to sponsor the $300 million aggregate insured industry index catastrophe bond. The Notes provide Everest Re with three-years of collateralized protection against Named Storms and Earthquake risks across North America. Interestingly, the transaction features an inflation factor, which adjusts potential recoveries based on the change in the CPI at the start of the respective risk period and the date on which the qualifying event occurs. Given the recent focus on inflation, many investors welcomed this structural feature which was reflected in the execution of the deal.

Exhibit 27: Trailing year's catastrophe bond issuances by a government, risk pool and FAIR plan sponsor



* FX conversion correct as of time of issuance
Source: Aon Securities LLC

Exhibit 28: Catastrophe bond issuance by Florida sponsor 2017 – 2022



Source: Aon Securities LLC

Exhibit 29: H2 2021 property catastrophe bonds covering North America perils

Sponsor	Issuer	Series	Class	Domicile	Perils	Trigger	Recovery	Issue Size ($m)	Issue Spread
Oak Tree	Acorn Re Ltd.	2021-2	A	Bermuda	US EQ	Parametric	Occurrence	$475.00	2.50%
Frontline	Astro Re Pte. Ltd.	2021-2	A	Singapore	US HU	Indemnity	Occurrence	$40.00	8.00%
ASIG	Bonanza Re Ltd.	2021-1	B	Bermuda	US MP	Indemnity	Annual Aggregate	$80.00	13.00%
AmFam	Four Lakes Re Ltd.	2021-1	A	Bermuda	US MP	Indemnity	Occurrence	$125.00	4.75%
Prologis	Logistics Re Ltd.	2021-1	A	Bermuda	US EQ	Indemnity	Occurrence	$95.00	3.50%
Swiss Re	Matterhorn Re Ltd.	2021-1	A	Bermuda	US MP	Industry Index	Occurrence	$150.00	5.75%
Alphabet	Phoenician Re Ltd.	2021-1	A	Bermuda	US EQ	Indemnity	Occurrence	$276.00	2.50%
LADWP	Power Protective Re Ltd.	2021-1	A	Bermuda	US WF	Indemnity	Occurrence	$30.00	15.00%
USAA	Residential Re Ltd.	2021-2	2	Cayman	US MP	Indemnity	Occurrence	$175.00	11.75%
		2021-2	3	Cayman	US MP	Indemnity	Occurrence	$125.00	5.50%

Exhibit 29: H2 2021 property catastrophe bonds covering North America perils (continued)

Sponsor	Issuer	Series	Class	Domicile	Perils	Trigger	Recovery	Issue Size ($m)	Issue Spread
Allstate	Sanders Re II Ltd.	2021-2	A	Bermuda	US MP	Indemnity	Occurrence	$250.00	3.25%
		2021-2	B	Bermuda	US MP	Indemnity	Aggregate	$150.00	12.50%
Sempra	SD Re Ltd.	2021-1	A	Bermuda	US WF	Indemnity	Annual Aggregate	$45.00	8.75%
		2021-1	B	Bermuda	US WF	Indemnity	Annual Aggregate	$135.00	9.25%
Ariel Re	Titania Re Ltd.	2021-2	A	Bermuda	US MP	Industry Index	Annual Aggregate	$175.00	6.50%
Farmers	Topanga Re Ltd.	2021-1	B	Bermuda	US MP	Indemnity	Annual Aggregate	$60.00	15.00%
		2021-1	A	Bermuda	US MP	Indemnity	Occurrence	$100.00	4.75%

