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MANAGING EDITOR
Fiona Robertson
fiona.robertson@insuranceinsider.com

SENIOR REPORTER
Lucy Jones
lucy.jones@insuranceinsider.com

MANAGING DIRECTOR
Tim Wakefield
twakefield@euromoneyplc.com

HEAD OF MARKETING SERVICES
Ben Bracken
ben.bracken@insuranceinsider.com

HEAD OF STRATEGIC PARTNERSHIPS
Oliver Nevill
oliver.nevill@insuranceinsider.com

SENIOR BUSINESS DEVELOPMENT MANAGER
Baker Jaggwe
baker.jaggwe@insuranceinsider.com

SUBSCRIPTIONS DIRECTOR
Tom Fletcher
tom.fletcher@insuranceinsider.com

SENIOR ACCOUNT MANAGER
Georgia Macnamara
georgia.macnamara@insuranceinsider.com

HEAD OF MARKETING & ANALYTICS
Lynette Stewart
lynette.stewart@insuranceinsider.com

BRAND MARKETING & ANALYTICS MANAGER
Aimee Fuller
aimee@insuranceinsider.com

PRODUCTION EDITOR
Ewan Harwood
ewan@insuranceinsider.com

SUB-EDITOR
Steve Godson
steve.godson@insuranceinsider.com

JUNIOR SUB-EDITOR
Simeon Pickup
simeon.pickup@insuranceinsider.com

SENIOR DESIGNER
Mike Orodan
mike.oroan@insuranceinsider.com

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Deane Wakefield Ltd

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The ILS market already lives by uncertainty

BlackRock CEO Larry Fink drew worldwide headlines earlier this year for the firm's letter to CEOs proclaiming that "climate risk is investment risk".

This is not news to investors who are already active in the ILS market.

While financial markets are catching up to this reality, ILS portfolios are already fundamentally driven by climate forces, at least in the broad sense of the term.

To be precise with the wording, only a small sub-segment of ILS investors are taking on true weather risks – the kind linked to everyday climate factors such as temperature or wind, rather than natural catastrophe risk.

"While financial markets are catching up to this reality, ILS portfolios are already fundamentally driven by climate forces, at least in the broad sense of the term"

This might seem like a minor distinction but it is worth bearing in mind – as it occurred to me when speaking to scientists on how climate change is expected to impact disaster activity for our feature on page 24.

Some of the findings were to me surprisingly neutral in the context of the harm expected from rising temperatures.

One more mantra from Fink's letter also resonated as a statement of the obvious for the ILS market: uncertainty is certain.

The ILS market already lives by this phrase.

That's not to say that it too doesn't have some catching up to do to address concerns about climate change, along with the broader markets.

Questions are being asked about whether current models properly capture the chances and costs of disaster activity, even before considering how they might need to be adapted to a warmer climate. Few managers focus on promoting in-house sustainable practices, and initiatives aimed at adding environmental, social and governance benefits to ILS cover, such as expansion into developing world cover or supporting resilience projects, are at their early stages and could be challenging to deliver.

But the fact that the industry is starting from a point of making their bread-and-butter from understanding disaster risk will put it in good stead to make headway on these issues.

Fiona Robertson

Managing Editor,
Trading Risk



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Climate change: pushing to be part of the solution

One of the top talking points for ILS investors and their managers is climate change – *Trading Risk* looks at the points of debate and where the conversation is heading



Climate change is increasingly at the forefront of ILS investors' minds following recent typhoon, hurricane and wildfire losses, as a surge in environmental activism pushes the issue to the top of the business agenda.

Ultimately the question these investors are asking is: am I getting paid sufficiently for risks associated with climate change?

There are reservations over the ability of models to adequately capture climate change and strong doubts about whether the uncertainty surrounding the issue is being sufficiently priced into contracts.

In some cases, it is understood this has led investors to pull back from the ILS space, though others are still entering for the first time.

"After losses in the last few years, so far investors seem to have been more cautious about allocating for 2020. Some of this caution is certainly related to concerns about climate change," says Matthew Swann, principal at Hiscox Re Insurance Linked Strategies.

"It's right that investors should push the industry hard on this question."

Short-term timing no longer an answer

The first response to investor questions about climate change has

always been to point to the short-term nature of ILS risk.

The market reprices most of its business annually, and even cat bonds only remain on risk for a few years – very short timeframes in the context of climate change impacts that will unfold over decades.

Annual renewal cycles should give ILS managers time to price in new information on these changing risk levels, the industry has always argued.

But this answer no longer seems to be reassuring investors. This might be influenced by the uneven renewal outcomes since the 2017 losses, which suggest that basic supply and demand forces ultimately drove the results.

The fundamental paradox is that while climate change should mean higher structural pricing for catastrophe reinsurance risk, rates remain close to multi-decade lows, says Hyperion X's head of analytics David Flandro.

However, this partly reflects structural changes in the reinsurance market since the growth of the ILS industry, which reduced the huge additional premium that Florida insurers were forced to pay for disaster cover compared with other global cedants.

And Flandro notes that rates

have begun to adjust upwards more recently, as capital has been trapped and hurricane losses have been more acute than expected.

"There might be some climate change experience-driven pricing there – but so far, it is only at the margins."

Outside the wholesale reinsurance and retro markets, driving rate change is a much more complicated matter in the heavily regulated primary insurance sector.

"There might be some climate change experience-driven pricing there – but so far, it is only at the margins"

David Flandro

"It is difficult for an insurance company from a regulatory, legal or competitive standpoint to reprice swiftly," says Barney Schauble, head of Nephila Labs.

"This idea that in some future specific year when a company realises climate change has arrived they will just reprice everything is little bit unrealistic for primary insurers."

Alex Bernhardt, a director at Marsh & McLennan Companies (MMC), suggests a staged approach should be the target.

"If you are confident climate change could shift the risk curve to the right, but you don't know when or you don't know exactly how that is going to manifest, then you should be adjusting for pricing on that basis incrementally over time," he says.

However, he adds, more fundamental market forces may conspire against (re)insurers attempting to do so in the near term.

The 'uncertainty gap'

How do you unpick the impact of climate change from "normal" volatility in disaster risks, when historic wildfires burn in Australia or the first hurricanes strike the US in more than a decade?

That is one of the factors complicating the ILS market response to climate change – the role of insurance is to smooth out risks over the long term, and though it might be human nature to react to short-term memory, it does not make for robust underwriting decisions.

To achieve this goal, investor confidence in the modelling companies' ability to capture climate change is going to be crucial going forward.

Swann points out that reinsurance is somewhat distinct in that the catastrophe models employ physical principles as well as empirical data.

"The physics are important for understanding tail risk – if you're just using statistics you're really quite limited to what has gone before.

"So right now, the challenge is how to integrate information from climate change projections into the catastrophe models, and to understand the potential impacts to our business, both in respect of next year's contracts, and further out into the future," he says, adding that the industry is already starting to act.

At present, the major risk models do offer the ability to switch from base-case to more conservative

assumptions around disaster activity – but there is no additional climate change loading available.

However, the major modelling firms have various initiatives under way to address these concerns.

Karen Clark & Company says its severe convective storm models are automatically accounting for climate change, while new trends showing that tropical storms are more likely to stall near the coast – as hurricanes Harvey and Florence did – are being incorporated into this year's hurricane model update.

RMS' alternative baseline perspectives attempt to capture any evidence that climate change is already affecting activities, chief research officer Robert Muir-Wood says.

But he points out there are decadal variations in activity, as well as potential trends that could be associated with climate change, and it is important to capture both sources of variability.

The company is pioneering more work to isolate the shifts expected from climate change alone.

Peter Sousounis, director of climate change research at AIR Worldwide, notes that "climate change science is focused on looking forward and projecting future impacts".

"We are researching solutions that will allow the market to make an assessment of risk based on forward-looking climate projections," he adds.

According to Schroder Secquaero's Dirk Lohmann: "The challenge is whether the models used by the industry can be adjusted to reflect climate changes in a timely manner or whether underwriters can make adjustments for the under-modelled or poorly modelled perils.

"One of the issues we have with models is the time it takes time for a new release to come out."

The inherent complexities of climate change mean there is always going to be a degree of uncertainty that cannot be avoided in even the most sophisticated model, explains Willis Re Securities executive vice president Brad Livingston.

But he says as modelling skill improves, the "uncertainty gap" will become more clearly defined and this in turn will help pricing decisions.

Balancing demand issues

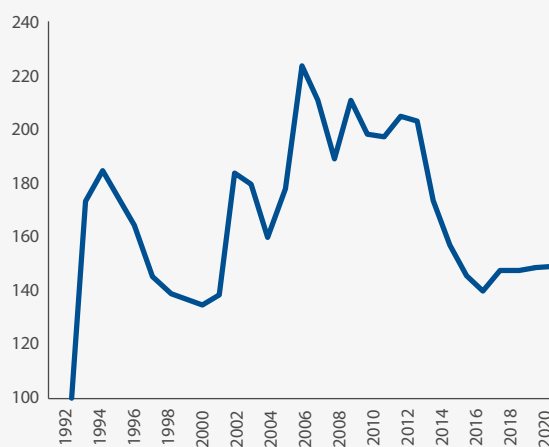
Aside from pricing adequacy, the major concern about climate change is how it will impact demand for ILS cover and whether the product can remain affordable enough to continue its growth trajectory.

There is a growing realisation among ILS investors that they are exposed to "transition risk", as business models are threatened by climate change, according to Livingston.

But if the transition to a low-carbon economy removes some demand for cover from the market, this will be balanced by new emerging business models which need financing and protection, he says.

Lohmann agrees that greater demand for cover is likely to come from trends such as urbanisation in areas that are prone to natural catastrophes and increasing movement to the coast.

Cat rates: limited signs of climate reaction



Source: Hyperion X

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A large, dark silhouette of a palm tree trunk and fronds, positioned on the right side of the poster against the blue background.

in | trading
risk

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Climate stress could also facilitate wholly new risk transfer products, according to consulting actuary at Milliman John Rollins.

In the future we could see a product like a “smoke health bond” that would reimburse a wildfire-prone state like California for the incremental public health costs of treating secondary wildfire victims, he says.

But there is also a fear that if climate trends push rates up abruptly, then affordability of insurance will come into question.

Affordability is always a concern, because ultimately free markets that don’t meet the needs of their participants will be pre-empted by governmental agencies, warns Rollins.

“An old legislator friend of mine in Florida referred to ‘snapping the rubber band’ to describe the will of the people suddenly favouring abrupt policy changes in an affordability crisis, and the analogy is apt,” he says.

For example, in Florida the state already supports a local reinsurer and an insurer of last resort, but this year fears of rate hikes have prompted talk about expanding the state reinsurance scheme further.

Within the ILS markets, investors could consider rearranging their portfolios to make them more climate change resistant, for example, by shifting ILS investments into health, life and earthquake, although these transactions represent a much smaller part of the market and offer little scalability.

Driving decision-making

With these threats and opportunities in mind, there are signs of the ILS and broader reinsurance markets getting more involved in helping companies and governments mitigate disaster risk and to maintain affordability of cover.

One helpful tool could be the introduction of a term structure for insurance rates – whether just in multi-year contracts, or some version of a futures index – showing projected rate increases resulting from climate change effects over time, says Schauble.

A view of future pricing trajectory could change behaviour today – for example people may choose not to live on flood plains if they know future insurance costs in the areas are going to change dramatically.

.....
“The lack of any longer-term price signal for insurance is problematic”
 Barney Schauble

“The lack of any longer-term price signal for insurance is problematic,” notes Schauble.

Other nascent initiatives are designed to incorporate added sustainability benefits, with the first World Bank cat bond with a sustainability focus for collateral investments under way at the time of publication.

The idea has been floating around for some time: in 2015, design firm re:focus partners joined with RMS, Swiss Re and Goldman Sachs, with the support of the Rockefeller Foundation, to launch RE.bound, an initiative to develop a cat bond-like instrument that could fund risk-mitigation projects.

The so-called resilience bonds could build in discounted premiums if investments in infrastructure projects to reduce risk are carried out.

“Designing major infrastructure projects can take years, but the potential for local governments to more quickly fund resilience projects, to share the burden with other stakeholders and to transfer the risk of a catastrophe to capital markets using this mechanism are significant,” says re:focus CEO Shalini Vajjhala.

A resilience bond could come out of a project undertaken by US-based organisation Build Change, which designs disaster-resistant homes and schools in emerging nations in partnership with RMS.

Being part of the outcome

With all the focus on the risks of climate change, considering the rewards might bring a new aspect to ILS investing.

As ILS payouts help the recovery process from a natural disaster, the industry can be seen as a socially responsible investment class – something that could assist it given the focus on environmental, social and governance (ESG) investing.

This is one of the things investors like about the ILS space, points out Schauble. “Unlike most securities markets, it’s not a zero-sum game.

“If we sell protection to farmers in India for bad weather and they have a poor monsoon season and are paid as a result, there is a social resilience aspect which is a powerful ESG benefit.”

The ILS asset class fits a number of the United Nations Sustainable Development Goals, such as the target of “taking action to increase resilience and capacity to combat and recover from climate change”, says senior financial analyst at AM Best Jessica Botelho.

MMC’s Bernhardt suggests: “I don’t think the answer with ILS is to cannibalise the already insured risk. I think it should be to broaden the pie.”

In line with the resilience bond concept, ILS could be used for impact investments, which are designed to generate a measurable social and environmental impact alongside a financial return.

For example, ILS-backed swaps are already being used to finance a number of US and Australian wind farm projects, enabling renewable energy to be produced.

The hope is that ILS will ultimately become part of the climate change solution.

Digging for new data

Reinsurance buyers and ILS managers should be working together to get more detailed exposure information, Leadenhall Capital Partners argues

Investors have many more questions about their ILS exposures following the 2017-2019 catastrophes and, to provide answers, managers are going back to the drawing board.

Leadenhall Capital Partners is working with their counterparties to radically improve the information they provide the manager, stress testing that data so it in turn can be passed on to the investor.

"It's about bringing trust back into the industry. Models can only summarise the world. If you put inaccurate or limited information in, you won't get an accurate view," says CUO at Leadenhall Jillian Williams.

The picture on exposure data is complex and ever-changing, she adds.

In Florida, for example, "social inflation" costs linked to increased litigation and plaintiff-friendly legal decisions are playing an increased role in settling insurance claims.

In Japan, the 2018-2019 typhoons brought to light that large swathes of industry data were out of date, as models had been calibrating exposure information that dated from typhoons in the 1990s and early 2000s with only simple inflation-adjusting techniques.

Leadenhall is also measuring the impact climate change is likely to have on exposures in the future.

Take for example the increasing popularity of solar roofs, which will undoubtedly help mitigate climate change but may not necessarily be hail proof, Williams points out.

In some instances, Leadenhall is working with sponsors on their policy coverage or the structure

of deductibles to in essence make them more insurable.

"ILS was traditionally considered to take only a model approach, only taking a few numbers to underwrite with. What we are trying to achieve is making sure we understand the product at the very base level and moving it up to provide information to investors that helps them in their understanding."

The trust has to go both ways – reinsurance buyers have to understand that investors are not here for the short term.

Consistency is a constant theme at the manager, which endeavours to provide consistent coverage for the sponsor and consistent information for the investor so "there are no shocks."

"Sometimes it is a challenge,"

.....
"It's about bringing trust back into the industry. Models can only summarise the world"

Jillian Williams
.....

Williams says, adding that communication with all involved parties is key.

