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TRADING Risk

ILS INVESTOR GUIDE

THE ILS MANAGER OF THE FUTURE

M&A has reshaped the market as it looks ahead to 2020

TRADING Risk

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GETTING THE PAYBACK

Hurricane season is no less tense this year for the calm winds that prevailed in the early summer months, though Storm Dorian is hovering offshore as I write this, as a reminder of nature's volatility.

After two active disaster years, many believe a third year of losses would result in a much bigger change to the ILS market than we have seen this year, as withdrawn capacity would accelerate the pace of rate increases amid more severe disruption for buyers.

That's why I firmly believe it would be a mistake for investors to walk away now if there was another negative year.

I've been covering this market for almost 10 years now, admittedly a blip in the timeframe you need to consider when it comes to rare disaster events. But the memories are still fresh of the pre-2017 years, when hurricanes seemed like some theoretical event that never actually produced any headlines.

Some have raised the question of whether the recent loss experience is a "new normal", but these are just two years following a good run of luck since the 2004-2005 hurricane seasons, or for a less US-centric view, since 2011's earthquake events.

Nothing in the catastrophe activity we have seen in 2017-2018 is out of the ordinary, insofar as disasters can be – it is just out of recent memory.

This means that the market is having to do a bit of revision, and in some cases quite a lot – for example, on exposures in Japan or for Californian wildfire, or to risks of prolonged claims development in Florida.

But change is already on the horizon: demand is rising, and yields along with it. There is now real data that lets you stress-test ILS manager performance against peers to determine what strategies have delivered in the long term.

By all means, investors should set the bar higher for what they want from the ILS sector long-term if it isn't currently meeting those demands. But this is the time that the market could rise to meet that bar – so it seems a shame to let others pick up on the spoils.

Fiona Robertson, Managing Editor, *Trading Risk*

INSIDE

New horizons as ILS M&A reshapes landscape

Reinsurers have bought up a leading share in the ILS market in recent years. We look at what ownership changes mean for investors

ILS platforms are still by and large run by the founders who established them – but behind the scenes, many are now on to their second set of owners.

There has been a striking overall shift in ownership since 2014, with many notable M&A deals struck in the last couple of years.

The sharp fall in the number of independent firms has contrasted with a surge in reinsurer-affiliated platforms, which now lead by share of assets under management, according to *Trading Risk* analysis.

This year's deal-making included Schroders taking over Secquaero in full, Scor striking an agreement to buy Coriolis Capital, and Elementum's founders selling a minority stake to White Mountains.

These transactions followed 2018 deals including Nephila's sale to Markel, and Neuberger Berman taking over the former Cartesian Iris Re business.

It hasn't all been one-way traffic: institutional investors have also made their share of acquisitions and grown existing ILS platforms since 2014.

"[The affiliated model] is one that is increasingly popular and I can understand why – but it doesn't mean the independent model is over," says Mercer's head of ILS Robert Howie.

But does it matter what type of company owns an ILS firm? We look at some of the practical ownership questions that investors may want to consider.

Weighing up support on offer

There is no single winning formula. Both major ownership models – institutional asset manager or (re)insurer parent – have their pros and cons.

In general, the asset manager model is viewed as offering a head-start with distribution and investor relations capabilities, whereas (re)insurer owners are perceived to have an edge in access to underwriting risk and leverage from their rated balance sheets.

Michael Knecht, partner at Siglo, believes that asset manager-backed firms that don't have a critical mass of at least $300mn-$400mn in collateralised reinsurance face particular questions over their ability to source attractive risks from brokers.

However, Knecht notes that some products, such as industry loss warranties or cat bonds, are more of "an asset management solution" and might lend themselves to asset manager owners.

Conversely, asset managers with particular experience in illiquid asset classes such as private equity should be able to manage investor expectations on delivering broader collateralised reinsurance portfolios, Christian Bruns from LGT ILS Partners argues.

But one particular obstacle for asset manager ILS firms now looms larger following the loss activity in the past two years: that of handling trapped capital.

This is one of the reasons that being able to lean on a parent reinsurer's rated balance sheet is seen as a key advantage of the affiliated model, albeit many independent managers use third-party fronting services in the same way.

That's because even if a cedant has held back cash in connection with a possible claim, an ILS firm's fronting partner will look across their portfolio to determine overall capital requirements, which can help them to deploy more capital overall than if all contracts were fully collateralised.

Access to a balance sheet has become a "USP" for the ILS market, Knecht says.

More broadly speaking, rated balance sheets allow ILS firms to appeal to a range of buyers, not all of whom may want to use collateralised solutions.

"Independent firms are struggling if they can't offer meaningful line sizes or reinstatements," one broker notes.

For ILS providers looking to grow beyond the nat cat market, leverage and ratings are crucial.

"[It] allows us to look at different lines of business and portfolio/capital mix to create products for varying investor appetites," Hiscox ILS managing principal Andrew Hughes says.

And as leverage amps up returns, LGT's Bruns believes the leverage built into sidecar vehicles has been a key attraction for investors in that segment.

"You can't replicate that as an independent ILS manager without a rated entity," he admits.

Shades of grey in reinsurer models

The reinsurer ILS model still has its share of challenges, even with the key attraction of leverage and underwriting resources on offer.

And crucially for investors, the range of affiliated ILS platforms makes it harder to evaluate them as a single bloc.

Cambridge Associates investment director Mark Wilgar says that with fewer independent firms remaining, structural analysis of ILS platforms is becoming more of a "grey area".

Establishing where possible conflicts lie can take significant effort because not all platforms in the same ownership category follow the same model, he notes.

"You need to look below the surface."

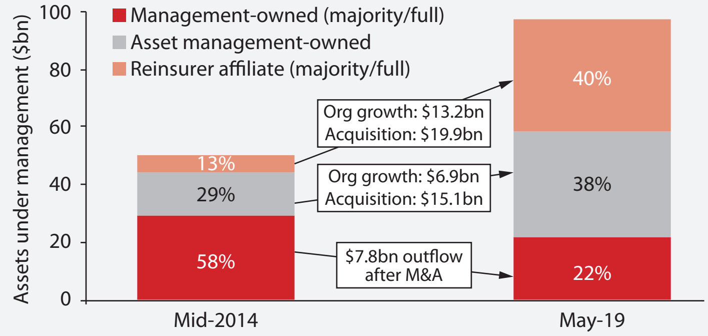
With this in mind, it is possible to attempt to draw some common groupings together.

One group within the reinsurer-affiliated market comprises satellite platforms that were formerly independent managers, such as Nephila or Leadenhall, which operate outside their parents' control. Similarly, some in-house platforms – such as Scor Investment Partners – have maintained more of a distance from the parent reinsurer.

Then there are the firms that have grown up integrated within a reinsurer, such as AlphaCat or Hiscox Re & ILS, and which source risk in tandem with the parent, although overseen by separate portfolio management teams.

Finally, there are small teams within a reinsurer that oversee third-party capital almost as part of their retrocession activities. Here, ILS initiatives are more likely to focus on sidecar vehicles that offer a pre-agreed slice of their portfolios to investors.

Reinsurers catch up to lead ILS AuM



Source: *Trading Risk*

Mercer's Howie says that in his view, it makes sense for affiliated ILS platforms to make the most of leveraging expertise off their parent reinsurer.

"The key is to maintain a structure where your focus is on your client, your fiduciary obligations to do the best for them and not to raise business for the parent," he explains.

Rather than an automatic sharing of risk, Howie says he would want to see that portfolio managers at reinsurer ILS platforms have the processes and powers in place to enable them to independently decide whether to participate in a transaction on offer from the parent.

Investors will be looking for aligned interests from any ILS asset manager, but this is particularly the case for the reinsurer platforms, where the parent is directly sharing certain risks with ILS investors.

If most risk going to third-party investors from reinsurers is via quota share, so long as the parent retains a sufficient share of the risk this might seem like a simple, straightforward way of achieving alignment of interests.

But prod a bit further and it's not necessarily such a simple answer. In most cases investors would not be getting a net share of the risks assumed by reinsurers after they buy retrocession protection.

Moreover, if a reinsurer-manager is overseeing only quota share portfolios, will they be able to offer fiduciary responsibilities when their ILS team is not underwriting the original business?

Aksia analyst Amit Patel argues that the difference in vetting a reinsurer ILS model versus an independent platform is not that material, at least from a strategy and risk underwriting standpoint.

Rather than straight ownership concerns, investors these days place weight on a more complex range of ways to deliver alignment, he says.

He cites fee structures with hard hurdles or multi-year crystallisation levels as examples, as well

continued on page 06

as retention structures including meaningful co-investment or deferred compensation.

"There are also creative means for [investors] to arrange for limits on the underwriting side," he adds.

In the early days of reinsurer ILS platforms, the market discussion about these vehicles centred on matters that are perhaps more ephemeral – the cultural barriers to getting reinsurance underwriters on board with sharing risk with ILS affiliates.

Despite initial worries about alignment, it seems that reinsurer-managers have largely come through unscathed in the past couple of active cat years.

Indeed, some reinsurer-managers have mitigated Irma loss creep better than their independent peers.

However, in some cases the reinsurer reserving model may be challenging to adapt for ILS frameworks, LGT's Bruns argues.

Reinsurers are used to setting conservative reserves, with the expectation of releasing some of the excess over time – but that is exactly what ILS investors want to avoid, he notes. "They want clinical precision."

Towards a third way

In recent years, a new model of ILS platform has begun to emerge – asset manager-backed firms that have set up their own rated reinsurance platforms. Effectively, these vehicles represent a halfway house between independent and affiliated models, as the approach brings credit rating tools to a standalone underwriting platform.

Credit Suisse Asset Management now runs two such vehicles – Humboldt and Kelvin Re – while LGT has set up Lumen Re and Nephila operates its Lloyd's Syndicate 2357.