Source: Aon Securities LLC

Exhibit 30: H1 2022 property catastrophe bonds covering North America perils

Sponsor	Issuer	Series	Class	Domicile	Perils	Trigger	Recovery	Issue Size ($m)	Issue Spread
TWIA	Alamo Re Ltd.	2022-1	A	Bermuda	US MP	Indemnity	Annual Aggregate	$200.00	7.25%
Allianz	Blue Halo Re Ltd.	2022-1	A	Bermuda	US MP	Industry Index	Annual Aggregate	$60.00	7.25%
		2022-1	B	Bermuda	US MP	Industry Index	Annual Aggregate	$65.00	7.25%
ASIG	Bonanza Re Ltd.	2022-1	A	Bermuda	US HU	Indemnity	Occurrence	$135.00	7.25%
TransRe	Bowline Re Ltd.	2022-1	A	Bermuda	US MP	Industry Index	Annual Aggregate	$40.00	7.25%
		2022-1	B	Bermuda	US MP	Industry Index	Annual Aggregate	$75.00	7.25%
		2022-1	C	Bermuda	US MP	Industry Index	Occurrence	$50.00	7.25%
NCIUA	Cape Lookout Re Ltd.	2022-1	A	Bermuda	US MP	Indemnity	Annual Aggregate	$330.00	7.25%
LA Citizens	Catahoula Re Pte.	2022-1	A	Singapore	US HU	Indemnity	Occurrence	$120.00	7.25%
		2022-1	B	Singapore	US HU	Indemnity	Occurrence	$55.00	7.25%
Heritage	Citrus Re Ltd.	2022-1	A	Bermuda	US HU	Indemnity	Occurrence	$100.00	7.25%
Hanover	Commonwealth Re	2022-1	A	Bermuda	US HU	Indemnity	Occurrence	$150.00	7.25%
Citizens Property	Everglades Re Ltd.	2022-1	A	Bermuda	US HU	Indemnity	Annual Aggregate	$200.00	7.25%

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Exhibit 30: H1 2022 property catastrophe bonds covering North America perils (continued)

Sponsor	Issuer	Series	Class	Domicile	Perils	Trigger	Recovery	Issue Size ($m)	Issue Spread
FEMA	FloodSmart Re Ltd.	2022-1	A	Bermuda	US HU	Indemnity	Occurrence	$325.00	7.25%
		2022-1	B	Bermuda	US HU	Indemnity	Occurrence	$100.00	7.25%
		2022-1	C	Bermuda	US HU	Indemnity	Occurrence	$25.00	7.25%
SURE	Gateway Re Ltd.	2022-1	A	Bermuda	US HU	Indemnity	Occurrence	$150.00	7.25%
KIN	Hestia Re Ltd.	2022-1	A	Bermuda	US HU	Indemnity	Occurrence	$175.00	7.25%
American Integrity	Integrity Re Ltd.	2022-1	A	Bermuda	US HU	Indemnity	Cascading	$75.00	7.25%
Everest	Kilimanjaro III Re	2022-1	A	Bermuda	US MP	Industry Index	Annual Aggregate	$300.00	7.25%
Travelers	Long Point Re IV	2022-1	A	Bermuda	US MP	Indemnity	Occurrence	$575.00	7.25%
Swiss Re	Matterhorn Re Ltd.	2022-1	A	Bermuda	US MP	Industry Index	Annual Aggregate	$175.00	7.25%
		2022-1	B	Bermuda	US MP	Industry Index	Annual Aggregate	$150.00	7.25%
Swiss Re	Matterhorn Re Ltd.	2022-2	A	Bermuda	US HU	Industry Index	Occurrence	$125.00	7.25%
		2022-2	C	Bermuda	US HU	Industry Index	Occurrence	$75.00	7.25%
State Farm	Merna Re II Ltd.	2022-1	A	Bermuda	US EQ	Indemnity	Occurrence	$300.00	7.25%
State Farm Florida	Merna Re II Ltd.	2022-2	A	Bermuda	US HU	Indemnity	Occurrence	$200.00	7.25%
State Farm Texas	Merna Re II Ltd.	2022-3	A	Bermuda	US HU	Indemnity	Occurrence	$300.00	7.25%
AXIS	Northshore Re Ltd.	2022-1	A	Bermuda	US MP	Industry Index	Annual Aggregate	$140.00	7.25%
USAA	Residential Re Ltd.	2022-1	11	Cayman	US MP	Indemnity	Annual Aggregate	$35.00	7.25%
		2022-1	12	Cayman	US MP	Indemnity	Annual Aggregate	$60.00	7.25%
		2022-1	13	Cayman	US MP	Indemnity	Annual Aggregate	$155.00	7.25%
		2022-1	14	Cayman	US MP	Indemnity	Annual Aggregate	$180.00	7.25%