Offering choice

ILS structures are also changing in the post-Hurricane-Irma phase, with more managers considering setting up rated reinsurance platforms.

Williams notes that having access to rated paper allows ILS managers to write across a broader range of risk levels.

"We're a big advocate of diversification. Maybe for the high-attaching levels [cedants] don't need a rated vehicle so collateralised cover may fit better. But for some of the bottom reinsurance layers that is not the case because of the cashflow requirements [from more regular claims]," says Williams.

Certain lines of specialty insurance business also mean risk-takers could be exposed to losses that are not immediately evident in the way property catastrophe events are, and these "longer-tailed" risks suit rated paper, she added.

"Reinsurance is about understanding the particulars... we have the ability to work with our clients and provide what they need transformed. They can have a mix of business with us," Williams continues.

"This helps us be consistent."

Leadenhall Capital Partners
CUO Jillian Williams



Timing the entry

After the loss years of 2017-2018, rising rates are now drawing a number of investors to enter the ILS space for the first time.

But investors in the ILS market should not be chasing a one-year return, says Williams.

“[ILS risk offers] an ebb-and-flow return. It’s always a good time to enter if you want this as part of your long-term strategy.”

Rate rises of 15-20 percent are expected on Japanese contracts this year, depending on losses and structure and where sponsors want to buy, according to Leadenhall.

With regards to retro prices at 1 January, some loss-affected layers had increases of 20 percent, and average uplift of 7.5 percent on loss-free top occurrence layers. Expectations for Florida business, especially for sponsors which have had more creep in 2019, is that there will also be significant price increases.

In 2020 and beyond, Florida insurers could struggle with the health of their surplus, and once again the space could see M&A, says Williams.

The Florida insurers could potentially be “squeezed” by constraints on rate increases on their upfront policies, as well as the increasing cost of reinsurance.

There is therefore potential to work with cedants on the best-value coverages and structures that would suit their risk and reinsurance cost, Williams adds.

Some potential solutions may be alternative covers, like parametric structures, for example using windspeed triggers, or industry loss structures. These could compliment a carrier’s tailored indemnity cover.

Retrocession rates are also rising, although the relationship between the cost of hedging and reinsurance rates is not always predictable as one might think, with underlying reinsurance rates slower to react to rising retrocession costs.

“Some retro may not have been bought because of the increased cost,” notes Williams.

Life ILS deals move closer to the money

Leadenhall also provides investors with an array of life strategies to invest in, and it currently is managing a very active pipeline with strong interest from asset managers and pension funds from different continents.

As of year end 2019, the firm’s life and alternative credit asset base had reached \$2.8bn.

.....
“This is a sector where innovation is still quite possible and idea generation with a counterparty is often key to get a transaction done”
Craig Gillespie
.....

One emerging trend in life ILS is expansion of the opportunity set to include deals that are structured to transfer more risk, and which consequently offer higher yields, says the firm’s head of life and alternative credit portfolio management Craig Gillespie.

Transactions are currently yielding anything from low single digits to the mid-teens.

The portfolio covers a variety of types of deal from traditional catastrophic mortality risks, medical loss ratio covers and private embedded value transactions.

“This is a sector where innovation is still quite possible and idea generation with a counterparty is often key to get a transaction done, and so we often introduce new type of deals into the portfolio.”

On the question of whether ILS investors will eventually back longevity deals, Gillespie says the recent completion of transactions with embedded longevity risk show that “something is being done” within the longevity ILS space.

“For the straightforward longevity swaps though, we believe that it is more of a challenge until ILS funds can find a matching appetite among its investor base,” he adds.

There are structural features which could make longevity more tradable which involve making some assumptions about the tail of a portfolio in a shorter timeframe but this would involve basis risk for the protection buyer, he explains.

In general though, Leadenhall’s investor base is traditionally already long on longevity risk, and so their lack of interest in this area is not necessarily only down to structural issues of individual trades, he points out.

Craig Gillespie, head of life and alternative credit portfolio management at Leadenhall Capital Partners



Reshaping of ILS asset base amid January intakes

Overall ILS assets under management (AuM) tracked by *Trading Risk* dipped by just under 2 percent in the second half of 2019 to \$95.7bn amid continued flux as a handful of players experienced significant inflows or outflows.

A pattern of redistributed growth continued as smaller firms picked up windfalls from investor reallocations following the tests of 2017-2018.

But although top-tier ILS managers continued to shrink, the trend has stabilised after more significant retractions in H2 2018 and H1 2019.

The surge of post-Hurricane Irma growth in early 2018 has been unwound, but while aggregate capacity remains ahead of pre-Irma levels, actual deployable capacity is harder to estimate.

The headline sums still likely factor in trapped capital due both to the fresh impact of Typhoon Hagibis losses last year and from 2018-year contracts. Brokers have estimated trapped capital at up to \$15bn.

The top-tier firms (with more than \$2bn of AuM) held collective AuM of \$71.3bn. This was down 1.4 percent from the mid-2019 total after a steeper fall in H2 2018, but still made up almost 75 percent of the total market.

The top peer group remained stable at 13 players, with Hudson Structured Capital Management joining the group as Markel Catco was moved out following its withdrawal from the market.

Hudson's growth would have put the sub-\$2bn ILS group's asset base up 10 percent over the six months, but growth among other participants in that group left it at 12 percent of total capacity.

Those growing in the second half of 2019 included some cat bond-

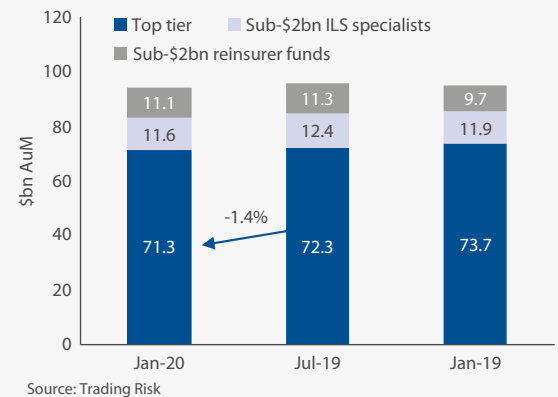
focused managers such as Fermat Capital Management (up \$350mn), reinsurer manager RenaissanceRe (up \$230mn) and a number of smaller ILS players such as Hudson (up \$300mn) and NB Insurance-linked Strategies (up \$600mn).

Retractions were posted by major players led by Credit Suisse ILS (down \$800mn from July 2019), along with Stone Ridge Asset Management (down \$650mn), Securis Investment Partners (down \$240mn) and Aeolus Capital Management and Nephila Capital (both \$300mn lower).

However, the largest movement was linked to Markel Catco – pushed down by \$2bn to zero since the firm had no live capacity at 1 January, although it is managing assets that are being wound down.

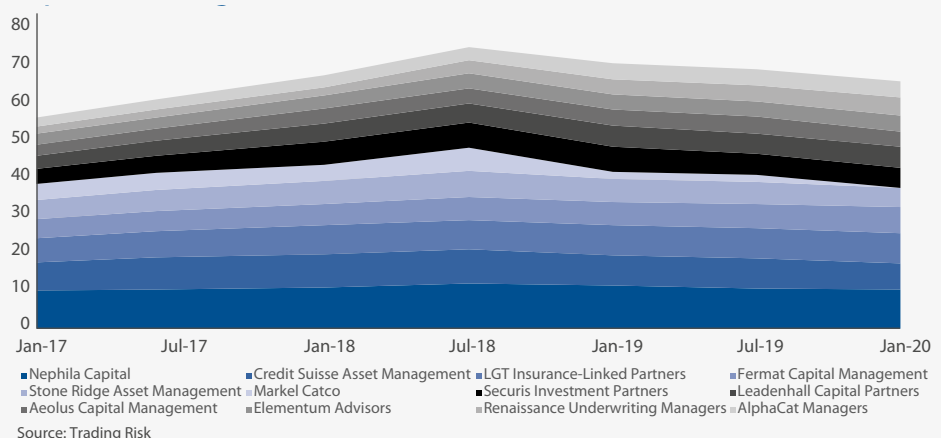
The total \$95.7bn asset base does not include a separate group of ILS fund of funds tracked by *Trading Risk*, with estimated collective AuM of \$1.7bn. These were excluded to reduce double counting of assets, although there will be some duplication of capacity across funds that heavily invest in quota shares and the reinsurer ILS platforms they support.

Top-tier shrink as smaller funds gain mass



“A pattern of redistributed growth continued as smaller firms picked up windfalls from investor reallocations following the tests of 2017-2018”

Top ILS managers AuM



Maturing cat bond market hits \$100bn landmark

The catastrophe bond market passed a major milestone this year as historic issuance levels went beyond \$100bn, reflecting the maturity that has emerged in the sector as it has broadened its investor appeal and refined the product coverage on offer over the past 20-plus years.

Since the first \$45mn cat bond deal was placed in 1996, the industry has evolved into a mainstay of many portfolios.

The investor base was originally primarily comprised of reinsurers and life companies, before hedge funds moved into the sector.

But since the financial crisis, dedicated ILS managers and institutions, investing on behalf of pension funds, have taken their place as the keystone of the market.

As markets increased their level of sophistication and resources devoted to the space, ILS moved from being commonly perceived as an exotic alternative investment offering a large premium to a

mainstay of many portfolios.

Even as a maturing market in the past four years, statistics show that the market was still deepening.

Orderbooks in 2019 show 23 percent more investors than in 2015, which has allowed average allocations to decrease from \$13mn to \$9mn, putting less pressure on any one market.

Product evolution grows market share

In turn, development of the investor base has supported expansion of the coverage that cat bonds offer cedants: moving away from simple parametric or industry loss structures to deals more closely resembling those found in the traditional (re)insurance market.

This has enabled the ILS sector to consolidate its role in the overall (re)insurance industry and to become an integral component of the way in which (re)insurers approach risk transfer.

Since 2016, alternative capital has remained at or near record highs. Across cat bonds and other ILS products, total capacity is now estimated at \$93bn – nearly five times the \$22bn level it was in 2009.

It makes up around 13 percent of total reinsurance capital by Aon estimates, against traditional capital of \$610bn.

But the ILS market share is even more significant in the context of the property catastrophe market, where it is heavily concentrated, while traditional capital supports a range of casualty and other specialty risks.

Aon has structured and placed more than \$34bn of cumulative new issuances in the ILS market since 2009, spanning 53 sponsors including insurance companies, reinsurers, governments and corporate entities.

Growth outlook

Over the past decade, ILS has produced an average annual return of 6.38 percent, and 7.48 percent for 2019, according to Aon ILS performance indices.

Aon's US Hurricane Bond index returned to positive territory in the year to 30 June 2019, rising by 2.74 percent, after posting a 1.13 percent downturn in the 2017-2018 year.

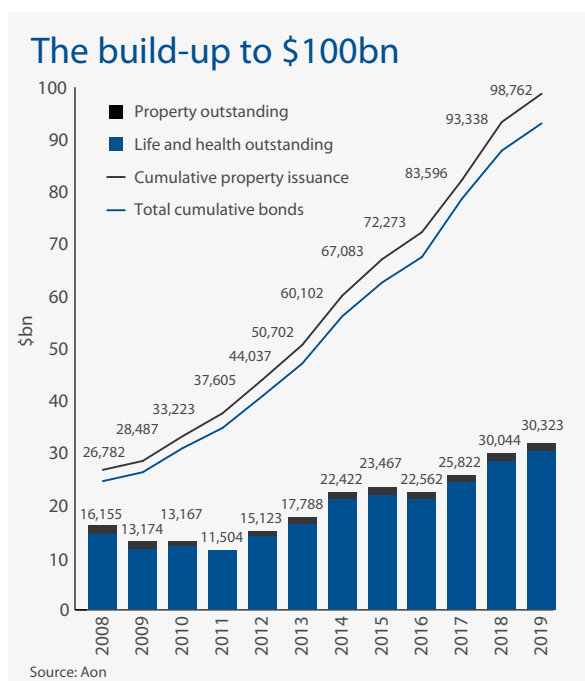
The All Bond ILS index remained positive in both years, gaining 4.3 percent in the year to 30 June 2019, versus 3.12 percent the prior year.

At the mid-year point in 2019, five-year average returns were 4.41 percent for the All Bond index – in line with the five-year track record of 4.55 percent for BB corporate high-yield debt indices.

The ILS market responded as expected to the natural catastrophes in 2017 and 2018.

Having endured these significant tests, the sector has shown strength in adversity, proving that (re)insurers and investors view ILS as being an enduring and important part of the industry.

Reaching this \$100bn milestone is a fantastic achievement, and we anticipate many further successes for ILS in the years to come as it expands into a greater number of geographies and perils.



Paul Schultz
CEO of Aon
Securities

Maturities to drive 2020 cat bond volumes as pricing stabilises

Cat bond spreads are forecast to stabilise or drop slightly in 2020, although a revitalisation of the market is expected following last year's lull in issuance, with new volumes predicted to reach \$8bn to \$11bn.

This is a reversal of last year's trends of rates hardening, against a backdrop of shrinking cat bond volumes, as new deal issuance was down 40 percent year on year to \$5.9bn (not including mortgage ILS transactions).

Cat bond rates increased 5 percent in 2019, after a spike in Q4 2018, according to the Lane Financial rate-on-line index.

Absolute spreads are also higher as the market took on more risk towards the end of 2019. Willis Re Securities' ILS rate-on-line index reached 8.7 percent in Q4 2019, up from 5.1 percent a year earlier.

With higher scheduled maturities due over the upcoming year, this will keep investable dollars available and may leave spreads flat to down by 5 percent or more, predicted GC Securities head of ILS origination Cory Anger.

"However, it will depend upon overall insured loss activity," she added.

Judith Klugman, head of ILS sales at Swiss Re Alternative Capital Partners, noted: "We see pricing between traditional reinsurance and ILS converging in key markets such as Florida and California."

In the near term, Aon Securities CEO Paul Schultz expected pricing to be flat, as he noted an investor preference towards more liquid product strategies. "I think that in part is leading to us having a pretty bullish outlook on the volume we see in 2020," he added.

Aon Securities predicted a cat bond issuance total of \$10bn-\$11bn

in 2020, while Guy Carpenter put the figure at \$10bn and Swiss Re estimated that the total would exceed \$8bn.

Willis Re Securities declined to make a prediction but stated there would be a "substantial" increase in property-cat-focused issuance in 2020 compared to muted activity in 2019.

With \$9.3bn of maturities due over the upcoming year – including some deals already written off as losses – it will be hard for the market to grow on an overall basis, even if it has a stronger year for new deals.

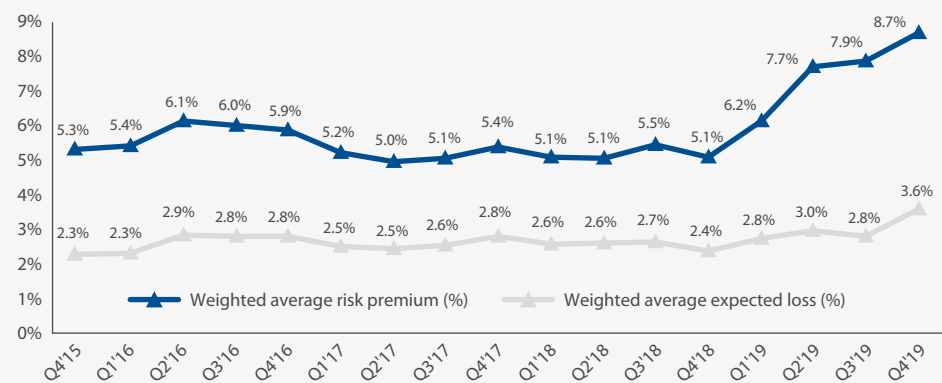
"We see pricing between traditional reinsurance and ILS converging in key markets such as Florida and California"

Judith Klugman

The cat bond market will largely be driven by repeat sponsors in 2020, broker-deals agreed.