More ILS firms are said to be considering this approach, and disruption in the third-party fronting market this year may accelerate this trend. Tokio Millennium Re, formerly one of the most active providers that was willing to "front" or write business on behalf of ILS firms, was sold to RenaissanceRe, which quickly announced plans to shut this aspect of Tokio Millennium's operations.

Hiscox's Hughes says investors should research and understand the cost of using fronting support, but that the decision of how to access balance sheet support is not purely a financial one.

"Cost is certainly one important element of fronting solutions, but in our view, stability is equally as important."

Indeed, reducing dependence on third-party fronting services was a major driver for LGT ILS Partners to set up Lumen Re, explains Hilary Paul, another partner at the firm.

But it took years of work to set up, and firms considering a similar move would need to weigh up the costs, versus the complexity of maintaining global licences to write business, she notes.

Meanwhile, the anticipated entry of Pimco to the ILS market in 2020 is another possible landmark for the evolution of the sector, Hughes says, in terms of what competitive response the move prompts from other global asset management heavyweights.

Historically, the prospect of ILS mergers has not been seen as a likely outcome of industry M&A, due partly to founding partners not wanting to sell out to competing peers.

But now that most firms have been through an initial sales process, this could change in the future.

It will be interesting to see whether ILS managers start buying up competitors with distinctly different strategies to achieve scale and provide broader solutions to investors, Hughes suggests.

Aksia's Patel says that investors need to ensure they are allocating to firms that are positioned to capitalise on structural changes within the (re)insurance industry, as well as running a model that best aligns with their own objectives.

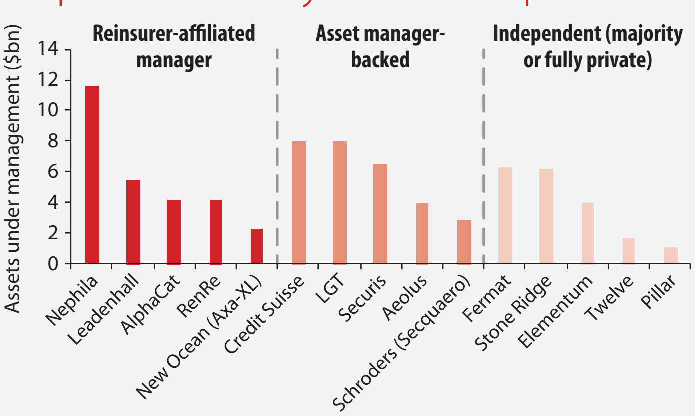
"What is clear to us is that accessing the asset class for the next decade will be different than the past decade," he says.

"We envision the future will continue to see a progression towards platform firms offering different access points for [investors] depending on risk-return appetite, liquidity and non-standard peril preferences."

Ultimately, with advantages and challenges in any ownership situation, the parentage of an ILS platform is not going to be the determining factor in its success.

Instead, it is the details – such as strong allocation policies – that investors will be looking for from any platform.

Top ILS firms by ownership



Note: Excludes Markel Catco where majority of assets are due to be redeemed

Source: *Trading Risk*

A rejuvenated market

2017 and 2018 were the first and fourth costliest years for insured losses in history, with $144bn and $80bn of estimated losses respectively (see chart below).

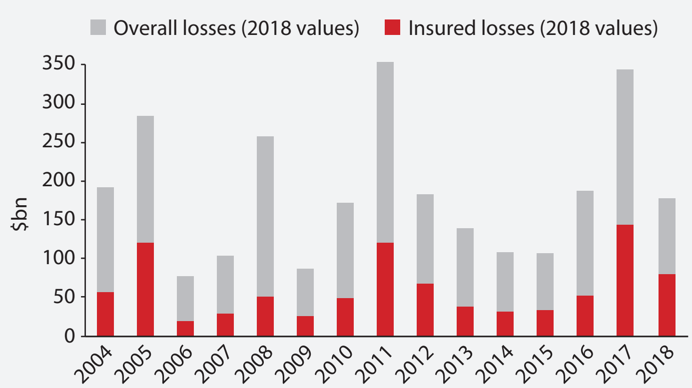
These back-to-back major loss years have provided an opportunity for the industry to improve the risk-adjusted returns and terms and conditions of insurance-linked investments.

Natural catastrophes are known to have an uneven distribution of losses over time, and the last two years followed eight years of uninterrupted positive returns for our funds. Insurance-linked investments therefore continue to provide an attractive, lowly correlated return source independent of equities, fixed income or real estate. Through organic cash flow (the no-loss expected income is linked to predictable insurance premiums), insurance-linked investments have delivered returns which, over the last 15 years, have been broadly in line with those of equities. Measured between January 2005 and July 2019, the Swiss Re Global Cat Bond Total Return Index and the S&P 500 index have recorded annualised returns of 6.93 percent and 8.25 percent respectively.

Preservation of capital, stability of returns and low volatility are key characteristics of insurance-linked investments, which sophisticated institutional investors such as pension funds, sovereign wealth funds, endowments and retirement schemes, continue to rate in the context of their long-term strategic asset allocation.

Recent market research from Preqin shows that institutional investors have increased their allocation to alternative assets by around 23 percent over the past three years, due to their ability to improve the efficiency and optimisation of the investors' resulting portfolio. The diversifying effect is sometimes recognised as so powerful that some investors will hold lowly and or uncorrelated assets even when their long-term returns are lower than core holdings. A recent increase in appetite for lower-risk/lower-yielding insurance-linked investment strategies is complementing the historical appetite for higher-yielding reinsurance investment strategies.

Overall and insured losses



Source: Munich Re NatCatService

> "After these past two years it is important to step back and appreciate the development and maturity of the insurance-linked investment market"

While 2017 proved to be the costliest year for insured losses in history, the chart opposite shows the number of natural disasters in 2017 was below average for the period from 1980-2018. This raises an important point: it is not just the frequency and severity of catastrophic events occurring over an annual period that matter when considering the potential impact to the results of insurance-linked investment portfolios but, most importantly, whether those events occur in highly populated areas with a high concentration of insured residential and commercial properties. A Category 2 hurricane making landfall in the centre of Miami is likely to cause more insured losses than a very severe Category 5 hurricane making landfall in a deserted area.

Positive premium momentum built up throughout the first six months of 2019, culminating in a strong Florida renewal. But investors, who by nature are slightly further away from the coalface, are waiting to see the impact of these improvements in returns and the outcome of the 2019 hurricane season before taking advantage of the yields on offer.

Market transformation

Since its peak in July 2017, the Eurekahedge ILS Advisers Index, which measures returns from a group of 33 ILS funds, has declined by 12.5 percent over almost two years. In May 2019 it reached levels last seen in September 2014.

At the same time, property reinsurance and retrocession pricing has increased to levels last seen in 2014.

In the intervening five years, the insurance-linked investment industry has nearly doubled, from $50bn at the start of 2014 to about $93bn, according to Aon.

Most importantly, alternative capital, as it is called relative to traditional capital from (re)insurance companies, has grown not just in assets under management, but also now covers a greater diversity of products, perils and geographies. While cat bonds, the original transformation method of the ILS industry, are still a fundamental piece of the overall market, growing by 50 percent between 2014 and 2018, it is collateralised reinsurance which is now the biggest component of the ILS market product suite, having expanded by over 100 percent in the same period.

This evolution has led insurance-linked investments to be seen more and more as a fundamental complement within a property reinsurance buyer's protection, and a voice to be listened to in driving both pricing and terms and conditions – which was evident during the recent reinsurance renewals.

What a difference a year makes

No two years are ever the same, and 2018 and 2019 are a perfect example.

Last year saw the "Great Reload", where a large amount of capital entered the asset class. This more than offset capital lost following the events of 2017 and lifted total assets under management in insurance-linked investments to an all-time high. However, rate changes expected by both managers and investors did not materialise due to the volume of fresh capital which entered the market, and return expectations were hit by losses including Typhoon Jebi and California's Camp Fire, the largest ever insured losses in their respective peril regions.

Driven by a combination of the 2017 and 2018 cat losses, collateral trapping and, in some cases, capital outflows (mostly among the private wealth investor base, which has proven to be less sticky than pension funds), 2019 will be remembered as the year where the total amount of available alternative capacity reduced for the first time in a decade.

This capital reduction resulted in an improvement in investment and underwriting discipline by both capital market investors and traditional reinsurers, and as a consequence, premiums have increased to levels not seen since 2014.

Underwriting discipline led to clear pricing differentiation between counterparties buying protection based on performance and prior behaviour, with better quality counterparties attracting more capital with rate changes below the average. Those that had performed poorly struggled and often had to agree side deals or shortfall covers, or offer improved pricing beyond the average movement in order to complete their placement.

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This was coupled with improved terms for capacity providers and improved underwriting conditions including narrower event definitions and tightening on coverage for perils and territories.

Taking stock

After these past two years it is important to step back and appreciate the development and maturity of the insurance-linked investment market.

The first cat bond, George Town Re, came to market in 1996. After hurricanes Katrina, Rita and Wilma in 2005, the sudden premium increase and lack of traditional reinsurance capacity prompted a rapid increase in investor interest, which helped the market to grow from $11bn in 2004 to $22bn in 2007.

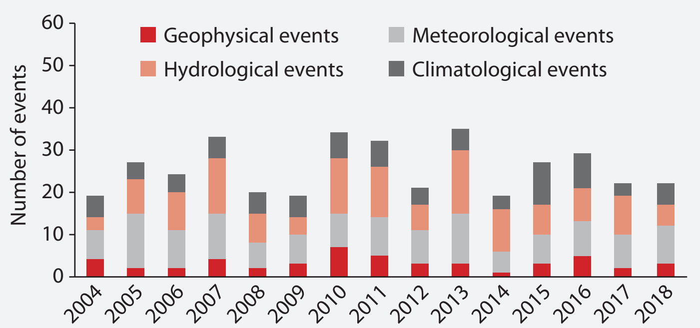
After 2005, early bird investors enjoyed stable and attractive returns over 10 relatively benign years, only to be reminded, through the 2017 and 2018 experience, that insurance-linked investments are not risk free; tail risk does play an important role and premiums are paid for a reason.