Exhibit 30: H1 2022 property catastrophe bonds covering North America perils (continued)

Sponsor	Issuer	Series	Class	Domicile	Perils	Trigger	Recovery	Issue Size ($m)	Issue Spread
Castle Key Insurance Company and Castle Key Indemnity Company	Sanders Re Ltd.	2022-2	A	Bermuda	US MP	Indemnity	Cascading	$150.00	7.25%
		2022-2	B	Bermuda	US MP	Indemnity	Occurrence	$100.00	7.25%
		2022-2	C	Bermuda	US MP	Indemnity	Occurrence	$37.50	7.25%
Allstate	Sanders Re III Ltd.	2022-1	A	Bermuda	US MP	Indemnity	Occurrence	$200.00	7.25%
		2022-1	B	Bermuda	US MP	Indemnity	Dual Trigger	$175.00	7.25%
		2022-1	C	Bermuda	US MP	Indemnity	Annual Aggregate	$175.00	7.25%
Validus	Tailwind Re Ltd.	2022-1	A	Bermuda	US MP	Industry Index	Annual Aggregate	$100.00	7.25%
		2022-1	B	Bermuda	US MP	Industry Index	Annual Aggregate	$150.00	7.25%
		2022-1	C	Bermuda	US MP	Industry Index	Annual Aggregate	$100.00	7.25%
		2022-1	D	Bermuda	US MP	Industry Index	Annual Aggregate	$50.00	7.25%
Palomar Specialty	Torrey Pines Re Ltd.	2022-1	A	Bermuda	US EQ	Indemnity	Occurrence	$200.00	7.25%
		2022-1	B	Bermuda	US EQ	Indemnity	Occurrence	$75.00	7.25%
CEA	Ursa Re Ltd.	2022-1	A	Bermuda	US EQ	Indemnity	Annual Aggregate	$175.00	7.25%
	Ursa Re Ltd.	2022-1	E	Bermuda	US EQ	Indemnity	Annual Aggregate	$70.00	7.25%
Vantage	Vista Re Ltd.	2022-1	A	Bermuda	US HU	Industry Index	Annual Aggregate	$65.00	7.25%
Core Specialty	Yosemite Re Ltd.	2022-1	A	Bermuda	US MP	Indemnity	Occurrence	$65.00	7.25%

Source: Aon Securities LLC

Europe

The year to June 30, 2022 saw minimal activity across European sponsors of catastrophe bonds, as traditional reinsurance continued to provide adequate and competitive levels of cover.

Covea Group returned to the market for their third issuance under the Hexagon Re vehicle, placing a total of €153 million of protection across two tranches. The Class A Notes provided €100 million of cover against European Windstorm, Hail and Other Events, whilst the Class B Notes cover just European Windstorm and achieved €53 million of protection from the capital markets. For this iteration of the Hexagon series, Covea opted to shift the domicile of its issuance away from Ireland for the first time, locating Hexagon III Re in Singapore to take advantage of the grant offered by the Singaporean financial regulator (MAS).

Whilst Hexagon III Re was the only successful European based catastrophe bond issuance, the coming period has the potential to prove more positive, primarily on two accounts. The first is that the traditional reinsurance market in Europe has shown early signs of hardening as reinsurers continue to re-evaluate their positions after the Bernd Flooding in July 2021. Secondly, as rates continue to rise in Europe in response to the ECB's monetary policy decisions, real interest rates may finally turn positive for the first time in around a decade. This has the advantage of opening up several collateral options for European sponsors, improving economics for both cedents and investors alike. The combination of these factors has the potential to drive a surge in ILS issuance in Europe, especially as the need for capacity rises market wide.

Asia-Pacific

Property Catastrophe Bonds Covering Asia Pacific Perils Issued in the Last 12 Months / Region Market Analysis for Asia Pacific

During the 12-month period ending June 30, 2022, four Asian-based sponsors came to market and explored the acceptability of structures through a new domicile, untested models and reporting mechanisms.