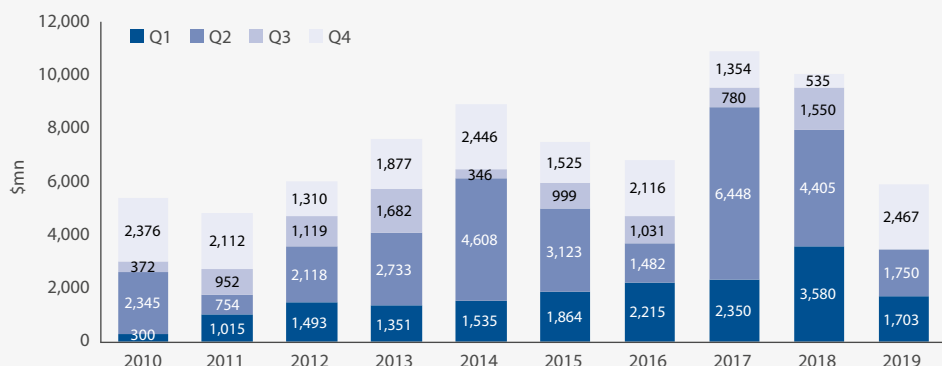
Reinsurers may turn to cat bonds for retro cover due to a tightening of capacity in the private space, following the recent examples of Hannover Re, Swiss Re and others.

ILS premiums: higher-risk deals push up spreads



Source: Willis Re Securities Transaction Database as of 31/12/2019 and may be subject to change. Expected losses calculated using higher of sensitivity or base-case modelling. Information based on sources believed to be reliable. No representation is being made as to the accuracy or completeness of such information.

Cat bond issuance expected to rebound in 2020



Source: Trading Risk



Q&A: Andrew Hughes

The managing principal at Hiscox ILS says the pivot to primary and specialty risks marks a thematic shift in the industry

What trends are you seeing in investor demands?

For the most part, there remains good investor appetite for property catastrophe business across the risk-return spectrum. Some investors continue to support existing strategies, although there are certainly others shifting to more risk-remote strategies following the losses of the past few years.

What we find interesting is increased investor enquiries about primary risks, including lines outside catastrophe-exposed property. I think this reflects a natural evolution for investors as they seek out new low-correlating risk premia, but also perhaps the broader theme of moving “closer to the risk” in a value chain that is often criticised, rightly or wrongly, for its length and cost. We launched the Kiskadee Latitude Fund at the beginning of 2019 to write these risks alongside a core property catastrophe portfolio.

What segments of primary risk make most sense for ILS capacity?

It really depends on the appetite of the investor – their return expectations, tolerance for valuation uncertainty and liquidity requirements. The most obvious place to start is catastrophe-exposed property as it is modelled and familiar, however, there are shorter tail, event-driven specialty lines that are non/low-correlating with the financial markets. These lines are attractive in our structure as we leverage the capital supporting the core property catastrophe portfolio. For these lines, in-house modelling and track record are essential.

What are the challenges to ILS expansion in primary lines?

Structurally, the primary market is not readily set up for collateralised ILS capacity. A balance sheet solution is required to take on and package the risk and manage the collateral. Sourcing risk is also a factor, especially when looking outside property catastrophe lines – you need to have an experienced underwriting

“We believe an in-house fronted solution is a better one”

team to bring on suitable risk. Our affiliation with Hiscox puts us in good stead in these respects. From an investor standpoint, you need to have greater tolerance for valuation uncertainty and be prepared to be invested for the long term as primary risks can take longer to accumulate and develop.

How much do you think the high-risk retro and reinsurance segment has changed in the past couple of years?

The main changes are the pricing and reduction in aggregate capacity, which have been well reported. This is clearly good news for allocators and why we recently launched the higher risk/return profile Kiskadee Cadence Fund, which complements our property catastrophe product suite.

The other dynamic we observed was the return of more rated capacity into the space, which was hitherto dominated by collateralised capacity. It will be

interesting to see whether buyers prefer the rated product to avoid the issue of releasing/rolling capital or whether collateralised capacity returns to the fore.

However, the underlying retro product remains the same: opaque, harder to value and slower to resolve. Investors should satisfy themselves that their ILS manager is not just relying on broker-provided modelling/reporting and that they are applying deeper underwriting and valuation methodologies to better understand and mark the underlying risk.

How is the ILS market's use of leverage evolving?

ILS managers are achieving leverage whether they engage the market on a collateralised basis or through a fronted solution, as we do. For example, cedants running sidecars/quote share strategies are willing to be collateralised to modelled return periods, generating leverage for the ILS manager/investor.

However, the collateralised structure leaves the parties with the issue of trapping/rolling collateral, a situation that has come to the fore after three years of catastrophe losses. Rolling collateral increases the leverage and puts risk back on the cedant: is this an attractive and sustainable risk management product for the cedant? On the other hand, trapping collateral drags the return for the investor: is this still an attractive investment proposition for the investor?

This is why we believe an in-house fronted solution is a better one; where the fronted solution manages the collateral, creating capital efficiency for our investors and a solid product for cedants.

Prior-year events drag on 2019 returns as performance diverges

ILS benchmarks returned to positive territory in 2019, but performance ranged widely as prior-year loss development hamstrung some strategies more than others.

The Eurekahedge ILS Advisers index posted an 0.92 percent gain for the year, following losses of 5.60 percent and 3.92 percent in 2017 and 2018 respectively.

The index provider segments the 33 ILS funds it tracks into pure cat bond and private ILS strategies that also participate in collateralised reinsurance deals.

Cat bond funds recorded a 3.3 percent gain for the year, pushing ahead of a 1 percent gain in 2018.

But the segment of private ILS strategies fell to a third loss year in a row with an 0.8 percent downturn, largely reflecting the impact of prior-year losses such as Typhoon Jebi and Hurricane Irma.

Overall, however, ILS Advisers said the year's performance did not properly represent the improved yields recorded by 2019 portfolios, due to the impact of prior-year loss creep.

Wide variations between returns have been a theme of many monthly reports from ILS Advisers, with an average 6 percentage-point spread of performance between the best and worst performing funds.

The most divergent month was May, with a near-20 point range in returns as Typhoon Jebi loss creep began to work through the market.

As losses trickled through, the index fell to a loss in five months throughout the year – the most monthly downturns in any year other than 2018.

However, September produced windfall gains as the market unwound initial mark-to-market write-downs posted in advance of Hurricane Dorian.

Jebi and Irma may have been a continued drag on returns, but 2019 performance was not fully influenced by these events.

For some strategies, last year's catastrophe events would also have produced claims activity – notably typhoons Hagibis and Faxai.

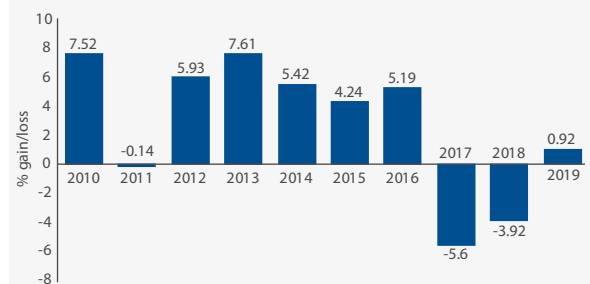
In the Japanese market, ILS participation has historically been constrained by local insurers' preference for traditional rated reinsurance providers as well as low rates on line. However, ILS providers with a preference for diversified strategies do participate on the local occurrence and aggregate treaties, and some had grown their share in 2019 amid Jebi repricing.

"Cat bond funds recorded a 3.3 percent gain for the year"

Late in the year and into early 2020 the Australian bushfires also produced losses on aggregate reinsurance deals for local insurers.

For many strategies these losses would have been contained as attritional level claims.

ILS Advisers Index annual returns 2010-2019



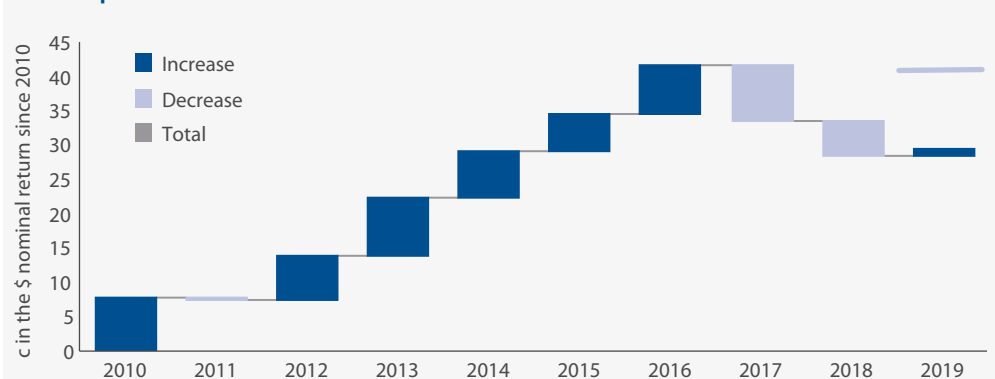
Source: Eurekahedge ILS Advisers

On the cat bond market, new losses included a small EUR45mn (\$49.2mn) deal for Unipol that was impacted by high Italian storm and flood losses; a \$200mn typhoon bond that became the first Japanese cat bond loss since 2011; and a \$60mn claim from the Peruvian quake.

Following the past few loss-impacted years, the average annual index return for the past decade has fallen to 2.72 percent.

But given strong performance in 2010 and from 2012 to 2016, the cumulative gain since inception in 2006 remains at 81.5 percent. The compound gain since 2010 is just above 29 percent.

Compounded returns 2010-2019



Source: Eurekahedge ILS Advisers



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Retro rate growth the outlier in January renewals



Reinsurance rates began to tick up in the January 2020 renewals after years of stagnation, amid a significant overhaul within the ILS-heavy retrocession segment.

The New Year catastrophe renewals focused on Europe, but some US business was transacted and a large section of the retrocession (retro) market also rolled over.

The January 2020 renewals showed that a continued reassessment of catastrophe risk remains underway, after the two loss years of 2017-2018, and further claims coming through from disasters such as Typhoon Jebi and Hurricane Irma in 2019.

Global property catastrophe rates moved up 5 percent year on year, boosted by repricing in the US peak zone, according to Guy Carpenter's rate-on-line index. The pace of change has picked up from a minor 1.1 percent increase recorded in January 2019.

But outside pockets of stress, pricing on traditional diversifiers

such as European cat business remained flat to moderately down.

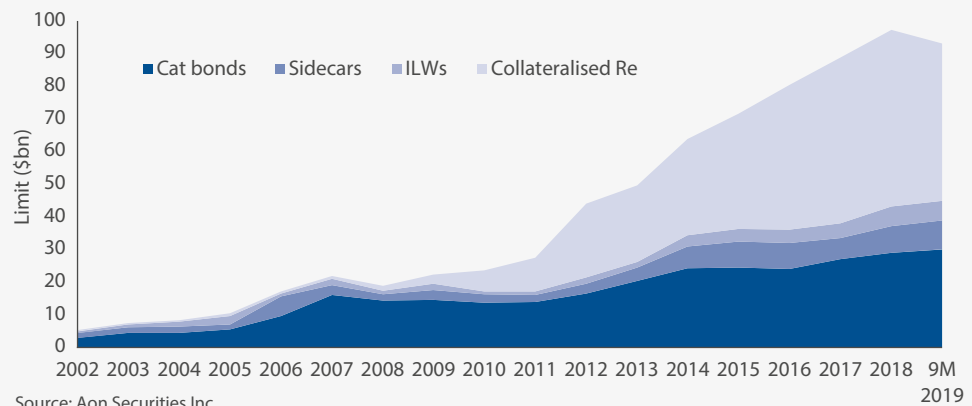
Notwithstanding the minor uplift on Guy Carpenter's rate index, the overall impression persists that the reinsurance market is caught in a plateau amid faster-rising primary insurance and tertiary retro rates.

Indeed, on the US reinsurance renewals, some sources polled put average rate change closer to flat or just modestly up.

Key points

- Retro rates driven up by tightening deal triggers/coverages
- Aggregate multi-event volumes shrink
- Global cat rates rise by 5 percent
- Reinsurance change lags retro/primary rate increases
- Lower ILS capacity drives retro change

Alternative capital deployment



Looking ahead, the major question the industry is currently debating is how higher retro costs will impact underlying reinsurance trading and the upcoming Florida renewals in June.

Retro overhaul focuses on structural issues

Retro providers pushed through major changes to the structure of existing covers, creating a much “cleaner” product, sources said.

But with lower capacity available this year it remains to be seen how much the market shrank.

The key themes were a shift towards occurrence (per-event) cover and less aggregate (multi-event) limit placed, more participation from rated carriers relative to shrinking ILS capacity, and significant double-digit increases for a second year running.

Aggregate or multi-event retro covers attracted the highest rate increases after taking the brunt of 2017-2018 losses and having had capacity locked up by 2019 events.

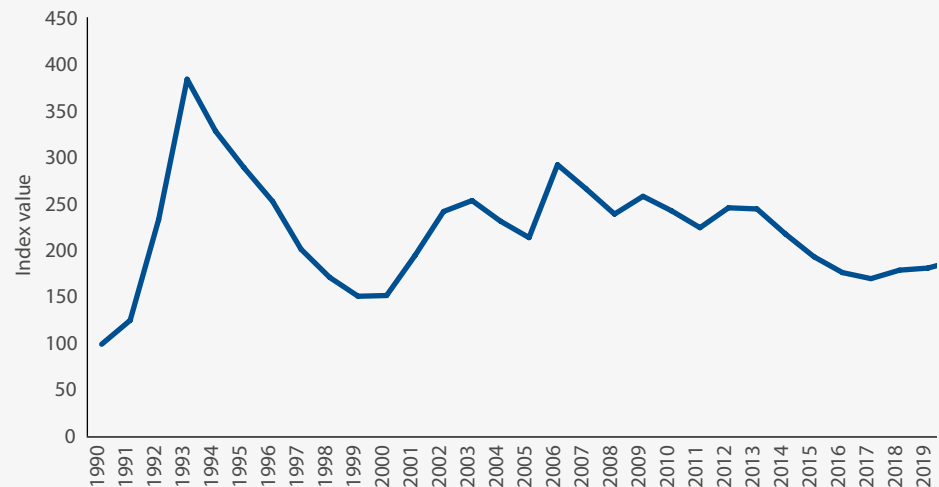
In this segment, the withdrawal of former top-10 ILS manager Markel Catco from the market was a major driver of tighter conditions. It had written upwards of \$1bn of limit that expired at 1 January.

As retro buyers faced up to shortages of capacity, many cut back purchasing and have accepted that low-attaching global aggregate cover is simply not available to cover their earnings in the same way that it had been in prior years.

ILS managers have also been impacted by the higher costs of retro hedging, with a few having bought from Markel Catco in the past.

Rate increases have taken the market back to levels observed in around 2014. Broker-analyst Hyperion X put retro rate increases at 20 percent year on year, with its retro rate-on-line index placing rates at around 140 percent of their 2017 levels.