However, the past two years have been instrumental in helping the market to further develop. Investors, while requiring increased transparency and communication, have been able to better benchmark ILS managers across different key quantitative metrics such as post-event track records and more complex qualitative metrics such as the use of side pockets and drag on expected investment returns caused by collateral trapping.

All the above should contribute to the advancement of a better understood asset class which is becoming more and more an integral part of any institutional investor's portfolio, with greater future interest expected.

Capacity figures from Aon and premium estimates from Guy Carpenter.

Number of nat cat events



Accounted events have caused ≥ 1,000 fatalities and/or produced normalised losses ≥$100mn, $300mn, $1bn, or $3bn (depending on the assigned World Bank income group of the affected country).
Source: Munich Re NatCatService

ILS returns seesaw in H1

Typhoon Jebi and other prior-year disasters continued to weigh on ILS returns in early 2019, partly offset by a couple of stronger months in a benign period for new catastrophe activity.

Industry benchmark the Eurekahedge ILS Advisers index fell to a 1.09 percent loss for the first half of the year. However, by late August with partial data in for July, the index had clawed back some ground to reach a loss of 0.46 percent.

The index tracks 33 funds, including private ILS funds and pure cat bond funds.

While both these groups reported positive returns in January, returns began to drop in February.

However, the main impact of loss creep was realised in April and May, when unweighted average losses across the funds tracked by the index fell to 0.69 percent and 1.13 percent respectively.

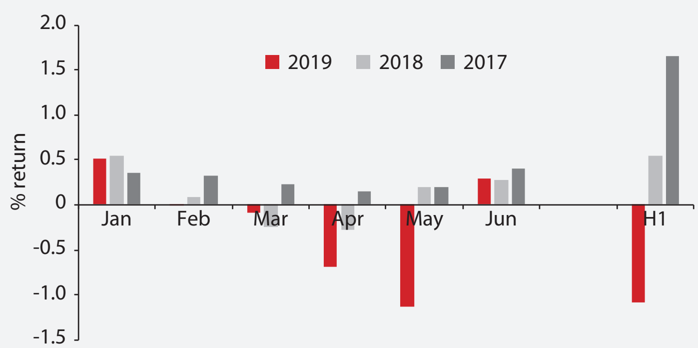
The timeline for the Japanese insurers' reporting year meant the full extent of Typhoon Jebi was not realised until then, while 2018's Hurricane Michael is also expected to have deteriorated slightly.

Some minor new claims have also emerged this year, such as a Peruvian earthquake in May that caused a $60mn payout under a World Bank-sponsored bond, while Jebi will also result in a $200mn cat bond loss.

The impact of trapped capital may also subdue stronger 2019 returns for some managers, as current-year portfolios should be benefiting from low loss activity.

Swiss Re estimated first-half natural catastrophe losses at $15bn, down from $21bn a year earlier and less than half the $31bn 10-year average.

June gains claw back downturn on ILS Advisers index



Source: Eurekahedge ILS Advisers

Eurekahedge ILS Advisers Index 2019

	Pure cat bond funds return	Private ILS funds return
Jan	0.76%	0.36%
Feb	0.02%	-0.03%
Mar	-0.21%	0.01%
Apr	-0.40%	-0.90%
May	-0.86%	-1.33%
Jun	0.61%	0.03%
YTD	**-0.09%**	**-1.86%**

Source: Eurekahedge ILS Advisers

> "The main impact of loss creep came from Typhoon Jebi with some minor new loss events"

Munich Re said the most expensive disaster for insurers in the period was an outbreak of thunderstorms and tornadoes in the Midwestern US, with (re)insurers covering $2.5bn of the $3.3bn of total damages incurred in the second half of May.

The first-half result was a significant underperformance against the average H1 returns of 0.54 percent in 2018 and 1.65 percent in 2017. While both 2017 and 2018 experienced significant losses, these were not realised until the latter half of each year.

Private ILS or collateralised reinsurance funds fared less well than pure cat bond funds with an average loss of 1.86 percent for the first half of the year. This compared with a narrow 0.09 percent drop for the pure cat bond funds.

The liquid bond strategies will have been impacted by some temporary mark-to-market losses in some months, as market hardening resulted in existing instruments being marked down.

The gap between the two groups has closed significantly from the end of last year when private ILS funds had an average annual loss of 7.47 percent and pure cat bond funds posted a return of 1.00 percent.

The cat bond fund group fell short of the benchmark gain on the Swiss Re total return cat bond index, which reported an average return of 0.62 percent for the first half of the year.

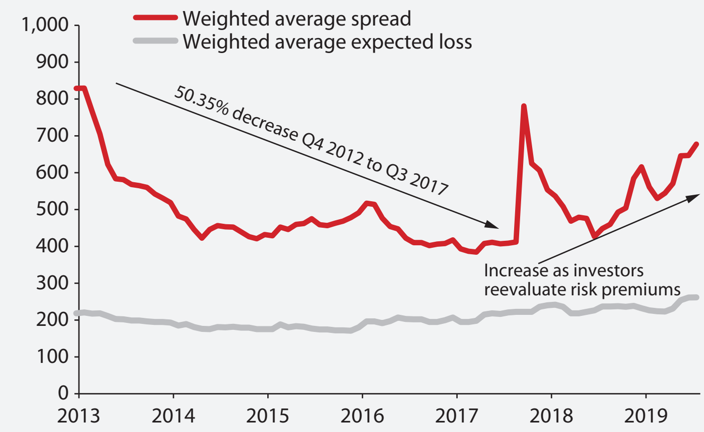
Despite the slump in April and May, both groups showed an uptick in June with pure cat bond fund reporting a positive return of 0.61 percent and 0.03 percent for pure bond funds.

Aftershocks of the Great Reload

With total catastrophe losses in 2017 and 2018 of more than $240bn, ILS and traditional market participants alike have operated through a challenging period. However, the market has responded positively to the needs of insureds, demonstrating the value proposition of (re)insurance. Recall that total global reinsurance capital decreased from $605bn at year-end 2017 to $585bn at year-end 2018, a reduction of 3 percent. Over the same timeframe, alternative capacity grew from $89bn to $97bn – an 8 percent increase and referenced in the markets as the "Great Reload".

While many in the sector heralded the end of pricing cycles in the face of the Great Reload, lower than hoped for pricing during 2018, combined with further loss events and additional loss development from 2017 events, have been testing the resolve of many investors. Accordingly, pricing has increased in 2019, with the most notable movements occurring in the retrocession market and closer-to-the-money excess of loss layers.

Cat bond no-loss yields surpass 6%



Source: Aon Securities' price sheet using seasonally adjusted bid spreads as of 31 July 2019

> "The recent spread increases could be viewed as a directional reversion to the mean"

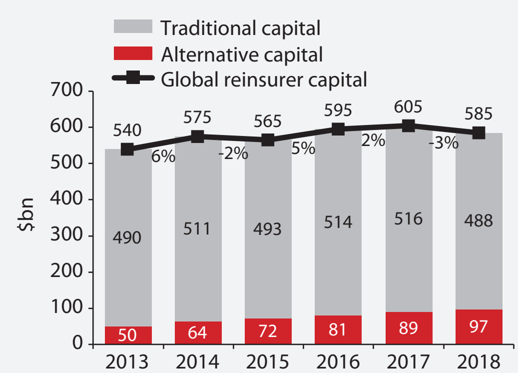
One can examine the weighted average yields observed through ILS indicative bond marks in conjunction with the weighted average expected loss. In August 2017, just prior to hurricanes Harvey, Irma and Maria (HIM), the weighted average yield was around 4.11 percent against a weighted average expected loss of 2.23 percent, representing a 1.85x multiple of price to risk. One month later, yields spiked to 7.82 percent against a similar risk profile (2.22 percent expected loss), reflecting a 3.5x multiple. This dramatic movement spurred the Great Reload, quickly reversing this spike in pricing.

Last year witnessed additional catastrophic events like the Camp Fire, Hurricane Michael, Typhoon Jebi, Hurricane Florence, the Woolsey Fire and others. These events, coupled with further loss development from 2017's Hurricane Irma and other catastrophes, pushed pricing higher in a more methodical manner. In June 2018, the weighted average yield of indicative ILS bonds marks was 4.27 percent against a weighted average expected loss of 2.27 percent, or a 1.88x multiple. By July this year, the weighted average yield had shifted to 6.77 percent against a weighted average expected loss of 2.72 percent, leading to a 2.59x multiple.

One should continue to frame the pricing implications over the past two and half years in the context of a longer time horizon. From the fourth quarter of 2012 to the third quarter of 2017 – the period before the HIM events – ILS pricing declined by 50 percent for similar risk. From the fourth quarter of 2012 to the present (including the full two years of heavy cat losses referenced above), spreads still declined by 22 percent. Accordingly, the recent spread increases could be viewed as a directional reversion to the mean, and while these dynamics do not herald the end of the reinsurance pricing cycle, they do provide support that ILS has muted wild pricing swings.

Author: **Paul Schultz,** CEO, Aon Securities

ILS capacity still elevated after reload



Source: Company financial statements, Aon's Business Intelligence, Aon Securities LLC

ILS capacity stabilises after slowdown

ILS capacity remained relatively stable in the first half of 2019, according to *Trading Risk* data, after falling in late 2018 amid losses and investor redemptions.