- In September 2021, Zenkyoren returned to the capital market by issuing two tranches totalling $775 million covering Japanese Earthquake. The Notes from newly established Singapore-based SPV, Nakama Re Pte. Ltd (Series 2021-1) is a three-year aggregate, indemnity trigger, with a term of up to 5 years. Both tranches were priced at mid-point of guidance and is the largest issuance to date by Zenkyoren.
- Also in September 2021, the first catastrophe bond was issued out of Hong Kong by state owned sponsors, China Property & Casualty Reinsurance Company. The $30 million Greater Bay Re Ltd (Series 2021) was issued as a zero-coupon Note and provides China Re with a single year of retro reinsurance protection against losses from Chinese typhoon.
- With the maturity of Japanese cat bond Akibare Re Ltd. (Series 2018), sponsors MS&AD looked to issue two series of Notes Tomoni Re Pte Ltd (Series 2022-1) in March protecting individual entities Mitsui Sumitomo Insurance and Aioi Nissay Dowa Insurance from Japanese Typhoon and Flood. Tomoni Re Pte. Ltd settled $220 million for two per occurrence tranches priced at upper end of guidance. This was also the first issuance using an updated AIR Touchstone version 9.
- The second Hong Kong domiciled cat bond issuance, Black Kite Re Limited (Series 2022-1) was issued in June 2022, structured as a single-tranche industry loss trigger over three years to provide Japanese Typhoon cover for Peak Re. This was the first cat bond which uses CRESTA CLIX loss index. Pricing was 20% – 30% above initial guidance.

An additional four catastrophe bonds which included perils in Asia were issued:

- Claveau Re Ltd (Series 2021-1): Multi-peril including Japan Typhoon and Earthquake; Australia Earthquake; Australia Cyclone and New Zealand Earthquake.
- 3264 Re Ltd. (Series 2022-1): Multi-peril including Japan Typhoons and Earthquake, Australian Cyclone and Earthquake and New Zealand Earthquake.
- Montoya Re Ltd. (Series 2022-1): U.S. Named Storm, U.S. and Canada Earthquake, Japan Typhoons and Earthquake.
- Bowline Re Ltd. (Series 2022-1): U.S., Puerto Rico, U.S. Virgin Islands, D.C., Canada Named Storm and Earthquake and Japan Earthquake.

There had been redemptions of two transactions totalling $1.02 billion of the Notes covering perils in Asia.

In October 2021, two tranches in total of $700 million of Nakama Re 2016-1 were successfully renewed with Nakama Re 2021-1. The other two tranches totalling $320 million of Akibare Re 2018-1 which matured in April 2022, were replaced with Tomoni Re 2022-1.

The redemption and new issuances covering Asia perils seen in the past year still suggest a healthy investor appetite for Asia catastrophe bonds.

April 1 Japan Renewals

Despite global losses elsewhere in the market, 2021 was another benign year for Japan in terms of natural catastrophes and the April 1 renewals in Japan were stable.

The downward spiralling yen to a level not seen since 1998, has enabled markets to better manage capacity in their original currency. This translates to reinsurers now requiring to put up less capital to meet the same supply year-on-year.

While inflationary trends have been an ongoing concern, Japan historically is a low inflation country and discussions on the matter were limited.

Reinsurers continued to seek price increases in the non-life treaty market, reflecting general market pricing movements despite significant rate increases over the course of the past three years.

Both the non-life and mutual sector property cat programmes for Wind and Earthquake were renewed at risk-adjusted single digit ranges. This renewal saw pricing increases weighted more heavily towards the upper end of Wind programmes.

AIR Touchstone version 9 was a discussion point but not an undue influence on pricing after considerable investment into cedent's own View of Risk (VoR).

Standalone Earthquake coverage continues to be dominated by the mutual sector. However, following the successive years of growth post-Tohoku (2011), the plateauing of Earthquake limits purchased which were first observed in 2021, carried into 2022.

A hard retrocessional market at January 1 became a defining factor in restricting reinsurer appetite primarily around lower programmes which resulted in significant restructuring and re-focus of portfolios by some markets. Whilst this led to some capacity reductions, there were other reinsurers who saw opportunities to grow in this space and any capacity shortfall was promptly met. The amount of over-placement compared to the previous year, had significantly reduced.