Guy Carpenter property catastrophe RoL index, 1990-2020



Source: Guy Carpenter

These figures were in line with those given to *Trading Risk* by market participants but mask widespread variety, with change ranging from 10-15 percent up year on year at the lower end of the scale to 25-30 percent at the top.

Estimating rate change is complicated by the widespread structural changes, with premium dollars set to rise less than risk-adjusted rate movements.

Changing terms of cover is typically done to manage risk levels and deliver higher returns to risk-takers without moving high rates on line by much.

These changes typically include higher per-event deductibles and event caps and higher overall attachments, as well as exclusions.

Expected loss multiples are nearing 2x for higher-risk business, up from around 1.2x at the bottom of the market.

The improved returns drew in players that have previously sat on the sidelines, such as DE Shaw, and some traditional reinsurers, but there was no clear leader chasing growth in a notable way.

A challenging fundraising environment meant that very little third-party money was raised by

new start-ups mooted in 2019.

But while available capacity was more than sufficient to meet cedant needs in the January renewals, Aon forecast that “modest tightening” would result as 2020 progressed and demand rose.

The broker estimated that alternative capital provided \$93bn of reinsurance capacity at the end of Q3 2019, down 4 percent from year end 2018 with a further \$15bn of capital trapped.

Outside the cat markets

Many specialty reinsurance lines experienced largely stable rates in the January renewals, but rates jumped in aerospace and construction after recent costly losses.

In casualty markets, reinsurers were taking different tactics to emerging cases of inadequate reserves. Social inflation worries about heightened litigation costs and generous jury verdicts drove rate increases to excess-of-loss business.

However, most liability business is placed on a quota-share basis, so reinsurers are expecting to benefit more from underlying rate increases than from direct changes to their contracts.

Sidecars – staying the course

Reinsurers are increasingly looking to pitch so-called “sidecar” strategies direct to investors – but what should they be looking out for before getting into the driving seat?

A sidecar doesn't call to mind the speediest motor vehicle ever, but when the first such reinsurance vehicles were set up in the aftermath of Hurricane Katrina, perhaps the bankers who dubbed them with this moniker wanted to call on their associations of adventure rather than pace.

At that time, the market desperately needed new capital – but 15 years later, despite healthy reinsurance supply, the bolt-on vehicles have endured.

They have evolved to become an asset management tool for reinsurers as much as a source of retrocession support, allowing carriers to grow in peak zones while managing their net risks.

So what is a reinsurance sidecar?

Essentially it is a vehicle set up for investors to access a slice of a reinsurer's underwriting portfolio, via a collateralised quota share reinsurance agreement with the sponsoring reinsurer.

Average target returns generally range from 6-15 percent, sources suggest. This refers to net figures after deducting modelled catastrophe losses – actual experience will vary widely.

It is also important to consider what types of risks are being included in the modelled loss projections, notes Amundi Pioneer portfolio manager Chin Liu, since some sponsors may add in more loadings to cover the less well-modelled global minor perils but others do not.

In recent years, the high level of catastrophe loss activity has naturally had a significant impact on

returns and highlighted a wide divergence in performance.

“It's not commoditised risk,” says Tangency Capital co-founder Michael Jedraszak. “[Reinsurers] all end up with quite different portfolios.”

Like most of the reinsurance market, there is little public data on sidecar performance. But Ross Stevens, CEO of Stone Ridge, a major ILS fund that invests heavily in such vehicles, suggested in the firm's last annual investor letter that cat quota shares had made an average 11.5 percent per annum return over the past 25 years.

However, the firm's own Interval fund's performance over its shorter life scale has trailed this, with annual gains of around 8 percent in its early years giving way to 8-9 percent losses in 2017 and 2019.

Diversified risks

Sidecar target returns are supported by leverage from a reinsurer's balance sheet, with the pitch for these vehicles ultimately based on borrowing not just that leverage but also a carrier's underwriting relationships.

As such, they are typically globally diversified rather than US-centric portfolios.

The leverage is achieved by a reinsurer “taking back the tail” of underwriting risk – in other words, collateral supports investors' potential liabilities up to a certain threshold, which may be around the level of a 1-in-200-year or 1-in-300-year disaster. The reinsurer caps investor exposure at that point and assumes any further risk directly.

Fee structures will involve a ceding commission, typically 5-10 percent of ceded premium, on top of profit commissions – often 5-15 percent above a set hurdle rate.

While the base ceding commission might seem high relative to standard management fees, Liu says they can compare favourably to costs charged by fronting carriers for the level of leverage available.

Checking the rear-view mirror

The most crucial point for investors considering sidecar investments is to ensure that they have confidence in the skills of the reinsurer behind the wheel.

“Selecting the right counterparties is key on top of structural features,” says TigerRisk global head of ILS Philipp Kusche.

There are only so many scenarios that can be prepared for in the paperwork supporting a deal, and some flexibility in negotiations might be called for. “Establishing more of a partnership approach is important.”

“Alignment of interests is the number one priority,” adds Liu.

The portfolio manager says he prefers quota share agreements that take a straightforward carve-out of a reinsurer's portfolio, rather than introducing an element of selection, in order to maximise alignment.



"You want to access a firm's core abilities," he notes.

The assembly line

The nature of a quota share deal helps to create alignment with investors – but the fact remains that these vehicles are typically carving out a small portion of a much bigger portfolio.

Reinsurers assembling their business rely on diversification from multiple lines of business, and it is likely their portfolios will benefit from other group hedges in turn.

Hence, this may create some concerns over alignment of interests for investors who are looking for a fund structure that assumes fiduciary duties. Liu believes that no sidecar structures truly offer this fiduciary function and that deep in-house knowledge is necessary to make direct investments.

However, some "hybrid" structures have been created that offer a fund wrapper around a sidecar insurance vehicle, which may be overseen by a separate investor relations team within a reinsurer, notes Kusche.

But he points out that this does not necessarily mean risk selection functions are undertaken at that level, with underwriting responsibilities and controls resting at a group level.

It is possible that more reinsurers will offer "net" sidecars in the future, ensuring that the portfolios ceded to investors benefit from group hedging and retro protection, Kusche speculates.

But these can be hard to implement, he cautions.

Future design evolution

Besides finding the best partners, structural features also have a huge influence on sidecar returns – with vehicles with similar underlying loss ratios capable of producing widely varying net returns, Tangency's Jedraszak says.

Fee levels play a role, but in particular he singles out collateral rollover mechanisms as a crucial influence on returns, and one that

has been showcased in the wake of recent loss years.

"If you keep having a big portion of your capital set aside [as claims develop], it depresses your return over time," he notes. "If you don't structure it well, it may no longer be good business."

Sidecars have historically drawn on so-called "buffer loss tables" used in collateralised reinsurance deals to negotiate how much capital is trapped or rolled forward at year-end. These tables lay out multiplying factors that are applied to loss estimates to determine how much capital is locked in, using progressively less of a cushion. But these mechanisms compound the impact of conservative reinsurer reserving processes, which are geared at setting aside more than "best estimate" standard reserves.

Jedraszak suggests that structural innovations will be seen in the sidecar market more widely in the future, after the 2020 renewal put a particular focus on collateral rollover negotiations.

The nature of quota share risk means it is easier to add adverse development cover the following year, he says, instead of leaving capital behind to meet potential obligations if losses deteriorate.

Cedants would be more reluctant to do this for excess-of-loss contracts since there is a risk prior-year loss creep could eat up the limit they might need to cover a second-year disaster – and once the trigger is reached for an excess-of-loss contract, the deterioration could quickly erode capital.

But in a diversified, leveraged quota share, sidecar investors only pick up a modest slice of additional prior-year losses relative to their collateral – so adding prior-year development risk to the following annual risk period creates only a minor additional loading to the risk of using up investor capital.

Other alternatives could be to create multi-year risk structures, suggests TigerRisk's Kusche. These could still include provisions for annual liquidity offers, but enable investors and cedants to consider collateral requirements over a longer timeframe.

"If you don't structure it well, it may no longer be good business"

Michael Jedraszak

Renewal tensions

Structural changes are being debated after a challenging January 2020 renewal for sidecar sponsors. The investor base was reliant on a small number of key providers, and many were paring back their involvement in this segment to varying degrees. Stone Ridge, for example, had faced redemptions within its flagship reinsurance sidecar fund, so needed to cut back allocations to free up cash.

Stone Ridge's model is similar to a fund of funds, in that it heavily invests in sidecars and operates a smaller in-house ILS team than peers. Other examples in the fund of funds mould active in sidecar strategies are Amundi Pioneer and Tangency. But some ILS managers that write a large share of direct business also participate in the quota share market, such as Securis and Credit Suisse.

Clearly the sidecar market is undergoing a change of gear – but will this set it on course to find a new speed?

Select sidecars, \$200mn+

Vehicle	Size \$mn	Sponsor	Launch
DaVinci Re*	1,400	RenaissanceRe	2001
Sector Re	1,000	Swiss Re	2007
Mt Logan Re	940	Everest Re	2013
K	640	Hannover Re	2008
Limestone Re	590	Liberty Mutual	2017
Pangaea + others	500	TransRe	2010
Eden Re II	285	Munich Re	2015
Versutus Re	200	Brit	2015

Source: Trading Risk

*Rated market-facing vehicle rather than a quota share; but replicates RenRe's cat book

ILS managers support push to improve valuation standards

The Standards Board for Alternative Investments reports a positive response to its recommendations for the ILS sector

A memo on ILS valuations launched by the Standards Board for Alternative Investments (SBAI) last year will provide a framework for investors to ensure robust processes are in place.

The reaction by ILS managers to the SBAI's extension of its initiatives to the ILS sector has been positive, with new members expected to be announced soon.

Leadenhall recently became the fifth ILS member of the non-profit organisation that develops and maintains operating standards for alternative asset managers.

Elementum, AlphaCat Managers, Hiscox ILS and Nephila Capital are already members, while Pimco too is listed as a signatory.

The SBAI recommended that ILS managers should attempt to segregate in-house valuations work from their portfolio management teams. It acknowledged such an approach might be unrealistic but so far the view is that it can be put into practice.

Albourne Partners senior analyst Michael Hamer, who was part of the working group that drafted the memo, said at the time that it was not supposed to be prescriptive about how valuations should be carried out.

He said the aim was to highlight issues investors should be aware of and suggest questions they should ask their managers.

He said the main objective of ILS managers in relation to valuation should be to provide a fair estimate of the resale value of their portfolio if a peer were to take on their contracts at that time.

"You need a robust system, and one that is auditable," Hamer emphasised.

"You need a robust system, and one that is auditable"

Michael Hamer

The memo recommended that ILS managers have a policy document covering how their valuation process works, and what controls and monitoring are in place.

It listed a slew of questions investors could use to ask managers for further guidance on how the valuation process works. These include how often they ask cedants for loss information, how they account for incurred but not reported losses, and what level of independence is built into their valuation process, whether from external reviewers or independent board directors.

Any point estimate of catastrophe losses from an ILS manager is likely to carry a wide range of uncertainty for some time after a major event.

This means open-ended fund investors are likely to regard it as "unsatisfactory" for managers to use point estimates in determining the entry price for new investors or the exit price for redeeming investors, the memo outlined.

In the case of open-ended funds, side pockets should be used to manage valuation uncertainty while allowing investors to redeem or invest fresh capital.

Senior investment manager at PGGM Eveline Takken-Somers encouraged ILS fund managers to sign up to the Alternative Investment Standards.

"Robust valuation procedures

Valuation tips/questions

Questions for your ILS manager could include:

- How often do you get loss updates from cedants?
- What external reviews are brought into valuation processes?
- Segregating valuations work from portfolio management staff may be preferable.
- Side pockets should be used to manage uncertainty in open-ended funds.

are of particular importance: they help address conflicts of interest between investors and the manager, and facilitate the fair comparison of performance between managers," she said.

The SBAI is working on a memo about side-pocketing practice to be published this spring.

The SBAI was formed in 2008 as the standards-setting board for the alternative investment industry.

Members have heralded the SBAI's work in bringing ILS managers and investors together to improve the industry's reporting standards.

"[Investors] want to be able to better benchmark ILS managers across key quantitative metrics such as post-event track records, but also more complex qualitative metrics such as the use of side pockets and drag on expected investment returns caused by collateral trapping," Leadenhall said.

The SBAI has been involved in developing the Open Protocol reporting framework. An insurance version of the Open Protocol guidelines was released in 2017.

Implementing ILS strategies

“What kind of ILS allocation will make a meaningful contribution to my overall portfolio?”

Trading Risk looks at practical questions that investors might have about implementing their ILS strategy – here, we talk allocations

Most advisers recommend that institutional clients allocate between 1 percent and 5 percent of their holdings to ILS, and note that its diversification benefits must be weighed against other considerations.

A 5 percent upper limit is something of an arbitrary cap, admits Cambridge Associates investment director Mark Wilgar. But this level gives investors headroom to adjust and reload their allocation after a major disaster if need be.

Limited exposure also means that a significant ILS loss will not drive overall portfolio volatility, adds Siglo partner Michael Knecht. Assuming a 25 percent loss of capital in a stress scenario, a 5 percent holding will put a fund down 1.25 percent.

“For a Swiss pension plan, it might cost half your target return – but it won’t kill the plan”.

Investors may want to adjust their allocation within these ranges depending on where the ILS market is in its underwriting cycle, taking into account their maximum drawdown tolerance and the fact that capital may be trapped by loss activity, notes Aksia researcher Amit Patel.

And at the lower end of the scale, investors may want to consider how much resource and time they expect to spend overseeing their ILS allocations.

A 2-3 percent minimum might be more appropriate given the complexity of the asset class, Knecht suggests.

“Due to its complexity, it might take up 5-8 percent of your time... some people might think that to make it meaningful, allocate 3-5 percent or leave it out altogether. I

Key points

- Most advisers recommend 1-5 percent ILS allocations
- Consider your drawdown tolerance and the diversification benefits
- Keep headroom to allow for underwriting cycle dynamics

can understand that some people would rather not do 1 percent.”

Making it count

But how can investors be sure that a small allocation will still have a meaningful impact on their overall portfolio?

The answer lies in the industry’s diversification benefits – which give an overall statistical boost at the portfolio level, explains Patel.

“The benefit you get is the perspective and ability to leverage information”

Even small ILS allocations can have marginal benefits, he says, because at a position level, the risk contributions of ILS are complementary to the typical common factor exposures (such as equity or credit) in a portfolio.

Investors may also derive broader benefits from an ILS holding – particularly for those that are looking to implement new climate investing strategies, Wilgar argues.

“The benefit you get is the perspective and ability to leverage information,” he explains, adding that understanding how the ILS market perceives catastrophe risk can carry read-across to other

climate strategies and other insurance investing.

“You’re in the game and you’re hearing the conversation.”

Given the ILS industry is around \$80bn in size, its developing presence opens up the market to a wide range of investors.