Some shrinking was still evident, with assets under management (AuM) dropping at the leading pack of ILS players with more than $2bn of assets.

This group – comprising a baker's dozen from Nephila down to Schroder Secquaero – posted mid-year AuM of $72.3bn collectively. Their total assets dropped by 2 percent from January 2019, slowing from a 6 percent decline in H2 2018.

Even so, the group's capital base remains ahead of the January 2017 level of just under $60bn, before the post-Hurricane Irma fundraising boom.

In the first half of 2019, Nephila and Securis both tumbled by almost $1bn, although in the latter case this was due to some delayed reporting which had inflated its January asset base.

Securis has dropped from fourth to sixth on the leaderboard with $5.6bn of assets at mid-year, while Nephila remains comfortably in the lead despite its AuM falling to less than $11bn from a peak of above $12bn in 2018.

Stone Ridge slowed its decline in AuM compared with the latter half of 2018, but still fell by $500mn to under $6bn.

Some top players posted increases: LGT moved from third into second place with $100mn of additional AuM; bond specialist Fermat gained $400mn to reach $6.7bn; and Elementum, Aeolus and RenaissanceRe also tracked up.

Outside the leading group, the main first-half growth was posted by Hudson Structured Capital Management and Pillar Capital – which took in $700mn and $650mn respectively – as both firms closed in on the $2bn mark.

The recent trend of dispersed growth further down the ranks of the ILS industry has somewhat flattened the market's formerly steep tiering by AuM.

Overall, there remains some opacity surrounding the level of deployable capital. Many managers were not willing to disclose levels of trapped capital.

However, the impact of side pockets varies widely depending on the strategy or firm, with cat bond strategies avoiding the issue and higher-attaching retro, aggregate or Florida contracts more heavily affected.

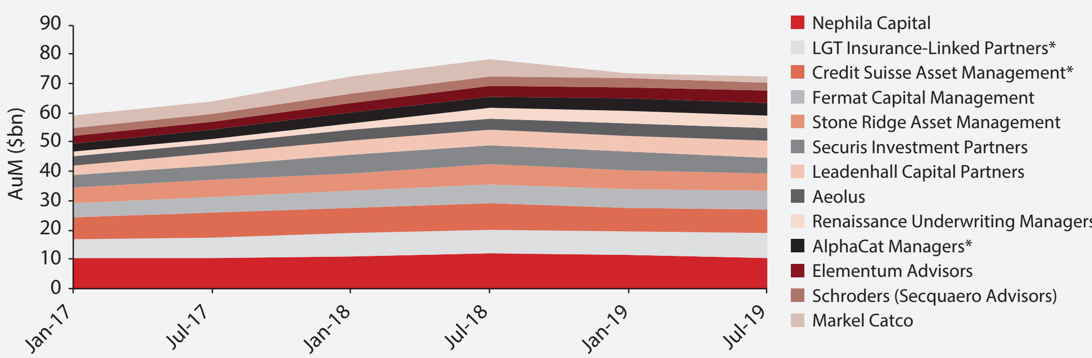
But ILS managers are finding ways around managing trapped capital. In most cases its impact could be managed between the ILS firm and its fronting provider.

This means ILS managers can effectively water down the impact of capital that has been tied up by a cedant, posting cat bonds or letters of credit so as to keep benefiting from their fronted leverage, and keep deployable capacity more constant.

However, once an ILS manager has side-pocketed certain assets, they may be returned to investors rather than automatically reinvested once any possible liability has elapsed.

This is the case for Markel Catco, which has been included in the top group for now with an estimated $2bn of assets to account for its trapped capital, although it emerged late in July that parent company Markel was putting the whole business into run-off.

Leading ILS players' AuM 2017-2019



Source: *Trading Risk*

Retro vogue

Retrocession, more commonly known as retro, is a simple concept: insurance for reinsurers.

But it is also a complicated market that has gone through considerable flux in the past couple of years as a result of disaster losses, trapped capital and the withdrawal of some major providers.

There is a high ILS share, approaching 60 percent of this niche market, which is estimated in total to be worth around $5bn of premium for just under $20bn of cover.

This high ILS participation reflects the fact that writing retro on rated balance sheets consumes a lot of capital, making collateralised deals more efficient.

But according to the experts, with demand remaining high and prices rising there is still plenty of opportunity for discerning ILS investors during this time of turbulence.

Retro portfolios are typically at the high risk-return end of the spectrum of ILS strategies – with expected losses of 5-15 percent – so there are some challenges that investors need to be aware of if they are weighing up allocations to this space.

As the third link in the chain from insurance to reinsurance to retro, there is always going to be a time lag before claims estimates reach the retro writer, which also has the complication of dealing with aggregate rather than discrete data.

"If you don't have your processes set up properly to compensate for that, you could face the problem of understating your ultimate losses," says Dirk Lohmann, head of Schroder Secquaero.

"You don't have the same degree of granularity in the risk information that you would have in an insurance portfolio."

Contracts are typically exposed to all natural perils, which can mean taking on less modelled risks – something which was brought into sharp focus by the Californian wildfire losses of 2017 and 2018.

"[Wildfire] is not an easy peril to model," admits Matt Belk, managing director and chief actuary at ILS Capital Management. "It is something that the modelling agencies are working on and limitations must be carefully considered."

However, typically the type of events that affect retro cover are extremely large and visible disasters, giving people time to prepare.

Moving beyond 2017-2018

Aggregate retro strategies took the brunt of ILS losses from the 2017-2018 loss years, as a result of their higher-risk exposure and the nature of the claims comprising a string of mid-sized disasters.

Aggregate covers make up just over $6bn of total retro supply, according to sources, with $8bn written on a per-event basis. Industry loss warranties (ILWs) account for about $4bn of cover and pillared aggregate products for $1.3bn.

The aggregate losses made 2017-2018 two of the worst years on record for the retro market, says Paul Nealon, co-founder and managing partner of ILS Capital Management.

As an example of the scale of claims that hit some strategies, Markel Catco delivered a 46.7 percent loss from its 2018 portfolio after a 64.9 percent loss in 2017.

In addition to actual claims, trapped capital has also dragged on retro returns. In a nutshell, money has been held back in case it is needed by claimants, meaning it is tied up and unavailable for re-investment.

After the false dawn of 2018, when rate increases did not live up to forecasts, the 2019 season has produced a more marked shift, with retro pricing moving up significantly.

This has taken place against the background of reduced capacity, a reflection of several key trends.

Firstly, major collateralised players were not able to reload as much capital for 2019.

Secondly, of the $15bn of ILS capital that broker Aon Securities estimates remains trapped, one commentator suggested as much as half of this relates to retro limit.

And thirdly, another big change has been the withdrawal of Markel Catco, which wrote as much as $4bn at its peak.

According to experts, the average rates on line – calculated by dividing the premium by the amount of coverage – has moved up in both January and June renewals this year.

Cover for risks with an expected loss of 10 percent paid 15-16 percent net of brokerage before 2017's Hurricane Irma, but now attracts a rate on line of 21-22 percent.

These changes have been achieved through a combination of higher trigger points as well as outright rate increases.

For those with fixed budgets to spend on retro, other changes have included getting less coverage for the same premium or having smaller limits per event, meaning more losses are needed to trigger aggregate payouts.

"Buyers have had to adjust and accept higher retentions and still pay a high premium for it," says Lohmann.

At mid-year demand for retro was outstripping supply, leaving reinsurers to keep more risks on their own books, and the question remains whether this will continue in the 1 January renewal season.

Historically in such circumstances, one solution has been ILWs, which sit at the commodity end of the market. They offer an easier way into retro for both buyers and investors.

Average rates on line for this simpler-to-understand product are generally below 10 percent, although this figure will vary greatly depending on the trigger. However, with major players significantly scaling back their participation in this market this spring, buying has been easier said than done.

"ILWs become much more in vogue and fashionable when there is a lack of capacity in retro," notes Darren Redhead, CEO of Kinesis Capital Management.

Tightening to persist

Crystal ball predictions are challenging to make in the middle of hurricane season.

But the expectation is that at the very least recent retro hardening will be maintained at the next major renewal on 1 January, when an estimated 65-70 percent of total retro limits are sold.

Another active loss year could drive still-greater change, but Redhead is confident the market would cope.

> "Focus less on what the top-line return is and more on what the structure of the contracts are that are being sold"
> *Dirk Lohmann, Schroder Secquaero*

Rising yields would lead to more "hot money" coming into the sector chasing elevated returns, he points out, although he notes that this natural inflection point has not yet been reached.

Advice

So what should ILS investors weighing up an allocation to retro strategies consider?

Take advice is the core message.

"Our view is that the last two years were outliers and there is a place for an allocation to retro in people's portfolios based on their risk appetite," says Nealon.

Similarly, Lohmann urges investors to have a good understanding what products and strategy the manager is going to be pursuing.

"Focus less on what the top-line return is and more on what the structure of the contracts are that are being sold," he says.

In the view of Neville Ching, managing partner of broker Capsicum Re Bermuda, there is one positive to come out of the past two years – that testing times have added to the knowledge in the industry.

Market-leading pack

The retro market is highly concentrated with a few key players taking most market share.

Key markets include Aeolus, AlphaCat, RenaissanceRe's Upsilon funds and Everest Re.

Other participants include Securis, Kinesis Capital Management, Credit Suisse Asset Management, Hudson Structured Capital Management and Leadenhall Capital, and Neuberger Berman for industry loss warranties.

Mid-year renewals boost reinsurance momentum

Reinsurers gained ground in the mid-year renewals this year, with the key Florida market at the centre of the push for higher premium rates.

The situation marked a delayed reaction to the 2017 hit from Hurricane Irma, as losses that deteriorated into 2018 and 2019 pared back capacity and meant reinsurers pushed hard for higher rates.