Additionally, the conflict in Ukraine has resulted in an increased focus on wording relating to Russia, Belarus and Ukraine. As a result of the application of sanctions on Russia which happened late into the renewal, some reinsurers pushed for exclusionary language relating to the region and sought clarifications on cover.

Notable Natural Disaster Events in APAC

Exhibit 31: Top 5 most significant events in APAC 2021 (Year ended 31 December)

Date	Event	Location	Deaths	Economic Loss ($ billion)	Insured Loss ($ billion)
06/01 - 09/30	Flooding	China	545	$30.00	$2.10
02/13	Earthquake	Japan	1	$8.00	$2.50
06/01 - 10/31	Flooding	India	1,282	$3.10	$0.10
05/25 - 05/29	Cyclone Yaas	India	19	$3.00	$0.10
03/13 - 03/25	Flooding	Australia	2	$2.10	$0.70
	All other events		~3,300	~$31.00	~$3.90
	Totals		**~5,000**	**$78.00**	**$9.40**

Sources: Aon - Impact Forecasting - Weather, Climate & Catastrophe Insight - 2021 Annual Report

Natural Catastrophe Losses

After three consecutive years of economic losses greater than $100 billion (2018-2020), the total economic losses in Asia-Pacific for 2021 was $78 billion.

The below-average losses were mainly due to a quiet Tropical Cyclone season and lower Flooding damages. However, insurers in APAC recorded aggregated losses of $9.4 billion, which was 31 percent below the 21st century average and 57 percent below the decadal average. Compared to the United States and EMEA, the protection gap remained a challenging issue in APAC as insurance covered just 12 percent of the economic losses in the region.

Flood events account for more than 55 percent of the economic losses in 2021. For the second consecutive year, seasonal Flood losses in China topped $30 billion, as Henan experienced record-breaking rainfall caused by the confluence of the “Meiyu” frontal boundary and a moisture belt from Typhoon In-fa in the summer monsoon. Coincidentally, the “Plum Rain” season was also the cause of the severe Flooding in central and southern China (Hunan, Chongqing, Guizhou etc.) last year. The percentage of damage covered by Chinese Floods was slightly higher than normal, primarily attributed to the July Floods in Zhengzhou, China where the urbanized area has a higher volume of active commercial and automobile policies in place. The Zhengzhou Floods became China’s costliest individual weather event on record.

In Japan, the most damaging catastrophes were attributed to the Earthquake peril. The combined economic loss was nearly $9 billion, mainly from the Fukushima (February) and Miyagi (March) events. The Fukushima event, in particular, was significant, as the magnitude-7.1 tremor caused insured losses approaching $2.5 billion.

For 2021, there were three Typhoons that made landfall in Japan. Despite elevated Tropical Cyclone losses in the last few years, they were significantly lower in 2021 as the number of West Pacific typhoons were below normal. The costliest APAC Tropical Cyclone was India’s Cyclone Yaas at $3 billion. The deadliest and strongest was December’s Super Typhoon Rai. It struck the Philippines and left more than 400 people dead. Rai became the third-costliest Typhoon on record in the Philippines.

For H1 2022, there were three significant events in Asia. While insured losses may further develop, these three events have had economic losses greater than $5 billion.

Exhibit 32: Most significant events in APAC 2022 (Year ended 30 June)

Date	Event	Location	Deaths	Economic Loss ($ billion)	Insured Loss ($ billion)
6/1 – 6/30	Seasonal Floods	China	N/A	$8.70	N/A
3/16	Fukushima Earthquake	Japan	3	$8.50	$2.70
2/23 – 3/31	Eastern Australia Floods	Australia	22	$7.50	$3.50

Sources: Aon - Impact Forecasting - Weather, Climate & Catastrophe Insight - 2022 Annual Report

AON

Property Claim Services’ Expansion of Industry Loss Data Aggregation and Index Reporting Services / Reporting in APAC

Property Claims Services (PCS), part of Verisk, have further expanded its industry loss data aggregation in Asia. Following the success of the first launch in Japan back in 2019, which covers all natural and man-made catastrophe events that are likely to cause losses of $2 billion and greater, PCS had since added further APAC territories. With a slightly higher threshold of $2.5 billion, losses occurring in Australia, New Zealand, Brunei, Burma, Myanmar, Cambodia, Timor-Leste, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand and Vietnam are now being reported. Upon reaching the threshold, events can then be classified as a “PCS identified catastrophe”.