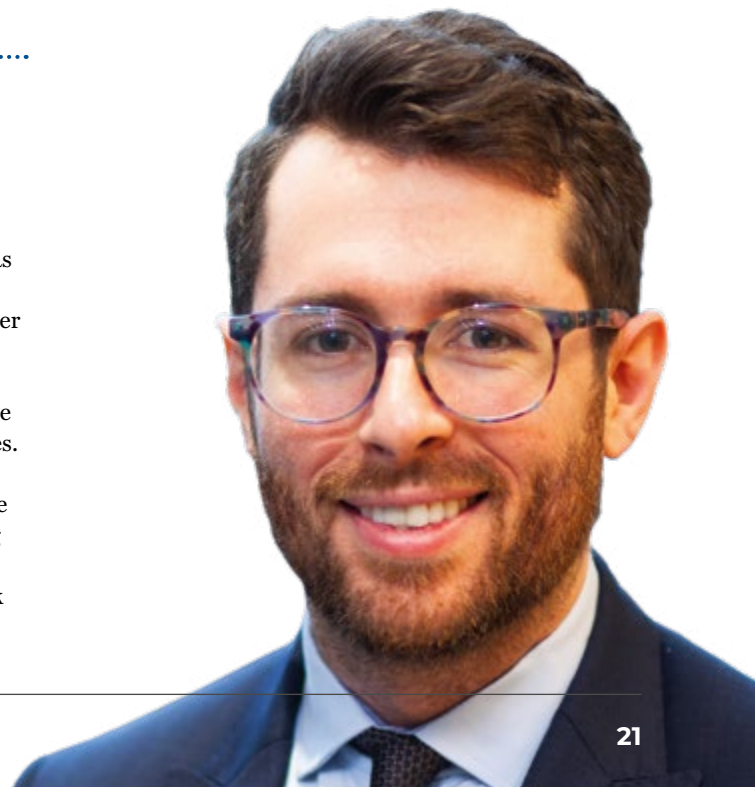
Open to all

Mercer principal Robert Howie says the ILS segment is “accessible to all but the very largest investors”.

“Given our preference is typically for a smaller allocation, we may also recommend multiple higher risk profile ILS strategies are used, as this is more capital-efficient, but we understand this does not suit all investors,” he adds.

In practice, Cambridge Associate’s Wilgar says that while there are no investors too big for the ILS sector since “the model scales up”, for smaller funds of \$100mn or less, they may need to look for pooled access.

Cambridge Associates investment director **Mark Wilgar**



Will more Australian pension funds take the ILS path?

Australia's burgeoning superannuation asset base has led to speculation that a shift towards ILS is inevitable

Australian investors were among the ILS pioneers, and some speculate that consolidation of Australian pensions into mega funds could help grow the industry's local presence further.

In November, two of Queensland's largest pension funds confirmed they were in talks about a merger that would create the biggest entity yet in Australia's superannuation industry, at A\$182bn (\$124bn).

Two smaller deals were completed in 2019, with merger negotiations continuing between VicSuper and First State Super to create an A\$110bn fund.

With employer pension contributions set at 9.5 percent on top of compulsory contributions by employees, Australia's A\$2.9tn superannuation industry is set for exponential growth.

According to research from Sydney-based consultancy Allen Partners, which partnered with ILS manager Twelve Capital in a recent local fundraising drive, Australian pension funds regard an allocation of 0.5-2 percent as the right guideline for the ILS asset class.

A 1 percent allocation from the local super industry would be worth almost a third of the existing ILS capital base, at A\$29bn. However, the picture may be more

complex than it appears, amid concerns that the ILS asset class may not provide the scale the mega funds require.

Increased resources

The integration of two pensions can result in larger portfolio management teams with more resources that can be dedicated to alternative strategies.

"Some smaller funds already invest in ILS but if a larger pension fund investing in ILS merges with a smaller fund, then the smaller fund may mirror the investment strategy of the larger fund. I'd expect additional assets allocated to ILS," explains Alex Zaika, managing director Australia at GAM Investments.

However, when two funds merge there could be winners and losers in the reinsurance manager space.

In Australia, one pension fund might be advised by a local investment consultant while another could employ a global asset consultant.

"Depending on how the merger is consummated, the fund is unlikely to maintain two asset consultants ultimately, given the thesis of a merger is usually based on economies of scale and harmonising investment approaches," says Ben Somers,

"I'd expect additional assets allocated to ILS"

Alex Zaika

head of business development at Elementum Advisors.

The prevailing asset consultant may not advise an ILS strategy, which could lead to lost mandates for existing ILS managers.

A question of scale

But even if larger investment teams result from consolidation, a shift in tactics towards ILS may not necessarily follow.

Consolidation could actually be a headwind to ILS penetration in Australia because the dollar sizes that can be put to work aren't worth the effort for merged entities, according to James Dick, managing director at Brisbane-based investment management service Industria Capital.

One solution could be more direct investments, such as the Vermeer Re balance sheet that PGGM has set up with RenaissanceRe, providing up to \$1bn to target risk.

Unlocking large sums of institutional money by creating a product that works for them is the next stage for (re)insurance, says John Seo, managing director at Fermat Capital Management.

However, the appeal of ILS for Australian funds is increasing by default as the benefits of other asset classes fade.

"They don't have to invest in ILS but ILS is on the shortlist of alternatives that can help all global savings-based institutions meet their goal. They have to look at it," he adds.

Australian investors in ILS

Fund	ILS allocation if known (US\$m)	ILS allocation	Managers	Date of allocation
Future Fund	1,141	1%	Elementum, Hiscox	2015
MLC	560	1%	Mt Logan, AlphaCat	2007
Sunsuper			Nephila	Unknown
NGS Super			Fermat	Unknown
HESTA			AlphaCat, Nephila	2018-2019
Victorian Funds Management Corporation				Unknown
Queensland Investment Corporation				

Source: Trading Risk

US state pensions look for ILS diversifiers

Trading Risk rounds up recent investor entries and mandate wins within the sector

Two US state pension schemes added new ILS managers to their roster in 2019 as they sought to introduce diversifying risks beyond catastrophe business to their portfolios.

Meanwhile, major new steps into the sector have been taken by Canadian scheme the Healthcare of Ontario Pension Plan (HOOPP) and the Abu Dhabi Investment Authority (Adia).

In the US, the Maryland State Retirement and Pension System (MSRPS) and Indiana Public Retirement System (INPRS) both awarded new mandates to ILS manager Hudson Structured Capital Management (HSCM) last year.

INPRS gave a \$100mn mandate to HSCM as it exited a Nephila

fund in search of a more diversified reinsurance strategy, according to board meeting notes.

The MSRPS had, as of 30 June last year, deployed \$40mn of its \$100mn commitment with HSCM.

The investment forms part of the pension fund's absolute return assets, which are expected to give overall returns of 4-5 percent above risk-free rates and exhibit low correlation to public stocks.

Its stake in the Nephila Palmetto and Nimbus funds were worth \$235.1mn and \$1.14mn respectively at 30 June.

The investor reported a 3.88 percent loss on the Nimbus holdings since inception in June 2017, while the Palmetto fund had returned a gain of 1.85 percent since its

inception in 2014.

In Canada, the HOOPP is set to launch an ILS strategy with the hire of Bernard Van der Stichele, formerly involved in the ILS portfolio at Ontario Teachers' Pension Plan.

And late last year, *Trading Risk* reported that the Adia had allocated around \$500mn-\$600mn or more to a group of about five ILS managers over the past year.

The sovereign wealth fund for the Emirate of Abu Dhabi is worth more than \$800bn, meaning the sizeable contribution for the ILS market is a tiny stake of less than 0.8 percent of its portfolio.

But the wealth fund is understood to be looking to significantly expand its initial ILS holdings over time.

Pension funds with \$200mn+ in ILS

Pension fund	Domicile	Current ILS allocation (\$mn)	ILS as % of total portfolio	Strategies/managers employed	Date of ILS entry
PGGM	Netherlands	4500	1.8%	Fermat, LGT, Nephila, Elementum, Munich Re, New Ocean, AlphaCat and RenaissanceRe on behalf of ultimate client PFZW	2006
RBS	UK	1330	2.3%	Nephila and Leadenhall	2012
Future Fund	Australia	1141	1.0%	Elementum Advisors (A\$100mn 2015); Hiscox Re Insurance Linked Strategies (undisclosed sum in 2016)	2015
Florida Retirement System	US	up to 950	0.6%	RenaissanceRe, Nephila, Pillar Capital, Aeolus Capital and CSAM/ILS P&C legacy fund (holdings show maximum allocations not deployed)	2018
Canada Pension Plan (CPP) Investment Board	Canada	>907	0.3%	Fermat, Nephila and RenRe. Acquired Ascot 2016 and Wilton Re in 2014	
Pennsylvania Schools (PSERS)	US	803	1.4%	Nephila (\$250mn 2011), Aeolus (\$200mn 2012), RenRe (\$200mn 2015)	2011
AP2	Sweden	643	1.7%	Fermat, Credit Suisse ILS, Elementum	2012
MLC	Australia	560	1.0%	Appointed Mt Logan Jan 2018, replaced Nephila with AlphaCat Managers in 2015	2007
AP3	Sweden	560	1.6%	In-house and external allocations	
State of Michigan Retirement Systems	US	538	0.8%	6% of SMRS Real Return & Opportunistic Fund at 31 December 2017.	
Abu Dhabi Investment Authority	Middle East	550	0.1%	Allocated to around five ILS firms throughout 2019	2019
Railpen	UK	462	1.5%	Credit Suisse ILS	
The Coca-Cola Company	US	403	5.4%	Securis (non-US focus) and 1 other (US focus)	2012
West Midlands Pension	UK	397	2.0%	Markel Catco, Credit Suisse, Coriolis	
PK SBB	Switzerland	384	2.1%	Not known	2013
Teacher Retirement System of Texas (TRS)	US	300	0.2%	Not known	2013
IBM UK	UK	291	2.5%	Nephila and Securis	2013
MassPRIM	US	250	0.3%	Aeolus (\$100mn), Markel Catco (\$150mn)	2017
NZ Superannuation	NZ	236	0.8%	Elementum Advisors (NZ\$200mn 2010, NZ\$94mn at 30.6.19), Leadenhall (NZ\$275mn 2013, NZ\$257mn at 30.6.19)	2010
Ontario Teachers' Pension Plan	Canada	223	0.2%	At least C\$150mn in RenRe's DaVinci Re, the Hudson Catastrophe Fund (in-house)	2005
Maryland State Retirement and Pension System	US	200	0.2%	Nephila Capital	2014

Source: Trading Risk

Climate change and catastrophe risk: the data so far

Key expectations:

- Likely for more tropical cyclones to become intense storms, with higher levels of rainfall – but evidence lacking for increased storm numbers
- Warming of 2°C could mean storm intensity rising by 1-10 percent and 10-15 percent rainfall increase within 100km of storm, with 5 percent median uplift in windspeed
- El Niño events might double (one event every 10 years) under 1.5°C of global warming, says IPCC

Until 2017, it had been 12 years since a major hurricane had made landfall in the US.

But those quiet times might now feel like a distant memory for the ILS market, after Hurricane Harvey struck in 2017, followed by Irma, and Maria hitting the Caribbean. More hurricanes, typhoons and major wildfires followed in 2018 and 2019.

As these loss years have coincided with increasing activism and prominence around the risks of climate change, investors are asking whether (re)insurance is becoming inherently riskier as a result of global warming – in short, whether the past three years are a “new normal”.

Moreover, if it is hard enough to calculate what a one-in-100-year risk looks like now, investors also want to know what the one-in-100-year risk will look like in 100 years.

Trading Risk looks at some of the key data points that are emerging from studies on how climate change will impact the disaster (re)insurance industry.

Some findings are surprisingly reassuring in the context of increased risk, while others suggest that the industry will face a challenge to address areas such as flood risk that are not currently extensively covered by private insurance.

Hurricane intensity and rainfall the focus for higher risks

First, it is important to remember that not all aspects of disaster risk are correlated to climate change – such as the major geological peril of earthquake risk.

The key concerns are water-based perils, due to the impact of rising seas and more precipitation, says Richard Dixon, director at CatInsight.

But there is conflicting scientific evidence around whether or how hurricane risk is increasing, with more agreement on how future storms might develop than overall levels of activity.

Tom Knutson, the weather and climate dynamics division leader at NOAA's Geophysical Fluid Dynamics Laboratory, says there are more than a dozen points of significant difference of scientific opinion when it comes to the emerging science of how climate change could influence hurricane activity.

This includes on fundamental points such as whether tropical storm frequency will increase; whether the tropical Pacific will trend towards experiencing more El Niño- or La Niña-like conditions and how much multi-decadal variability in storm activity has been influenced by natural variability or aerosol changes.

Knutson was the lead author of a July 2019 assessment report in the Bulletin of the American Meteorological Society on how models project that tropical cyclone activity might be impacted by a 2°C increase in global temperatures (which the IPCC has medium confidence will come to pass after the end of the 21st century).

On the issue of tropical cyclone frequency, for example, while a few studies suggest the number of storms could rise, 22 of 27 studies cited in the Bulletin report projected a decrease in tropical cyclone activity – with a 14 percent median decline.

Historical records show no compelling evidence of a long-term increase in Atlantic hurricane activity from existing warming since the late 1800s, after accounting for “missing hurricanes” or other historical gaps in data.

“In the Atlantic basin, we’re still waiting for a clear anthropogenic climate change signal in hurricanes to emerge,” says Knutson.

There is greater confidence – with medium to high confidence levels – that storms will be more intense and have higher rainfall rates.

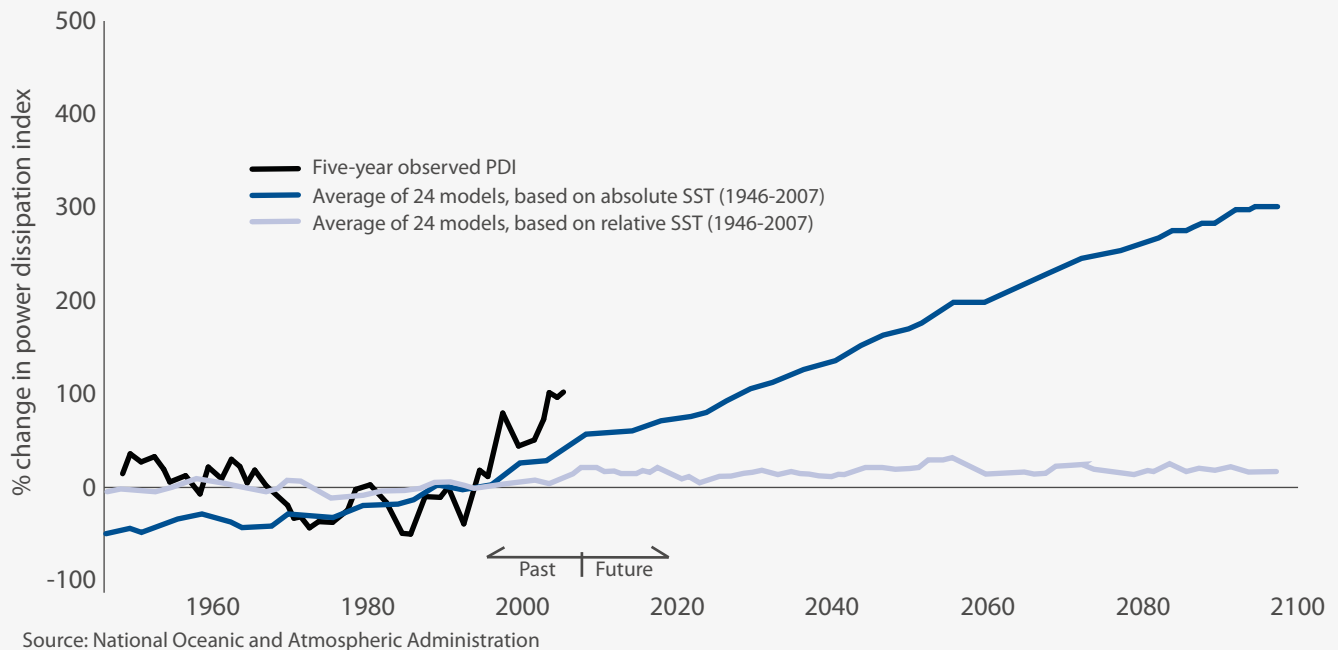
Rising sea levels also mean coastal areas will become more prone to flooding, even if storm activity does not change.