Sources generally put the Florida rate increases in the 15-20 percent range, although a number of factors meant it was harder than usual to benchmark average change.

This included wide disparity in outcomes among different insurers and for deals at different risk-return levels, as well as more use of private deals outside the subscription market.

Rate increases were hard-won, however, and followed a late-running and tense renewal season.

The stage for a late renewal was set at the beginning of the season, with Nephila and RenaissanceRe among those calling for higher rates in response to "social inflation" – the lawsuits and high claims handling costs that have pushed up overall Irma losses.

Top, remote-risk layers in some cases attracted increases of up to 60 percent on low benchmark levels, taking rates on line up to the 6-8 percent level.

First-layer Florida reinsurance covers typically change relatively little year on year in terms of absolute premium levels, given prevailing high rates on line that are in the low-to-mid 30 percent range.

ILS market capacity was constrained across the

Key points

- Florida rates rise by double-digits in response to loss inflation concerns
- Buyers tactically adjust demand to manage higher costs
- Increased use of private/sideline deals to top up to buyer targets
- ILS market share dips on reduced capacity
- Regulatory changes help improve terms in reinsurers' favour
- Changing views of risk critical to assessing ultimate uplift in yields

Sunshine state reinsurance

- The 1 June renewals are a key date for ILS funds and reinsurers, as Florida insurers are heavily reliant on reinsurance
- Ratings agency Demotech estimates Florida insurers ceded $4.7bn of premium in 2018 or 54% of their gross premium income
- ILS providers took about a fifth share of premiums ceded by the state's top 10 insurers in 2018, according to *Trading Risk* analysis

board due to losses and trapped capital. With no sign of significant inflows to the alternative market, it is likely to have taken less market share this year than in the past.

Balancing out higher post-Irma risks

Ahead of the renewal, it was estimated that Florida rates would need to rise 10 percent overall for margins to stand still after factoring in social inflation.

Therefore, a company's view on how much the underlying risks had changed had a key influence on their take on how much of a real-terms uplift was achieved.

Some estimated that yields were now back to levels prevailing in about 2014, rewinding several years of reductions before Irma.

But others suggested that the increases on offer were still not enough for them.

RenaissanceRe CEO Kevin O'Donnell said the firm believed rate increases had been in the high-single-digit range after adjusting for increased risks, and described this as "necessary but not sufficient".

Accordingly, it pared back its participation in the Florida domestic market and focused on taking exposure through southeast US retrocession risks, he added.

Some also lamented a lack of greater change on terms and conditions of cover.

"We need more alignment of interest between the parties and that didn't happen," one senior ILS executive said, adding that Florida insurers had "hung their hat" on the improvements from modest reforms to assignment of benefit (AoB) rights and increased loss adjustment expense coverage from the state reinsurance scheme.

Legal reforms target problem areas

Florida politicians enacted two key reforms in the run-up to the renewals, which were seen as a welcome respite for reinsurers, albeit not necessarily a solution to the state's insurance issues.

Some reforms targeted the AoB regime which has enabled a huge spike in third-party contractors suing insurers for Irma recoveries.

Among other provisions, new legislation sets a higher threshold for legal fee awards in AoB litigation.

It also allows providers to sell AoB-exempt policies as well as requiring more notification around policyholders taking up AoB offers.

But the most immediate financial boon to reinsurers came from lifting the cap on coverage for loss-adjustment expenses from the state reinsurance scheme, the Florida Hurricane Catastrophe Fund, from 5 percent to 10 percent of an insurer's ultimate losses.

As Irma claims handling costs spiralled to above 20 percent, private reinsurers had borne the brunt of the low state coverage cap.

Tactical demand changes

In anticipation of rate increases this year, some of the largest Florida insurers opted to keep control of overall expenditure by sourcing more cover from the state reinsurance scheme, even as some looked to increase their overall limits.

The shift towards more participation at the 90 percent, maximum level, was expected to result in $2bn of limit overall moving to the public market, removing private market cover at the riskier end of the spectrum.

But even with reduced private market demand, many Florida insurers initially fell partly short on their target reinsurance capacity.

One underwriting source estimated that a dozen shortfall covers were being sought just ahead of 1 June.

Private bilateral or small-club deals were effectively filling the role of shortfall covers, even if sponsors and brokers did not officially label them as such.

This came as broker Willis Re highlighted the market's increasingly bespoke pricing practices in its mid-year renewals point.

"'Market-standard' price increases have been displaced by reinsurers' more discerning approach, creating a wide pricing disparity between different [cedant] accounts," Willis Re observed.

Ultimately, these trends undercut the prevailing view of Florida risk as a commodity trade in the reinsurance markets – suggesting that, amid the challenges, there was room for some providers to manoeuvre favourably.

Property rate movements

Terrority	Cat loss free % change	Cat loss hit % change
US – Florida	0% to +7.5%	+5% to +25%
US – Nationwide	0% to +5%	+5% to +20%

Note: Movements are risk-adjusted

Source: Willis Re

Cat bond pace slows as rates rise

Cat bond issuance volumes slowed dramatically in the first half of 2019, but firming yields meant improved opportunities for investors.

New deal volumes for the first half of the year were the lowest since 2011, with just $3.5bn of bonds being issued compared with $8.0bn in 2018, excluding mortgage ILS transactions.

The drop in volumes partly reflected deal sponsors reacting to pricing disparities between the cat bond and traditional reinsurance markets, as well as to capacity shortages, sources suggested.

In the run-up to hurricane season, several Florida cat bond deals either failed to place or downsized, with rates up year on year.

Meanwhile, existing bonds experienced downward pressure on the secondary market, with more sellers than buyers.

But by the end of the first half, two large new industry loss bonds had expanded above their targets.

On the secondary market, buyers returned in greater numbers in June as sources suggested that the bulk of upcoming investor redemptions had worked through the market, meaning fewer ILS managers were looking to free up cash via the bond market.

"The tide is turning again," said one.

Even so, overall the pipeline of upcoming deals is not expected to pick up significantly in the short term, with both (re)insurer cedants and investors acting with far more caution than in previous years, sources said.

Yields rewind to 2014

These dynamics produced better yields for investors.

Zurich-based ILS manager Twelve Capital estimated in a May report that cat bond spreads had increased by 100-150 basis points in a year, taking yields back to levels last seen more than five years ago.

The average insurance spread on Q2 2019 deals moved to 7.8 percent, well ahead of the 4.4 percent average seen a year earlier. The uplift reflected higher risk-taking but also improved margins.

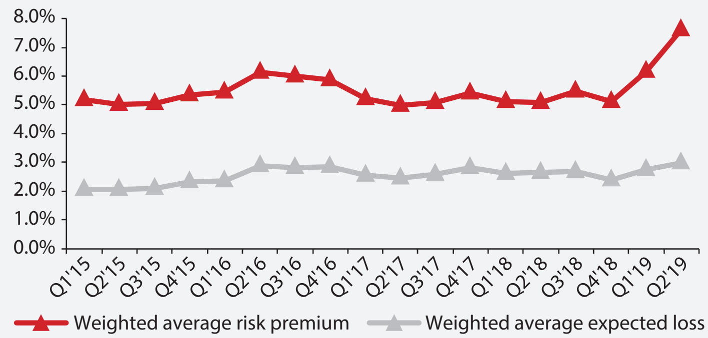
Second quarter bond spreads represented a multiple of 2.4x expected catastrophe loss levels, up from a 1.9x margin a year earlier.

The benchmark multiple fell back from 3.7x in Q1 2019, but the second quarter's deals were skewed by having a lower risk profile, and the multiple remains comfortably higher than the 2.0x achieved on Q4 2018 transactions.

According to Willis Re's rate-on-line index, which tracks cat bonds over a trailing 12-month period, average gross yields of 7.6 percent fell to a net 4.6 percent yield after subtracting expected losses.

This is the first time the cat bond market has offered net spreads of above 3 percent since 2016. From February on, net ILS yields have also offered higher rates than BB-rated corporate debt.

WTW Securities rate-on-line index



Source: Willis Towers Watson Securities Transaction Database as of 31/05/2019 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

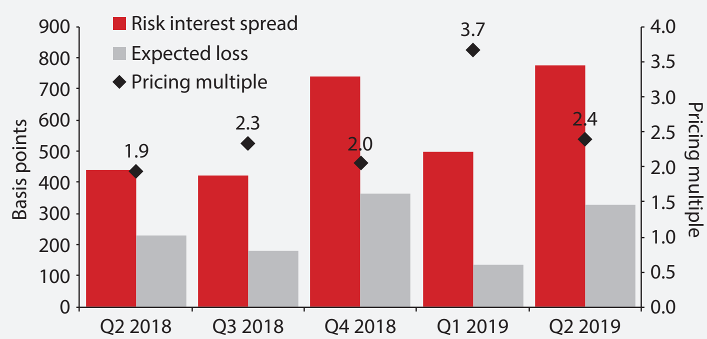
Reinsurers buy cover

Reinsurers made up a significant number of sponsors seeking retrocession cat bond covers in 2019, with 50 percent of deals placed on an industry loss basis, up from 31 percent a year earlier.

New types of deals – or those building on recent innovations – also featured, with two quasi-governmental insurance authorities buying cover.

These were the UK's terrorism reinsurer Pool Re, and a follow-up transaction for the US National Flood Insurance Program.

Weighted average spread, expected loss and pricing multiple



Source: *Trading Risk*

ANDREW HUGHES

The managing principal at Hiscox ILS tells us that event-driven specialty reinsurance opens up new horizons

Q: What avenues of specialty risk do you think ILS investors should be considering?
It really depends on the type of investor and their appetite, as well as their ability to overcome the perceived challenges that speciality lines present.