PCS APAC estimates include covered losses from Personal Property, Motor and Commercial Property policies from common events including Winter Storm, Flood and Typhoons, with the first estimate released within 90 days of designation.

The estimates are derived through polling (panel of insurers, reinsurers, intermediaries and ILS funds) and internal processes which may include news reports and company financial statements.

PCS plans to add more countries to the Asia-Pacific region in the near future and is currently exploring ways to lower the reporting threshold.

Similarly, PERILS announcement of entering the APAC market had also been welcomed by the market. Following the launches of exposure database for Indonesia, Philippines and Thailand, the independent Zurich-based company, launched its first industry loss data service in Japan covering Wind and Flood in June 2022. In addition, PERILS will provide industry event loss data for any events caused by atmospheric perils that generate an industry loss figure of JPY 100 billion or above.

The property sums insured and event loss data for the Property Line of Business are collected directly from participating Non-Life insurers at the prefecture level (CRESTA Zone). Based on the collected data, PERILS produces a data set of market exposures (total sums insured) and market event losses. With the addition of Japan, PERILS now covers 21 territories: Australia, Austria, Belgium, Canada, Denmark, France, Germany, Ireland, Italy, Indonesia, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Philippines, Sweden, Switzerland, Thailand, Turkey and the United Kingdom.

The expansion of loss reporting in APAC will allow for a range of applications including industry loss-based risk transfer products such as Industry Loss Warranty contracts and Insurance-Linked Securities.

Australia and New Zealand

Following several years of large catastrophe losses and record-breaking Floods in February and March 2022, the June and July renewals were a market-changing event for Australia. The market is at the start of a period of adjustment, as both insurers and reinsurers adapt to the prospect of higher frequency secondary perils and the uncertainties of climate change.

Australia and New Zealand is now a key market for catastrophe risk at the forefront of climate change. The market, which is exposed to Earthquake, Bushfire, Tropical Cyclone, Hailstorm and Flood, is the fourth largest for catastrophe reinsurance demand globally, just behind Japan.

Reinsurers sought significant rate increases at the Australian June and July renewals and many were not willing to attach to lower catastrophe layers, at any price. The market pushed for higher retentions as reinsurers sought to move to cover tail risk rather than be over-exposed to a frequency of catastrophe events. The use of alternative markets slightly increased year over year as several capital providers took advantage of a “dislocated” lower layer market to seek attractive structures and returns.

While there was no new cat bond activity the overall increase in traditional pricing creates a more competitive market between traditional and alternative markets, particularly at more remote risk levels. Additionally, as local reinsurance programs continue to grow sponsors will be increasingly motivated to broaden their accessible pool of capital which the ILS markets can provide.

Model Updates

North America

U.S. Hurricane

Impact Forecasting plans to release a new U.S. Hurricane Model in late 2022. Building off the methodology introduced for their Florida Hurricane Model released in 2021, the model will feature a new event set covering the entire U.S. Hurricane domain and expanded construction and occupancy classes. The model will also include alternative vulnerability functions to reflect law and ordinance coverage in Florida.

U.S. Severe Convective Storm

Verisk released a new Severe Thunderstorm Model for the U.S. in June 2022 that includes significant updates to hazard and vulnerability models. The updated hazard model incorporates new historical data and improvements to Hail and Wind event generation, including a new detrending methodology, a new Derecho detection algorithm, and Hail intensity modeling. The new vulnerability model includes a new component-based Hail vulnerability framework, updated damage functions, incorporation of updated building codes, and new/extended support for certain risk characteristics.

Impact Forecasting plans to release a new U.S. Severe Convective Storm Model in late 2022. The model will feature a redesigned hazard model with a new event set and explicit treatment of Derechos. The vulnerability model will leverage a new component-based framework with new/updated primary characteristic differentiation and the addition of secondary modifiers.