Importantly, changes to the intensity of storms could lead to an even larger percentage increase in the destructive potential per storm.

But a NOAA website maintained by Knutson notes that estimating how much more destructive hurricanes could become by 2100 is hugely influenced by whether you look simply at projected Atlantic warming or at the difference in warming between Atlantic and tropical sea surface temperatures. Some studies show storm activity being strongly correlated to the differential temperatures.

A straightforward statistical projection based on warmer Atlantic temperatures implies a three-fold increase in the “power dissipation index” measuring storm activity by frequency, intensity and

Relative warming scenarios much more benign for hurricane outlook



duration, but this drops to under 25 percent stronger using a projection based on relative differentials – with the smaller change considered much more plausible.

Some harder-to-predict factors for scientists include the impact on storm size and track, which depend on atmospheric circulation changes.

“We have less confidence with projected future circulation changes than with the basic anticipated increase in temperature,” says Knutson.

Another point of debate is what has driven historical multi-decadal swings between less active and more active Atlantic hurricane phases, particularly in terms of how much aerosols contributed compared to natural climate variability.

This influences the projected outlook, because if aerosols were a significant suppressor of activity in the 1970s and 1980s, future decades might not see a return to such benign conditions now their influence has dissipated.

“Our ability to quantify the contribution of natural variability

“Our ability to quantify the contribution of natural variability to these past changes in hurricane activity in the Atlantic is rather primitive”

Tom Knutson

to these past changes in hurricane activity in the Atlantic is rather primitive,” notes Knutson.

Regional changes are another area of debate. In Europe, the potential impact on windstorm risk is less clear, says Dixon, adding that recent studies have highlighted the role of urbanisation in decreasing wind speeds – while increasing flash flooding risks.

“Because climate change acts to warm the poles more rapidly, this decreases the pole-to-equator temperature difference that is so central to [European] windstorm activity, lowering the background forcing for windstorms. Other elements may act against this, but the jury is still out as to whether this risk has changed – or will

change in the future.”

As to how findings could vary in a 1.5°C or 2.5°C environment, Knutson says specific research has not yet been done on this scenario although findings could be roughly scaled up or down.

“We’ve got so many other large uncertainties to deal with already.”

Complex wildfire interactions

Minor perils such as wildfire and convective storms are also in the spotlight. However, in the case of wildfire, it is less clear whether increased loss activity is because of climate change or human behaviour.

Munich Re argues that climate factors are a clear driver of increasing Californian risk, with fire-conducive conditions on the rise in the Mediterranean region and parts of Australia.

The largest wildfires recorded in California since 1930 have predominantly occurred since 2000, with the latter period recording the highest temperatures and unusually dry conditions.

Continues on page 26

Continued from page 25

However, Dixon notes that increased development and suburban expansion into wilderness areas also increased the threat of deliberate ignitions and insured properties at risk.

“There are other things at play here so to lay the blame squarely at climate change’s door, as much as it’s a key factor, is unfair.”

On convective storm risk, scientists at modelling firm Karen Clark & Co (KCC) scientists note that the annual numbers of tornadoes and hailstorms do not appear to be increasing over time but studies indicate that global warming might be changing the nature of tornado and severe weather outbreaks, and the variability of losses from year to year.

How will climate change impact risk modelling?

One of the questions that has come up around climate change is whether its potential impacts are captured adequately by existing cat risk models (see pages 4-7 for more).

Climate change adds an extra level of complexity to these models, says Dixon, partly because it is impossible to tell how much climate change is already taken into account in existing models.

“Secondly, the topic of climate change and its relationship to extreme risks... is still, relatively, in its infancy, largely as we are only just reaching an era where climate models have a fine enough scale and amounts of data to understand extremes.”

Recent work on both European and US windstorm perils suggests that the impact could be highly dependent on how localised and fine-scale the model output can be, or the “resolution” of the model, notes Dixon.

“Given that we’re still improving the resolution of climate models, I believe we will see changes in the scientific guidance over the next few years. Therefore, we need to be nimble to respond to the science – and also work with the academics more.”

The mainstream cat models already offer users the ability to

project either a lower base-case view of risk, or a higher “sensitivity-case” view – with the latter typically adopted by the ILS market as a more conservative assumption.

But the rationale behind these sensitivity case models varies. AIR Worldwide bases its version on higher sea surface temperatures; while RMS recalibrates its sensitivity case scenarios for near-term historical experience and other factors.

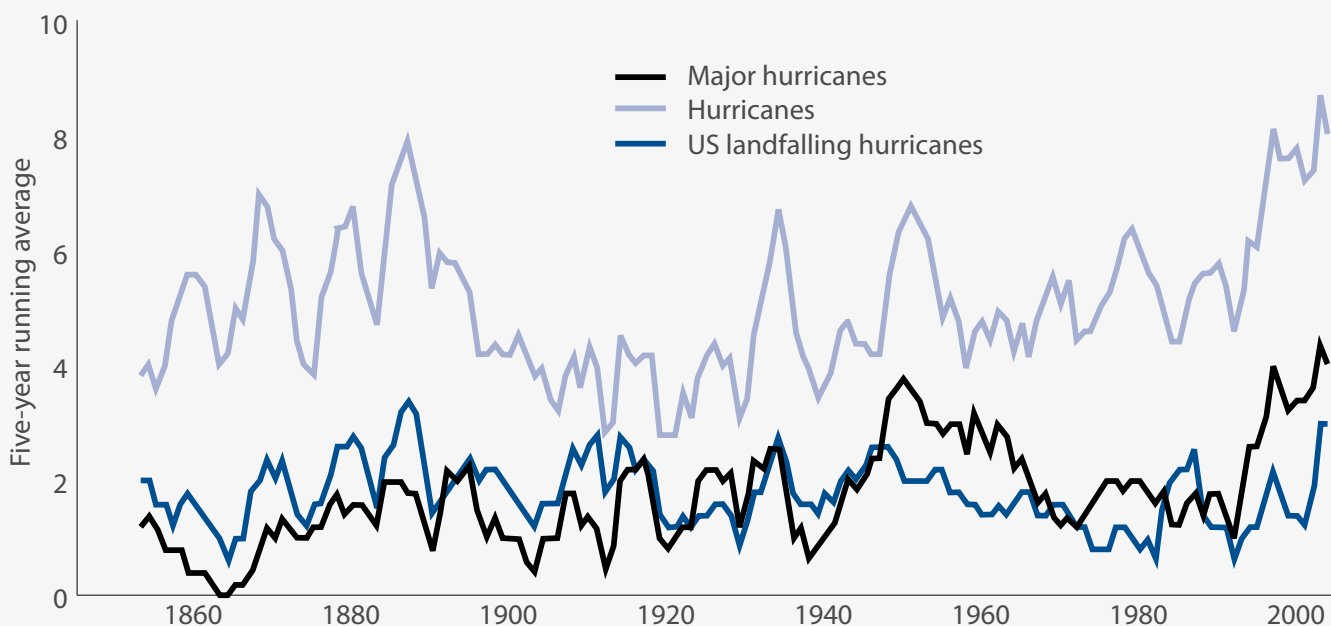
Finally, the science of how climate change might impact natural disasters must be separated from political goals, says Dixon.

“The political element of climate messaging tends to accentuate, quite rightly, the possible impacts and concentrate on the downsides.”

For some perils, the “everything is getting worse’ mantra” may not hold, he adds – yet scientists can be critiqued for talking about issues like the hurricane drought that aren’t perceived to fit in with the expected narrative.

“I find this sort of closing down of open discussion unhealthy for the risk-taking business we are in.”

Atlantic Basin hurricane counts (1851-2006)



Source: National Oceanic and Atmospheric Administration



What would it cost: Japanese typhoon

Typhoons Faxai and Hagibis jolted the ILS market in 2019, after losses from 2018 Typhoon Jebi spiralled to around \$15bn.

Hagibis was the costliest natural disaster for 2019 but with losses of around \$10bn, it has had a more limited impact on the ILS market.

But the surprise Jebi costs highlighted the potential for a hefty reinsurance impact should a typhoon track over densely populated areas of Japan.

To shed more light on the typhoon peril, *Trading Risk* asked modelling agencies to estimate the one-in-20-year and one-in-50-year return period industry losses for typhoon.

This means that there would be expected to be one year in each 20 or 50 year interval in which a typhoon produces losses at least as high as these estimates.

One-in-20

The industry loss figure for the one-in-20-year time period averages to \$11.6bn, according to modelled outcomes from RMS and Karen Clark & Company (KCC).

RMS estimates the one-in-20 industry loss for wind, coastal and inland flood for the whole of Japan at \$8.2bn, while KCC's estimate comes in at almost twice this figure, at \$15bn.

KCC noted that at the one-in-20 return period there is a 5 percent chance a typhoon loss will exceed this amount. KCC also provided losses for a 20-year event for Osaka and Tokyo, which was defined as a

typhoon with peak winds at landfall of 120 mph.

The insured loss from the 20-year event making landfall near Osaka is \$15bn and near Tokyo \$22bn.

The agency explains that a 20-year event will cause different losses depending on the landfall point, as more densely populated areas will generally experience higher losses than sparsely populated areas.

Hence, the urban events are more costly than the nationwide return period average.

One-in-50

The average industry loss figure for the one-in-50 time period comes to \$20.3bn.

RMS estimates the one-in-50 industry loss for all lines for the whole of Japan at \$15.6bn. Again, this is less than KCC's estimate of \$25bn, with a 2 percent chance of a typhoon loss exceeding this amount.

KCC also provided losses for a 50-year event for Osaka and Tokyo which is defined as a storm making

landfall with 140 mph winds.

Such an event would cause losses of over \$40bn near Osaka and over \$50bn near Tokyo, KCC estimates.

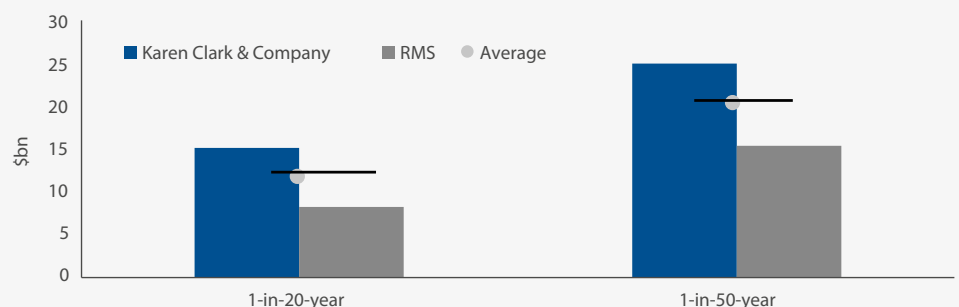
Jebi lessons

The Jebi experience taught the insurance sector that a Japanese typhoon does not have to be particularly large to result in huge losses. While Jebi was only a Category 3 storm, the insured loss was the result of small to moderate damage to more than one million properties, KCC says.

The modelling agency says insured losses from the storm should not have come as a surprise to the (re)insurance industry, and it should expect a Japanese loss of \$15bn at least every 20 years.

Using present property pricing, Jebi is not the most costly typhoon ever to hit Japan, the risk modeller adds. Typhoon Nancy (1961) and Typhoon Isewan (1959) would have been the largest losses if they had happened today.

Typhoon loss potential



Source: Trading Risk

ILS market primer: from disaster frontline to pension portfolio



What is the insurance-linked securities (ILS) market? As the name suggests, it consists of financial instruments that provide insurance cover.

But don't conflate this industry with a standard burglary or fire insurance product. If you're investing in the ILS market, your risk antennae instead need to be tuned to the kind of natural disaster that might take over CNN screens – US hurricanes or Japanese earthquakes, for example.

The ILS market first emerged in the mid-1990s but it wasn't until after the 2008 financial crisis that it began to take off.

This surge was driven by its major selling point as a source of diversifying, or non-correlating risk – acts of God that won't be triggered by financial market turmoil.

The ILS market has largely made its home within the reinsurance sector – a wholesale industry that provides insurance to insurers to help them bear claims when disasters produce a spike in losses.

The ILS sector is sometimes labelled the “alternative” reinsurance market, and contrasted with the so-called “traditional” reinsurance market, which refers to rated balance sheet companies

Why ILS?

- Diversification from financial market risks
- Catastrophe models provide a framework for analysing risk and quantifying exposures
- Purer access to insurance risks – avoiding investment exposure on the balance sheets of major (re)insurers
- Cushions against inflation risks, as premiums include a floating rate return from cash pledged against insurance liabilities
- Short-term liabilities (largely one- to three-year contracts, some tradeable)

ILS primer: Market timeline

1996 – George Town Re, widely cited as the market's first cat bond, is launched by St Paul Re, followed a year later by the first Residential Re deal from USAA and a Swiss Re deal

1997 – Nephila Capital, which is now the industry's largest asset manager, is founded

2005 – The hurricane season of Katrina, Rita and Wilma sets off a spike in reinsurance rates and a spate of new start-ups

2008 – Lehman Brothers collapses – it had managed collateral for four cat bonds that defaulted – cat bond structures shift to invest collateral largely in Treasury money market funds

2011 – A heavy international loss year produces three full cat bond defaults due to the Japanese earthquake and US tornadoes

2017-18 – Hurricanes, wildfires and typhoon make 2017-18 the ILS market's biggest loss years to date

such as Swiss Re or Munich Re, to cite two of the longest-standing industry brands.

That's because the emergence of ILS market asset managers has given investors an alternative entry route into reinsurance risk, instead of just buying equity.

However, since its early days, any simplistic distinction between the two segments has eroded as the ILS segment has broadened and melded into the wider reinsurance markets.

For one, many traditional reinsurers have set up asset management platforms to compete with ILS managers, while a number of ILS managers have set up or are closely tied to rated reinsurance vehicles, giving them more freedom to take on a broader range of underwriting risks.

In recent years, the ILS market has expanded into segments such as marine and energy and aviation reinsurance. It has also delved into catastrophe-exposed property insurance, a step down the business chain. And for a select group of managers, life (re)insurance risk is a major part of their business.

Despite its blurring boundaries, ILS still offers investors a distinct route into taking reinsurance risk while skirting the equities market.

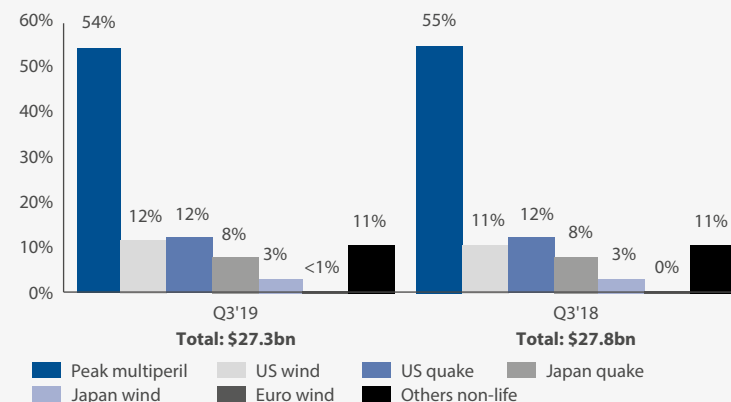
Perils: US risks dominate

The ILS market portfolio is heavily skewed towards the US, led by tropical storm/hurricane risks. Other major perils are US earthquake and Japanese earthquake, with small elements of European wind or Australian catastrophe.