There is a large universe of specialty risk but the ones that lend themselves well to ILS tend to have the same qualities as catastrophe business, namely non/low correlation to financial markets, higher volatility, higher value, event-driven exposures. For example, in our new fund we have some space launch exposure which matches these characteristics.

Cyber risk is well-publicised as a growing market in search of capital and we are now seeing increased investor interest in this class. Again, it's another risk our funds have exposure to and where Hiscox is at the leading edge on the primary insurance side.

The key challenges for investors who want to move into specialty lines are firstly, moving away from the perceived comfort of third-party models against which you can assess catastrophe portfolios, and secondly, accessing specialty risk given it is generally less capital constrained. These factors will require investors to apply more scrutiny and trust in a managers' proprietary modelling, investment process and access to risk.

Q: Do you see more pricing momentum in primary insurance markets or reinsurance segments?
We're seeing improvement in both, although perhaps the primary market pricing is slightly better, albeit coming off a lower base. In both cases, the high levels of capital in these markets means rate rises are somewhat muted compared with previous cycles.

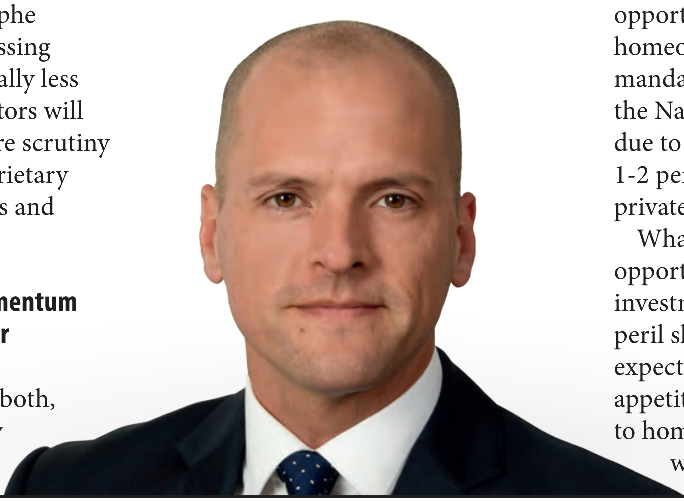
It's a well-reported dynamic of loss-affected layers increasing in price with marginal to flat price responses to loss-free positions.

What will be interesting to see is whether the pricing momentum gathered through 2019 continues into 2020. That will depend in no small part on the number and severity of catastrophe losses over the coming months.

Q: What lessons can be taken from Typhoon Jebi's loss deterioration?
At a high level, the main lesson taken is that despite sophisticated catastrophe modelling, we work in an asset class that still can, and will, present events with uncertain outcomes.

In the case of Jebi, although the loss is still settling today, it seems that a combination of insurance company and vendor modelling deficiencies, late reporting (from the close of the Japanese financial year), demand surge (think construction for the 2020 Olympics and 2019 Rugby World Cup) and antecedent environmental factors (heavy rainfall) could be the reasons for the unusually large and prolonged deterioration.

We expect all industry participants will be thoroughly reviewing their view of risk and pricing approach for Japan for the next renewal period.



Q: How fast do you think US flood risks could open up as an opportunity for ILS investors?
We have seen the opportunity open for ILS investors directly with the Federal Emergency Management Agency (Fema)'s cat bond programme, but what is interesting is the nascent opportunity in private US flood risk. Given Hiscox offer a bespoke product on the primary side, this is an area we are actively looking at for our funds.

Unsurprisingly, how quickly the opportunity scales depends on US homeowners. Outside those that must mandatorily purchase flood cover from the National Flood Insurance Program due to the location of their homes, only 1-2 percent of US homeowners buy private flood insurance.

What will drive uptake and the opportunity for ILS? Increased investment in education about the peril should help, but unfortunately, I expect more flooding and a reduced appetite of Fema to provide assistance to homeowners following flood events will be the primary drivers.

Unpicking the value of locked capital

Losses are the biggest threat to any ILS investment, but trapped capital can also drag down returns, as has been demonstrated following catastrophe activity in 2017/2018.

But what is the process of unlocking trapped capital and how much has it weighed on income in the past two years?

Brokers have estimated that around $15bn-$20bn of the circa $90bn ILS market may remain trapped in 2019.

Buffering the loss

At the end of a contract period, whether capital is held back is determined by so-called "buffer tables", which allow reinsurance buyers a safety margin above their current losses in case their claims rise.

The threshold to trap capital initially starts at a generous level that means cash can be locked down even if claims are some way below a contract trigger point – although the factors change over time at set intervals.

For example, for a windstorm event cedants typically multiply their actual initial claims tally by 200-300 percent to arrive at a sum used to calculate how much capital can be held back.

That amount decreases over time as more clarity is gained on losses.

Typically, once cash is freed at the end of these extension periods, further liability would be extinguished.

However, it should be noted that this process on the cedant side is independent of how ILS managers determine the capital they may set aside in side-pocketed share classes, which has a more direct influence on investors looking to redeem capital at any point.

Buffer table multiples have shifted since the 2017 and 2018 events, but only by a few percentage points, agree experts.

Capital can typically be held back for up to 24 months after the end of a standard one-year risk period. However, Aon Securities CEO Paul Schultz notes that for the cat bond market the norm is up to 36 months, and in some cases earthquake transactions have specified 48 months.

> "It's not so much the drag – it's that you want 'x' amount deployed in a strategy"
> *Robert Howie, Mercer*

Plenum portfolio manager Dirk Schmelzer says the typical extension timeframe is getting longer and longer on the cat bond market.

"We're seeing bonds with up to five years of potential extension – that is a reaction to HIM."

Schultz adds: "Like all marketplaces, cedants and investors find new clearing levels in this dynamic following events that allow for repricing, modifying terms and incorporating new information."

One of the factors that has exacerbated levels of trapped capital from the 2017 and 2018 catastrophes is that events such as Hurricane Irma and Typhoon Jebi showed striking levels of loss creep, as initial claims estimates rose.

So even six to 12 months after an event, having lower margins of error for trapping collateral under buffer loss table calculations is offset by the higher underlying losses.

But this loss development phase is a necessary and normal part of processing insurance losses, emphasises Schultz.

"By definition, it takes time for the full impact of large catastrophic events to crystallise and for losses to be completely quantified."

Low-single-digit impact on returns

Mercer's head of ILS Robert Howie estimates that collateral lock-up has led to a 1-3 percentage point average reduction in ILS investor returns since hurricanes Harvey, Irma and Maria (HIM) in 2017.

Before the loss years struck, Milliman actuary Aaron Koch had attempted to quantify the impact of collateral lock-ups in a 2016 study.

Koch believes his forecasts have been in line with the actual experience over the past couple of years.

His 2016 study noted that the impact would be steeper on higher-risk contracts, with the estimated drag as high as a third of net returns.

For deals with a moderate chance of loss the drag was in the region of 15-20 percent of the expected return, dropping away to 2 percent on remote risk events.

He found that for a hypothetical excess of loss treaty with a 6-point expected net return, depending on the risk level, collateral drag could result in 0.12 to 2 points of lost returns. The events of 2017 and 2018 provided a reality check on how major loss events, which on the surface seem to be over very quickly, can take time to handle, says Koch.

"Some capital will be returned within a year, some will be tied up for multiple years."

As the sums of trapped capital can vary so widely, it is up to investors to grill funds about its potential impact on their investments – but not just when disaster strikes.

"If I were an institutional investor, I would be asking funds how the potential impact of trapped collateral had been considered in the target return metrics they were expecting over time," says Koch.

Another question to ask a fund is what policy it has for setting up side pockets in the event capital is withheld, so that investors are aware how trapped capital may translate into liquidity constraints for their shares.

As well as trapped capital itself, fees could turn into a meaningful drag on performance of side pockets, according to Cambridge Associates investment director Mark Wilgar.

Charging fees on side-pocketed capital was "more or less universal" in the ILS market, but Wilgar suggests the best practice for the industry would be to introduce fee structures that drop down over time to incentivise freeing capital as early as possible, as well as only charging fees on the sums that can be recovered at the end of the claims process.

But while drag may be an inevitable part of the ILS asset class, there are hacks investors can deploy to mitigate its impact.

Some investors have been able to top up their investments so they will have more capital at work, says Howie.

"It's not so much the drag – it's that you want 'x' amount deployed in a strategy," he says.

> "I would be asking funds how the potential impact of trapped collateral had been considered in the target return metrics"
> *Aaron Koch, Milliman*

If investors can afford it, they can on a temporary basis effectively "over invest" in ILS and then take that money out as side pockets unwind, he adds.

Going forward, investors are likely to look for greater consistency in reporting.

"Like in most relationships, avoiding negative surprises is important. Therefore, we expect to see greater emphasis among all parties regarding communication of losses," Aon's Schultz predicts.

Cedants are also refining commutation techniques to give themselves more leeway to deal with losses.

But despite the trapped capital discussions, ILS structures did what they were supposed to do amid the catastrophes, Schultz opines. Contracts that were hit paid out, while those with uncertainty retained capital until losses become clearer.

Not only did ILS investors reload, cedants continued to seek out alternative capital providers, he adds.

"The ILS markets passed the big test."