U.S. Earthquake

CoreLogic released a new U.S. Earthquake Model in 2022 that incorporates updates to hazard and vulnerability models. The new hazard model now includes updates from the USGS 2018 National Seismic Hazard Mapping Project (NSHMP) model with updates to seismic sources, time-dependent probabilities, ground motion models, site amplification factors, soil maps, and the modeling of specific sedimentary basins in California, Washington, and Utah. The vulnerability model was also updated to reflect the latest publications on Earthquake vulnerability modeling.

U.S. Winterstorm

RMS is updating the U.S. Winterstorm Model in 2022, informed by new data and understanding of the peril. The update includes a new historical reconstruction representing the February 2021 severe freeze event and significant vulnerability enhancements. There are no changes to the stochastic event hazard.

Caribbean

Caribbean Earthquake

Impact Forecasting is releasing a new Caribbean Earthquake model in 2022 in collaboration with Global Earthquake Model (GEM) with significant updates to hazard and vulnerability. Hazard was developed in the framework of the CCARA project (CCARA project: Central America and the Caribbean region), a GEM collaboration project funded by USAID with many local organizations and institutions involved. The model now includes the whole Caribbean region, while the previous model only included Puerto Rico and the U.S. Virgin Islands. The update also consists of a completely new vulnerability module.

Europe

Wind

Impact Forecasting (IF) released ELEMENTS v16 which includes updates to European Wind models.

Touchstone v10.5 (VERISK) is scheduled for release in December 2022. This will include updates to EU demand surge and an expansion of the NGM model preview.

Flood

JBA released v3 of their Flood model, which includes improvements to Flood mapping (the Hazard layer), coastal defence algorithms and is now enabled by FLY technology – a more transparent and flexible modeling platform. V3 also supports vertical postcodes. JBA further released climate change event sets for two RCP scenarios (4.5 and 8.5) for the UK and Europe.

IF ELEMENTS v16 includes updates to the Flood models for Hungary and the Czech Republic.

Hail/CS

There have been no further updates to European Hail/CS models since the release of RMS HD.

Earthquake

There have been no further updates to European Earthquake models.

Asia-Pacific

RMS have announced Version 22 for RiskLink and RiskBrowser in June 2022 with several updates to APAC.

The updated South Korea Typhoon model is based on a review of all model components, using the latest data and with learnings from recent typhoons across the region and with a focus on a recalibration of vulnerability and improvements to Flood Hazard modeling.

RMS has also updated their Taiwan Typhoon view of risk, incorporating learnings from typhoons over recent years and vulnerability functions from other regions including Japan, Europe and the U.S. The update focuses on components of the Wind Hazard and both Wind and Flood vulnerability.

For Earthquake, RMS have made significant improvements to their China Earthquake model. The updated model provides a robust, comprehensive representation of seismic risk, accounting for damage due to ground shaking and ground deformation associated with liquefaction and landslides. New stochastic event sets were included as well as an updated assessment of buildings based on latest construction practices. The geographic coverage for the model includes continental China, Hong Kong and Macau – with Taiwan covered by a separate but integrated model.

Additionally, RMS has also recently expanded its latest suite of RMS Climate Change Models to include Japan Typhoon and Flood HD models which will further enable customers to strategically assess the near- and long-term impacts of climate change across a wider range of perils and regions. The Japan model will complement the existing suite launched in 2021 including Europe Flood, Europe Windstorm and North Atlantic Hurricane Climate Change Models. Using these models, customers will be able to simulate the effects of climate change across four greenhouse gas concentration trajectories (known as Representative Concentration Pathways, or RCPs) at any time between 2020 and 2100.

No updates to the region from Verisk AIR since the Touchstone version 9 releases of Japan Earthquake and Japan Typhoon models in June 2021. No updates to CoreLogic RQE as well.

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About

Aon plc (NYSE: AON) exists to shape decisions for the better—to protect and enrich the lives of people around the world. Our colleagues provide our clients in over 120 countries with advice and solutions that give them the clarity and confidence to make better decisions to protect and grow their business.

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