That's because these are historically the most lucrative products for reinsurers. Florida, in particular, is their peak zone of exposure, meaning more capital must be held against these potential liabilities, attracting higher rates in turn.

They are also the most well-studied risks, with third-party statistical models available to help quantify hurricane exposures.

Par outstanding by risk peril



Source: Willis Re Securities Transaction Database as of 30/09/2019

This combination of higher rates and strong data laid the foundation for ILS managers to target catastrophe risks in their early days, since for their pension fund capital providers, hurricane risk was a minor source of diversifying income to their own peak peril of equity market risk.

As ILS managers grabbed more market share in the property catastrophe market, the ensuing competition eroded much of the premium previously attached to hurricane risk.

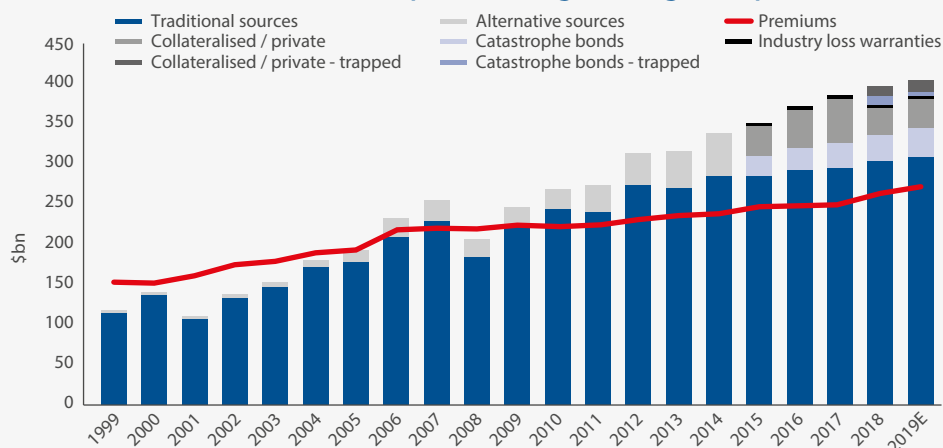
However, it remains the market's peak exposure with a corresponding price advantage compared to the types of catastrophe business that diversify a reinsurer's portfolio.

Continental European catastrophe margins are often said to be little better than break-even, which is one of the reasons why ILS market participation in this sector is relatively limited – cash collateralising limit for such margins would be highly inefficient.

Outside the catastrophe bond market, however, ILS managers are likely to be exposed to a wide range of catastrophe risks beyond the specific perils that are discussed here.

They typically offer “all natural peril” catastrophe cover, which may involve exposures that are unmodelled or less well-modelled – such as wildfires or floods.

Dedicated reinsurance capital and global gross premiums



Source: Hyperion X, Swiss Re Sigma, Artemis



Sizing up the market

Estimates vary, but ILS makes up around 18 percent of overall reinsurance capital at \$93bn, according to Q1 2019 figures from Aon.

But what exactly does the ILS market's of capacity represent? There are several distinct segments within this total.

The catastrophe bond market attracts a wide range of investors looking for liquidity, although it typically presents a lower risk, lower return opportunity within the ILS world.

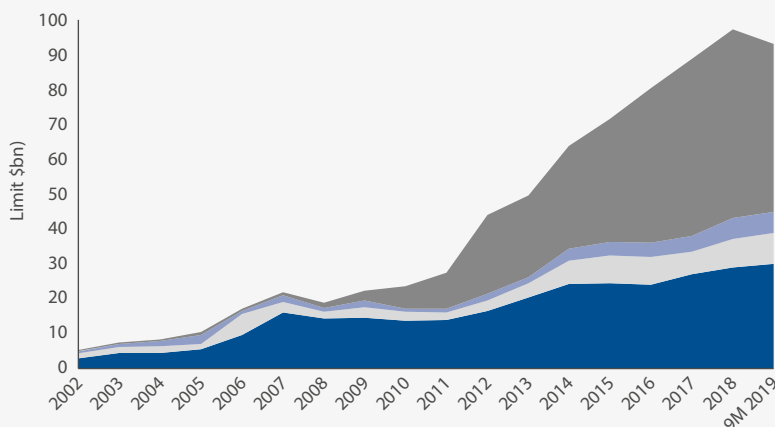
The niche industry loss warranty market is also relatively

What is a cat bond?

A cat bond transaction involves a sponsoring insurer paying investors a premium for reinsurance cover against defined catastrophe losses. If a cat bond triggers, investors' capital is used to reimburse a sponsor's losses. There is no requirement for insurers to later repay such sums to investors. However, if no qualifying event occurs, then investors recoup their capital at the end of the transaction (typically three to four years).



ILS market components



Source: Aon Securities Inc

■ Catastrophe bonds

The most liquid section of the ILS market. Reinsurance in tradeable form, typically providing slightly narrower terms of cover for specified perils.

■ Collateralised re

Effectively just traditional reinsurance contracts, providing indemnity cover for a buyer's losses, across a broad range of perils. ILS managers pledge cash collateral to back their liabilities, hence the name.

■ Industry loss warranty

Contracts that trigger not on a buyer's actual losses, but on the insurance industry's overall loss from specified disasters, e.g. a \$5bn Florida hurricane.

■ Sidecar

Vehicles run by reinsurers in parallel to their balance sheets. Typically involve a reinsurer ceding a share of a set portfolio of risks to investors (via "quota share" reinsurance). Some are "market-facing", akin to a fund, where a reinsurer writes a specific portfolio for the vehicle.



commoditised and easier to access, with a variety of risk-return options.

In contrast, the collateralised reinsurance segment is more specialised and difficult to access, but also provides a range of risk-return targets.

Finally, other small niches such as retro business can provide higher-octane strategies, while sidecars offer the chance to leverage off rated balance sheets and may introduce a range of diversifying risks.

Weighing up returns

So far during its short history the ILS market has delivered strong returns for investors, although margins have softened significantly in recent years.

Before 2017-18, the market's most difficult years had been 2011 and 2005, as a result of the Tohoku earthquake in Japan and Hurricane Katrina, respectively. These were both testing, but by no means worst-case, catastrophe scenarios for the largely Florida-exposed market.

Even 2017, with its trio of hurricanes, could have been much worse had Irma taken a less favourable track over Florida.

There are a couple of benchmarks of returns that are often cited within the industry, although

neither is without its limitations. The Eureka hedge ILS Advisers tracks the performance of 34 ILS funds all equally weighted, which cover a wide range of strategies from high risk-return retro vehicles down to low-risk cat bond-only funds. Its worst year to date was 2017, when it lost 5.60 percent.

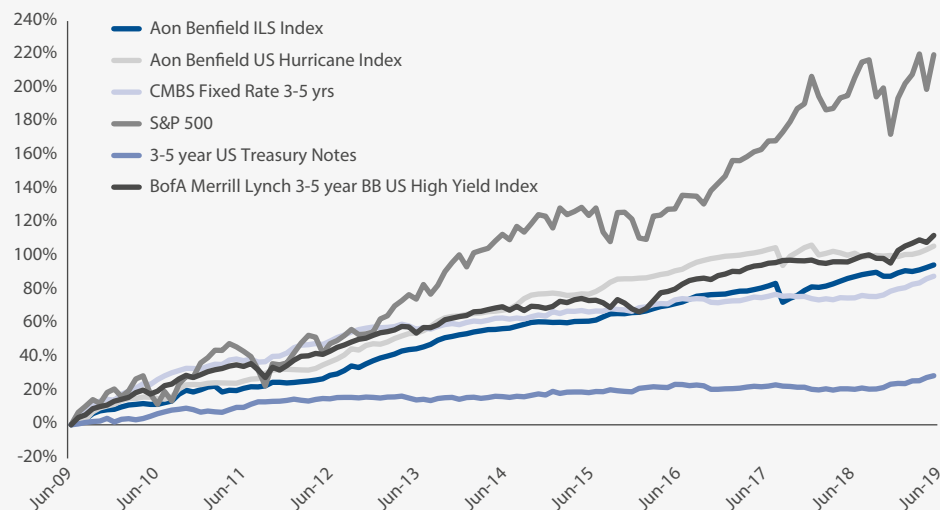
Meanwhile, the Swiss Re Cat Bond Total Return index – which solely tracks performance of the cat bond segment – returned 4.43 percent last year.

Quantifying risks

Cat bond investors are typically given the “expected loss” of a deal to measure their risk levels, a figure that expresses the likelihood of capital loss in any given year. For example, a 1 percent expected loss means investors could lose that amount of their principal in any year – or looked at another way, is roughly similar to the prospect that a 1-in-100-year disaster would wipe out all their capital.

Cat bond spreads are often cited as a multiple of the deal's expected loss, which is an easy way of referencing the margin of premium earned in relation to potential losses. Typically, cat bonds in the 1-2 percent expected loss range now offer investors around a 2x multiple (or spreads of 2-4 percent), depending on the risk profile.

Aon All Bond index versus financial benchmarks



Source: Aon

Manager list

Manager by type	Total AuM in ILS \$mn (estimated)	Notes	ILS strategies	Established in ILS	Base
Specialist ILS manager					
Nephila Capital	10,400	Acquired by Markel in Q4 2018	Various multi-instrument funds and single-investor mandates, also invests in weather	1998	Bermuda
LGT Insurance-Linked Partners	8,000	Former Clariden Leu ILS team moved to Swiss alternatives manager in 2012. Team of 50 (20 portfolio managers; 30 support staff). Manages rated reinsurance carrier Lumen Re	Various funds and bespoke mandates	2005	Switzerland
Credit Suisse Asset Management	7,200	Manages two rated reinsurance vehicles, Kelvin Re and Humboldt Re	Various funds with different risk levels	2003	Switzerland
Fermat Capital Management	7,000	Independent ILS manager	Cat bond focus	2001	US
Leadenhall Capital Partners	5,600	Now majority-owned by MS&AD – group took over ownership from MS Amlin subsidiary in Feb 2019	Non-life and mortality funds, life/non-life mandates	2008	UK
Securis Investment Partners	5,361	Northill Capital owns majority stake	Life, non-life and mixed strategy funds	2005	UK
Stone Ridge Asset Management	5,076	Independent US mutual fund manager	Cat bond and sidecar funds	2013	US
Renaissance Underwriting Managers	4,900	Reinsurer subsidiary	Medici cat bond fund; Upsilon funds write collateralised re/retro; DaVinci takes quota share focused on cat reinsurance book and new PGGM joint venture Vermeer writes high-layer US business	1999	Bermuda
Elementum Advisors	4,300	Independent manager; sold 30% stake to White Mountains in May 2019	Multi-instrument funds	2009	US
AlphaCat Managers	4,300	Part of AIG's Validus reinsurance business. AuM from 1 Jan 2019, last public disclosure	Runs a lower-risk and higher-risk fund, BetaCat cat bond tracker fund and direct mandates	2008	Bermuda
Aeolus Capital Management	4,200	Majority-owned by Elliott Management	Retro and collateralised re	2006	Bermuda
Schroder Secquaero	2,868	Fully owned by Schroders since Jul 2019	Six funds: two cat bond; three multi-instrument of which two include life risk, one life fund. Four segregated mandates	2008	Switzerland
Hudson Structured Capital Management	2,000	Independent manager led by Michael Millette; backing from Blackstone	Reinsurance AuM listed; transport fund not included. Firm AuM \$2.05bn. Flagship ILS strategy invests across catastrophe, life/health, casualty, other risks and various instruments	2016	US/Bermuda
Amundi Pioneer Investments	1,950	Amundi subsidiary offers one ILS vehicle and invests multi-strategy funds in ILS	Pioneer ILS Interval fund and others; invests in cat bonds, sidecars and other instruments	2007	US
Pillar Capital Management	1,800	Previously Juniperus; part-owned by TransRe	Collateralised re focus, runs two funds and fund-of-one mandates	2008	Bermuda
NB Insurance-Linked Securities	1,600	Acquired by Neuberger Berman from Cartesian Capital in Nov 2018	Focus on index strategies via ILWs, cat bonds and other ILS	2009	Bermuda
Twelve Capital	1,564	Spun out from Horizon21; team in ILS since 2007	Cat bond and multi-instrument ILS funds (insurance debt fund not tracked)	2010	Switzerland
Hiscox Insurance-Linked Strategies	1,500	Hiscox-owned asset manager; Hiscox capital \$55mn	Two co-mingled diversified funds; single-investor funds; one insurance sidecar	2014	Bermuda
Scor Investment Partners	1,500	Asset management affiliate of reinsurer	Multi-instrument	2011	France
Axis Ventures	1,500	Reinsurer subsidiary; also oversees \$600mn Harrington Re joint venture not tracked here	\$1.0bn for property cat support; largely private sidecars	2014	Bermuda
New Ocean Capital Management	1,300	Subsidiary of reinsurer Axa XL, which bought out minority partners in Nov 2018	Pantheon Re quota share cat sidecar; Daedalus algorithmic strategy and one JPY cat bond fund alongside managed accounts	2014	Bermuda
Axa Investment Managers	1,118	Axa XL affiliate; invests third-party funds only. Reported separately from New Ocean	Various funds and mandates, new UCITS fund added 2017	2007	France
Mt Logan (Everest Re sidecar)	934	Includes some Everest Re capital	Quota share of Everest Re book		
Coriolis Capital	765	Acquired by Scor Investment Managers but not yet reporting combined AuM	Multi-instrument including weather	2003	UK
Kinesis Capital Management	750	Lancashire subsidiary established mid-2013	Kinesis Re I vehicle writes multi-class reinsurance and retro. Wrote \$340mn limit	2013	Bermuda
Tokio Marine Asset Management	725	Asset management arm of Tokio Marine Group	Largely ILS/cat bonds		Japan
Aspen Capital Markets	650	Reinsurer subsidiary	Runs managed accounts, co-mingled funds and sidecars including Peregrine		
Arch Underwriters	600	Underwrites for rated \$1.13bn casualty-focused Watford Re, not tracked here	Also manages \$500mn third-party capital	2014	Bermuda
TransRe Capital Markets	500	Reinsurer subsidiary	Pangaea Re and other sidecars		
PG3	470	Family office; invests in QS/sidecars, legacy, life settlements, insurance debt/equity and other ILS	Largely family office funds, may take third-party capital		Switzerland
Plenum Investments	431	Independent asset manager	Cat bond focus, long only strategies	2010	Switzerland
Tangency Capital	400	Independent manager launched by trio of reinsurance execs	Quota share retrocession portfolio	2018	London