Collateral lock-up: the multiplier factors

Months after deal concludes	Buffer factor
0-3	200%
3-12	150-175%
12-24	~125%
24+	100%

Source: *Trading Risk* sources

Modelling for the cost of capital drag

Chance of precautionary loss notice	Chance of partial loss notice	Chance of full loss	Est. annual net return "single-year" model	Est. annual net return TAR model	Difference
1.00%	1.00%	0.50%	6.00%	5.88%	12.5 bps
2.00%	2.00%	1.00%	6.00%	5.78%	22.2 bps
5.00%	5.00%	2.50%	6.00%	5.43%	56.8 bps
10.00%	10.00%	5.00%	6.00%	4.91%	108.7 bps
15.00%	15.00%	7.50%	6.00%	4.44%	156.5 bps
20.00%	20.00%	10.00%	6.00%	4.00%	200.5 bps

Range of results for contracts priced at 6.0% single-year net return (after expected loss)
Source: Milliman

Mixed tactics among ILS pension investors

The Florida State Board of Administration allocated a further $400mn to ILS in the second quarter of 2019, as it moved to capitalise on a hardening market.

This followed an initial $550mn commitment to the sector in 2018, although deploying these mandates would be dependent on market conditions and achieving rate targets, the fund's senior investment officer of strategic investments Trent Webster told its council.

"If it's not [hardening], we won't do anything more."

He said the fundamental diversification of ILS was appealing to the fund.

"The Earth's crust does not care what the Fed is going to do. The wind is going to blow no matter what the stock market does."

Webster said he would like to see insurance mandates rise to 5-10 percent of the strategic investment portfolio he oversees, which was worth $13.4bn at 31 March.

The Florida board has invested with RenaissanceRe, Nephila, Pillar Capital and Aeolus Capital, as well as a legacy ILS joint venture run by Credit Suisse Asset Management.

Meanwhile, in the UK two pension schemes have shown differing strategies in the asset class.

The North Yorkshire Pension Fund increased its allocation to ILS, while the BBC Pension Scheme investment nearly halved year on year.

The North Yorkshire Pension Fund increased its ILS allocation to £159.4mn ($208mn) by 31 March this year, up from an initial investment of £80mn with Leadenhall Capital in Q2 2018.

The increase took its ILS allocation to 4.5 percent of total assets.

The fund's allocation is now approaching the top end of the £110mn to £165mn range that it signalled it would commit to ILS when it was looking to enter the sector last year.

Meanwhile, the BBC Pension Scheme's ILS investment, via London-based manager Securis, more than halved in its financial year to 31 March, according to its 2019 annual report.

The fund reported a £41.2mn investment with Securis at that point, compared with £98.1mn a year earlier.

The BBC declined to comment on how much it had pared back its ILS allocation.

Select pension funds invested in ILS

Pension fund	Domicile	Current ILS allocation ($mn)	% ILS allocation	Strategies/managers employed	Date of initial allocation
PGGM	Netherlands	4,500	1.8%	Employs Fermat, LGT, Nephila, Elementum, Munich Re, New Ocean and AlphaCat	2006
RBS	UK	1,230	2.2%	Includes an insurance litigation funding investment as well as ILS holdings with Nephila and Leadenhall	2012
State Board of Administration for Florida	US	Up to 950	0.6%	RenaissanceRe, Nephila, Pillar Capital, Aeolus Capital and CSAM/ILS P&C legacy fund	2018
Pennsylvania Public School Employees' Retirement System (PSERS)	US	803	1.4%	Nephila ($250mn 2011), Aeolus ($200mn 2012), RenaissanceRe ($200mn 2015)	2011
AP2	Sweden	643	1.7%	Fermat, Credit Suisse, Elementum	2012
AP3	Sweden	560	1.5%	In-house and external allocations	
MLC	Australia	560	1.0%	AlphaCat Managers and Mt Logan from 2018	2010
State of Michigan Retirement Systems	US	538	0.8%	6% of Real Return & Opportunistic Fund at 31/12/17	
West Midlands Pension	UK	397	2.0%	Markel Catco, Credit Suisse, Coriolis (latter holding not disclosed in 2018)	
PK SBB	Switzerland	391	2.1%	Not disclosed	2013
The Coca-Cola Company	US	~379	6.0%	Securis (non-US focus) and one other (US focus)	
Teacher Retirement System of Texas	US	300	0.2%	Targets a 5% allocation of the $5.6bn Stable Value Hedge Fund portfolio	2013
MassPRIM	US	250	0.4%	Aeolus ($100mn), Markel Catco ($150mn)	2017
NZ Superannuation	NZ	241	0.9%	Elementum Advisors, Leadenhall	2010
Ontario Teachers' Pension Plan	Canada	223+	0.2%	DaVinci Re, Hudson Catastrophe Fund (in-house vehicle) and other non-disclosed holdings	2005
IBM UK	UK	223	3.0%	Nephila, Securis	2013
Aargau Pension Fund (APK)	Switzerland	218	2.0%		
Maryland State Retirement and Pension	US	200	0.2%	Nephila Capital	2014
Pension Fund of the city of Winterthur	Switzerland	194	10.6%		2011

Source: *Trading Risk*

LARRY SWEDROE

Now is the time to earn back ILS losses , says the chief research officer at Buckingham Strategic Wealth

Q: How long have you been investing in ILS and what has your approach to the sector been?
We have been using Stone Ridge since the third quarter of 2016. We spent several years doing due diligence. We looked for whether they put their money where their mouth is by committing their own capital.

Q: What do you like about the sidecar approach of investing in ILS?
Just like we do in all our investments, we want to buy different betas rather than trying to buy alphas because we think the market is too efficient for that and we do not want to pay for alpha that you are not likely to get.

We like that Stone Ridge is not saying "we can write the risk better than the reinsurers". It is a long-term capital partner to the reinsurance industry. It is basically trying to buy beta on the best terms it can execute.

Q: Have your ILS investments performed in line with your expectations?
Our expectation long term is 4-5 percent over riskless investments. Clearly that has not happened in the last two years. We fully expect ILS to have losses in a really bad year but that is the reason you get a risk premium.

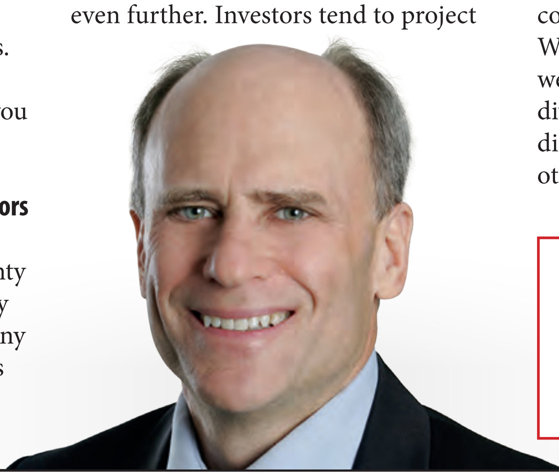
Q: What advice would you give to investors considering their first ILS allocation?
We are dealing in a world of uncertainty and the prudent strategy is to diversify to minimise the risk of having too many eggs in one bad basket. Reinsurance is one of the best diversifiers away from equity risks.

Something in the order of 5 percent of assets is prudent. If you are not willing to accept the certainty that there will be some periods, and maybe even fairly long ones, of big losses then you shouldn't invest.

Q: Were there any surprises in the results from the 2017 and 2018 losses?
The California wildfires were unprecedented and were not built into the insurance prices. One insurance company I know raised its premiums by 25 percent back to back and changed the terms for getting cover.

Q: Did you lift your ILS allocation this year?
I recommended to people to buy more. We are adding assets and see no reason not to. Back in 2011, there were big losses from the earthquake in Japan. In four years all of those losses were recovered. You only got that recovery if you stayed the course rather than pulling out.

Q: If there were a third year of losses would you invest again?
Of course, as premiums would rise even further. Investors tend to project the recent past indefinitely into the future. They think two to three years is enough to judge the performance of an investment strategy, when any economist worth their salt will tell you even 10 years is noise.



So many people look at losses and panic and sell because their stomachs are reacting. Diversification is the answer, not running away.

Q: What other concerns do you hear from investors about ILS?
[Judging on short-term performance] is probably the biggest challenge combined with concerns around global warming. But most of global warming doesn't have too much to do with longer-term risks that get built into reinsurance prices.

People fail to understand that reinsurers probably have more scientists looking at this issue than governments have.

Q: Would you use another ILS manager?
We are always looking for competitors to arise. We would like to see lower costs and competition can drive that. We would add another manager if we saw they could provide some diversification. We are doing due diligence and hope to be able to approve other firms in the near future.

About Buckingham

Buckingham Strategic Wealth is a $16bn financial advisory business advising people on the whole spectrum of their financial lives.

Jebi jolts reinsurers with outsized loss

Typhoon Jebi may not have made many headlines outside Japan, but the storm remains a major talking point in reinsurance markets.

Nearly a year on from the event, rising losses have continued to hit the ILS market.

While the storm's losses were modelled at around $5bn in the fortnight after the typhoon, the true extent of the disaster only became fully apparent following the end of the Japanese financial year in April.

Following updates from local insurers earlier this year, the expected Jebi industry loss is now feared to be in the $12bn to $15bn range, with JMP Securities managing director Matthew Carletti putting the loss as high as $16bn.

But unlike in the Florida market, where legal costs were identified as one of the major drivers of worsening losses from Hurricane Irma, Jebi's deterioration has stemmed from a variety of influences.

ILS firms write relatively little direct reinsurance business in Japan, but losses have filtered through via the retro market, sidecars and the cat bond market.

In turn, this has contributed to declines on the Eurekahedge ILS Advisers index, which in May recorded its steepest monthly fall for the year to date at 1.13 percent.

While the bulk of ILS Jebi claims are expected to come through the retro market, one cat bond is expected to be a full loss as a result of the typhoon.

In May this year, the $200mn Akibare Re 2016-1 became the first cat bond payout to a Japanese insurance company since the 2011 Tohoku earthquake triggered a $300mn payout to Zenkyoren.

The Akibare bond provided Japanese heavyweight Mitsui Sumitomo with indemnity cover against typhoon events on an annual aggregate basis.