Manager by type	Total AuM in ILS \$mn (estimated)	Notes	ILS strategies	Established in ILS	Base
Invesco	375	ILS team part of Oppenheimer acquisition; invests via multi-strategy funds and ILS strategy	Global Cat Bond Strategy open to external investors	1997	US
ILS Capital Management	350	Independent ILS manager backed by Don Kramer	Specialty focus	2014	Bermuda
Brit (Sussex)	300	Brit Insurance sidecars.	Sussex market-facing, Versutus quota share	2018	UK
PartnerRe	259	Reinsurer offering quota share sidecars	Two sidecars		US
Lutece	250	Acquired by BTG Pactual Asset Management in Jul 2018	Initially a focus on retrocession	2018	Bermuda
Blue Capital Management	210	Sompo International subsidiary; public funds in run-off	Collateralised re (regional focus)	2012	Bermuda
AZ Fund Management (Eskatos)	210	Italian asset manager Azimut Group's AZ Fund Management has absorbed the former Eskatos brand	Small longevity exposure within Multi-Strategy fund	2008	Luxembourg
Leine Investments	200	Hannover Re has seeded the fund	Cat bonds and collateralised re	2013	Germany
Merion Square	150	Joint venture between Rewire Holdings and Vida Capital		2019	US
Lombard Odier	140	Swiss private bank launched ILS fund in 2016	Cat bond funds	2016	Switzerland
Pimco	150	Began fundraising for new ILS strategy in 2019	Third-party and Allianz risks	2019	US
Sumitomo Mitsui DS Asset Management (Tokyo)	105	Advised by Mitsui Sumitomo Insurance	Also manages \$500mn third-party capital	2014	Japan
Lodgepine Capital Management	100	Markel subsidiary; insurer seeded with "up to \$100mn"	Retro focus for first fund	2019	Bermuda
Tenax Capital	58	Fosun bought majority stake in Jul 2019	Cat bond funds	2017	London
Eastpoint Asset Management	50	Backed by Japanese manager Asuka Asset Management	Cat bond focus	2012	Bermuda
Mercury Capital	45	Independent manager with seed funding from insurer Ark	ILW tracker fund	2013	Bermuda
Entropics Asset Management	25	Independent ILS manager	Cat bond focus	2015	Sweden
Markel Catco		Now in run-off; AuM due to be returned to investors hence marked at zero	Retrocession writer	2011	Bermuda
Context Insurance Strategies	not disclosed	Independent firm set up by ex-Magnetar reinsurance execs Andrew Sterge and Pete Vloedman	Sub-adviser to mutual fund investing in liquid ILS and insurance debt/equity	2018	US
Solidum Partners	not disclosed	Independent ILS manager	Cat bond and multi-instrument funds	2004	Switzerland
Munich Re	not disclosed	Internal ILS fund of up to \$1bn	Sidecar assets not tracked here	2006	Germany
Swiss Re	not disclosed	Internal ILS portfolio, invests in cat bonds, ILWs and swaps	Sidecar assets not tracked here		Switzerland
Total	94,213				

Note: this total will include some double-counting of assets as several ILS vehicles are heavily focused on quota share partnerships with reinsurers and are arguably akin to fund of funds vehicles. Other reinsurers also take third-party capital via sidecars but if no clear fund management framework in place, these are not included here

ILS fund of funds

K2 Advisors	915	Hedge fund of funds manager; \$11.6bn AuM	Invests with multiple ILS funds; buys cat bonds directly	2003	US
ILS Advisers	245	Part of Hong Kong-based investment manager HSZ	Fund of funds; index tracker fund tracking ILS Advisers index	2014	Bermuda
GT ILS fund	230	Texas-based advisory firm offering ILS fund of funds solution	Securis and others		US
City National Rochdale	190	City National Bank-owned adviser targeting HNW clients	Allocates to NB Re and Stone Ridge	2017	US
Altair Reinsurance Fund	78	Operated by wealth adviser First Republic Securities	Feeds into Hudson Structured ILS funds	2018	US
AIM Capital	20	Finnish fund of funds manager	AIM Insurance Strategies fund	2011	Finland
Total	1,678				

Multi-strategy investors (directly active in ILS; but not offering external strategies)

Aberdeen Asset Management	25	8% of £427.5mn Diversified Growth fund at end Q1 18			
AP3	560	Swedish pension fund; made 3.9% on ILS pre-hedging in 2018	\$541mn (5bn kronor) "other" assets as of year-end 2018		Sweden
Baillie Gifford	286	Scotland-based asset manager; one multi-asset fund invests in ILS – much less active in ILS through 2015 than 2014	Buys ILS directly. Also holds stake in listed ILS funds Catco/DCG Iris		
DE Shaw	not disclosed	Has \$40bn+ total AuM; ILS holdings not disclosed	Writes collateralised re/retro	2007	US
Man Group		Invests in cat bonds via Man AHL Evolution Frontier fund			
New Holland Capital	not disclosed	Hedge fund of funds manager for Dutch fund manager APG			US
One William Street		\$4bn alternatives manager; recently hired ILS trader to set up portfolio		2019	US
Ontario Teachers Pension Plan	300+	Invests via third party ILS managers and through internal team	Stakes in DaVinci Re, Catalina	2005	Canada
Quantedge	300	Hedge fund with \$1900mn overall AuM	Invests in cat bonds, collateralised re, sidecars, ILWs	2013	US
Tiaa-cref	not disclosed	Manages \$800bn overall AuM	Buys cat bonds directly		US
Total	1,471				

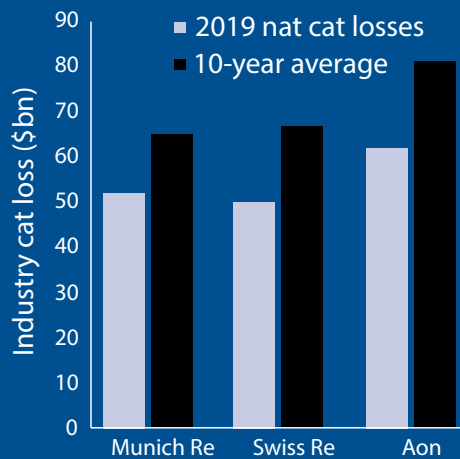
Source: *Trading Risk*

Benign year for 2019 catastrophe losses

Disasters in 2019 produced \$55bn of industry insured losses, using the average of figures from Swiss Re, Munich Re and Aon. This came in 23% below the average annual loss of \$71bn over the past decade. But Aon noted its figure was 23% higher than its 10-year median, as its rolling 10-year average exceeded \$80bn for the first time. Typhoon Hagibis was the year's most costly catastrophe, with loss estimates ranging from \$8bn to \$10bn.

Insured disaster losses average \$55bn for 2019

2019's most costly disasters

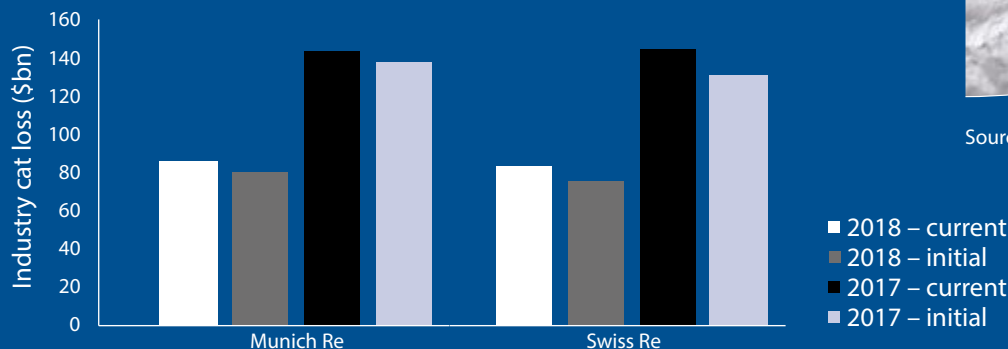


Source: Firms as cited; excluding man-made losses for Swiss Re estimates

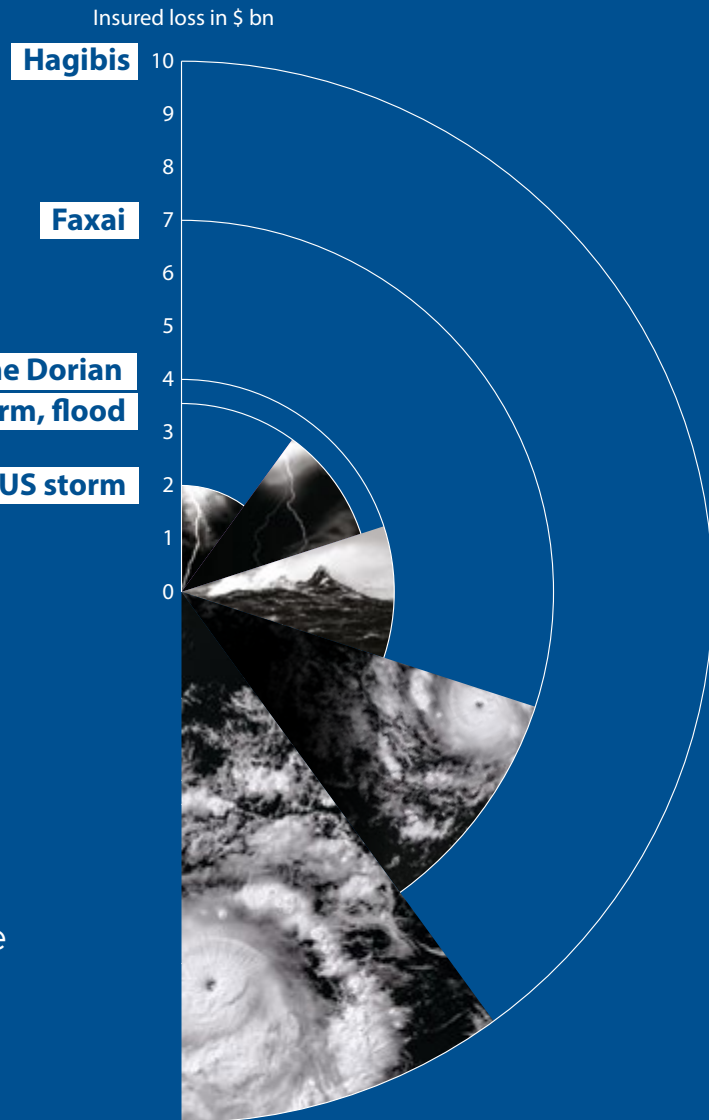


The continental reinsurers have increased their industry loss estimates for the 2017 and 2018 major loss years by up to 11 percent from their initial forecasts. Munich Re pushed its 2018 loss estimates up by more than for 2017, as Typhoon Jebi claims took the industry by surprise.

Reinsurers lifted 2017-18 loss-year estimate



Source: Firms as cited; excluding man-made losses for Swiss Re estimates



Source: Munich Re NatCat

GLOSSARY OF TERMS

Key phrase	Definition
Aggregate exceedance probability (AEP)	Probability of total annual losses of a particular amount or greater
Alternative risk transfer	Transferring risk through methods other than traditional insurance or reinsurance, for example utilising capital markets capacity through the issuance of insurance-linked securities
Attachment point	The point at which excess insurance or reinsurance protection becomes operative; the retention under an excess reinsurance contract
Attachment probability	Likelihood of losses exceeding the attachment point over the course of a one-year term
Administrator	Assumes all operating and reporting protocols for a special purpose insurer/entity
Basis risk	Risk that losses in a non-indemnity trigger differ from indemnity losses
Capacity	The largest amount accepted on a given risk or, sometimes, the maximum volume of business a company is prepared to accept
Catastrophe bond	Securities that transfer catastrophe risks from sponsors to investors
Cedant	Party to an insurance or reinsurance contract that passes financial obligation for potential losses to another party
Collateralised reinsurance	Reinsurance contract that is fully collateralised to the limit
Earned premium	The portion of premium (paid and receivable) that has been allocated to the (re)insurance company's loss experience, expenses and revenue
Excess of loss	System whereby a (re)insured pays the amount of each claim for each risk up to a limit determined in advance, while the (re)insurer pays the amount of the claim above that limit up to a specified sum
Exhaustion probability	Likelihood of losses exceeding the exhaustion point, causing a full loss on a reinsurance layer
Expected loss	The expected loss is the modelled loss within the layer divided by the layer size
Extension period	Time period after the scheduled maturity used to calculate losses for events which took place during the risk period
Extension spread	Spread paid during the extension period (typically a reduced rate from the initial risk spread)
Gross premiums	Premium before subtracting direct costs
Indemnity trigger	Type of trigger that most closely resembles the traditional market ultimate net loss cover, and offers ceding insurers (a.k.a. sponsors) the ability to recover based on actual losses
Industry loss index trigger	Type of trigger where payouts are determined by a third party estimate of industry losses
Industry loss warranty (ILW)	Form of reinsurance or derivative contract that covers losses arising from the entire insurance industry rather than a company's own losses from a specified event
Incurred losses	The total amount of paid claims and loss reserves associated with events from a particular time period
Insurance-linked security (ILS)	Financial instruments whose value is affected by an insured loss event
Limit	The maximum amount of (re)insurance coverage available under a contract
Loss ratio	Incurred losses divided by earned premiums (earned premiums include reinstatement premiums)

Key phrase	Definition
Modelled loss trigger	Type of trigger where payouts are determined by inputting event parameters into a predetermined and fixed catastrophe model to calculate losses
Net premiums	Premium less direct costs
Quota share	Reinsurance where the cedant transfers a given percentage of every risk within a defined category of business
Occurrence exceedance probability (OEP)	Probability that any single event within a defined period will be of a particular loss size or greater
Parametric trigger	Type of trigger where recoveries are triggered by a formula that uses measured or calculated parameters of an actual catastrophe event (e.g. wind speed, magnitude of an earthquake)
Peril	A specific risk or cause of loss covered by an insurance policy
Probable maximum loss (PML)	The anticipated maximum loss expected on a policy
Profit commission	A provision that provides the cedant a share of the profit from business ceded
Proportional reinsurance	System whereby the reinsurer shares losses in the same proportion as it shares premium and limit
Rate on line	Reinsurance premium divided by reinsurance limit
Reinsurance	A transaction whereby the reinsurer, for a consideration, agrees to indemnify the ceding insurer against all or part of the loss which the insurer may sustain under a policy or policies that it has issued
Reinsurer	Company that provides financial protection to an insurance company
Reset	Adjusting a layer of a multi-year catastrophe bond to maintain a bond's probability of loss at the level defined at issuance
Retention	The net amount of risk the ceding company keeps for its own account
Retrocession	A transaction whereby a reinsurer cedes to another reinsurer all or part of the reinsurance it has previously assumed
Risk period	Time period for which a reinsurance agreement covers events taking place
Sidecar	A structure to allow investors to share in the profits and losses of an insurance or reinsurance book of business
Special purpose insurer/entity (SPI/SPE)	A company created by (but not owned by) a (re) insurer for the purpose of raising capital for a specified programme
Treaty	An agreement between a cedant and a reinsurer stating the types or classes of businesses that the reinsurer will accept from the cedant
Underwriting profit	Earned premium minus incurred losses and incurred commissions (earned premiums include reinstatement premiums)
Variable reset	Adjusting a layer of a multi-year catastrophe bond up or down within a pre-defined range of probability of loss, with a corresponding update in risk spread
Vendor models	Software that estimates expected loss and probability of occurrence for specified exposure sets and predefined peril scenarios. The three largest vendors by market share are AIR Worldwide, Risk Management Services and Eqecat
Written premiums	Premium registered on the books of an insurer or a reinsurer at the time a policy is issued



Insurance Linked Investments

Non-Life and Life Strategies

Website: www.leadenhallcp.com **Contact:** investors@leadenhallcp.com

Leadenhall Capital Partners LLP, The Leadenhall Building, 122 Leadenhall Street, London EC3V 4AG,
Registered in England No: OC336969, VAT No 939 1387 89