Time lapses

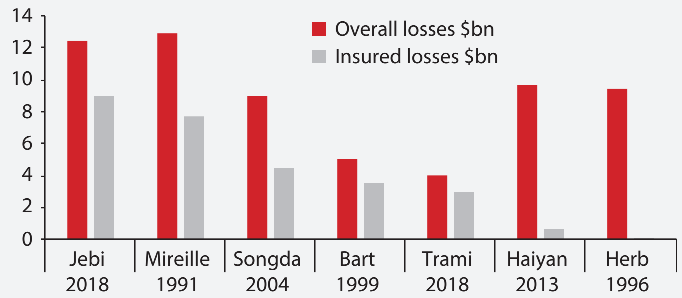
The reporting cycle is different in Japan compared with other major catastrophe zones like Florida, which means that claims information can be slower to flow to reinsurers and then to retrocessionaires, according to JB Crozet, senior vice president of advisory services at Horseshoe.

"In Japan the rhythm is different: an in-depth assessment of loss reserves may not take place until the end of the financial year on 31 March – which can be a long time after an event," he explained.

Another factor in the uncertainty is simply the amount of time that has elapsed since a major typhoon claim. Jebi was the most powerful typhoon to make landfall in Japan since Yancy in 1993, according to Swiss Re.

Many in the reinsurance market didn't believe that a Japanese typhoon event could reach a level above $10bn of industry losses, JMP analyst Carletti wrote in an investor note.

Costliest Asian typoon losses



Values inflation-adjusted to 2018 losses
Source: Munich Re NatCat

One of the reasons put forward for the loss creep is the knock-on impact from the 2020 Olympics due to be held in Japan.

Some of the material being used to rebuild damaged residential properties is also being used in construction of structures for the event, which has led to a demand surge, sources said.

Business interruption costs were one of the other main causes named as being behind the loss creep.

The location where Jebi hit was key in driving up business interruption costs, Arch president and CEO Marc Grandisson explained during the firm's Q1 earnings call.

The area near Kansai airport – which was closed for 10 days – is an important hub for semi-conductor factories.

It is important to look at a mixture of these factors, Horseshoe's Crozet said.

"The surprise from Jebi comes from two elements: the event itself but also its timing. We have seen unexpected levels of business interruption and demand surge. These are linked to the timing of the typhoon, the other catastrophes which preceded it and the preparations for Tokyo 2020. Business interruption and demand surge are notoriously hard to model, and all the more so outside the US".

There is typically a significant difference in the granularity of information available for modelling between US and non-US risks, he added.

Jebi's proximity to other storm activity has also made it harder to get a handle on losses, Swiss Re management said on the firm's Q1 earnings call.

"In this specific case, we have the Typhoon Trami that came in on an overlapping area to Jebi. And trying to disentangle… the scope of the losses was complicated by the second set of storms," Swiss Re's chief financial officer John Dacey explained.

It was further complicated by an earlier 2018 event – a minor earthquake near Osaka – that had gone unnoticed by many in the market, he added.

The human reaction to the events, both in Japan and the wider reinsurance market, has also been blamed for the rising losses.

In Japan, there is also a hesitancy to pass on bad news at both a policyholder and senior executive level, sources said. This partially explains why losses have taken such a long time to filter through to the wider reinsurance market.

RenaissanceRe president CEO Kevin O'Donnell pegged Jebi as a $15bn loss in late July. The executive said he was not convinced about the scale of the impact of the Olympics on Jebi's deterioration, but agreed there was some loss inflation in Osaka.

He flagged optimistic underwriting models before the typhoon and slow reporting after the event as important factors.

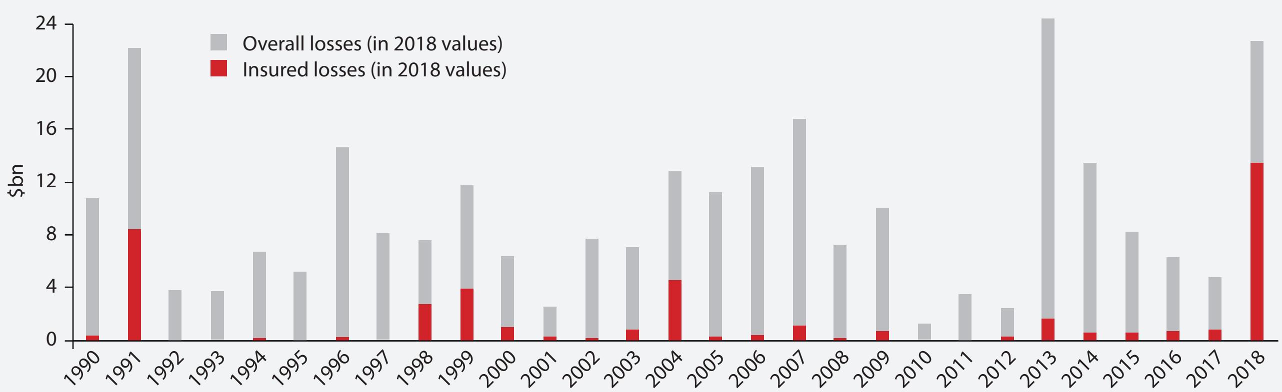
Legacy of Jebi

One of the ways the ILS market could help mitigate the risk of loss creep is to better reflect the uncertainty around the loss reserves in their valuations and side-pocketing, Crozet said.

"When losses occur, we need to be aware of how much we don't know. Currently, some may see an early loss estimate below the attachment point and assume the reinsurance layer will run clean. But you have to consider the uncertainty around the loss estimate and the likelihood that the layer could be triggered. If there is a 40 percent chance of rain, you may still want to carry an umbrella even though it is more likely not to rain – but that might obviously be different if the chance of rain is 1 percent."

Overall and insured losses

Catastrophic meteorological events in Asia 1990 – 2018



Inflation adjusted via country-specific consumer price index and consideration of exchange rate fluctuations between local currency and US dollars
Source: Munich Re

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What would it cost: Japanese earthquake

The Japanese call it X Day – shorthand for the scenario of a major earthquake striking Tokyo, the world's most populous city.

In human terms, the impact would be devastating. According to the Tokyo Metropolitan Government, a magnitude (Mw) 7.3 quake striking northern Tokyo Bay could kill 9,700 people.

The insurance market was last tested by a Japanese earthquake loss in 2011, from the Tohoku disaster, which Swiss Re puts at $39bn in today's terms.

Trading Risk asked modelling agencies to estimate industry claims from major and moderate earthquakes in Tokyo and in the second-largest metropolitan area, Osaka.

Tokyo

The modelling agencies considered various scenarios for a major earthquake striking the Japanese capital.

These ranged from $66bn to $70bn, for different scenarios including 7.2Mw, 7.5Mw and 7.9Mw events.

Karen Clark & Co (KCC) emphasised that various factors such as depth and exact location of a rupture, as well as the type of faulting, could have a huge influence on the scale of losses.

"The same magnitude event could cause twice or half the loss depending on the above parameters," the firm noted.

With relatively low insurance take-up for residential earthquake hazards, there remains a large gap between forecast insured losses and overall losses.

AIR Worldwide estimated that a 7.9Mw event could cause a total insurable loss of 10.80tn yen ($102bn), with just under 65 percent insured, producing a 6.99tn yen ($66bn) insured loss.

This represented just under a 1-in-250-year event, with commercial losses expected to be almost 1.8x the level of residential claims, AIR ILS manager Harry White noted.

Meanwhile, RMS for a 7.5Mw Tokyo event estimated an insured industry mean loss of $70.5bn, and KCC modelled a 7.2Mw event causing $400bn of total losses, of which $70bn would be insured.

Osaka events

The modelling trio put insured losses of $20bn-$37bn on a 7Mw+ earthquake in Osaka.

This comprised a $27bn insured loss estimate for a 7.4Mw event from AIR, which showed a lower degree of insurance coverage than for a major Tokyo scenario. A little over 25 percent of insurable damages were covered in the insured loss estimate.

Meanwhile, RMS estimated a mean loss of $37.4mn for a 7.5Mw Osaka event, while KCC put an insured loss of $20bn on its scenario of a 7Mw disaster causing total losses of $150bn.

Cat bond losses

The impact of a large 7.0-7.9Mw Tokyo quake on the cat bond market would be significant, AIR said.

It calculated that six classes of Kizuna Re and Nakama Re notes would be totally eroded – amounting to a $900mn loss. A further four notes, including some Akibare Re tranches, would experience partial erosion of another $500mn.

In the case of Osaka earthquakes, AIR estimated that for a 7.0-7.9Mw disaster, one $220mn deal would be a full loss, while another would be 78 percent eroded, or a $39mn loss.

Minor quakes would not impact the cat bond space.

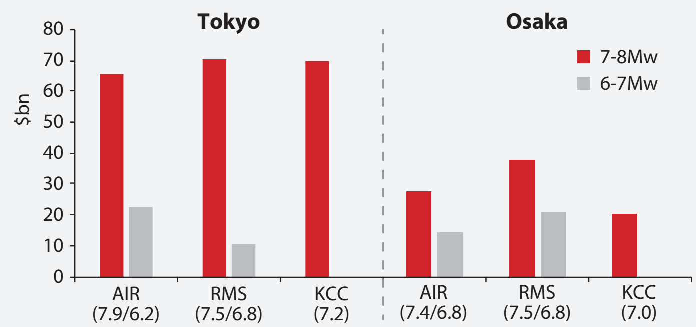
State coverage

The state plays a significant role in picking up losses from residential earthquake claims in Japan. Direct government capacity is complemented by state-backed reinsurance scheme, the Japanese Earthquake Reinsurance (JER) company.

For major quakes between 88.4bn yen and 224.4bn yen, the government meets roughly half the losses, with the JER taking just over a third and private insurers responsible for the remaining 28 percent.

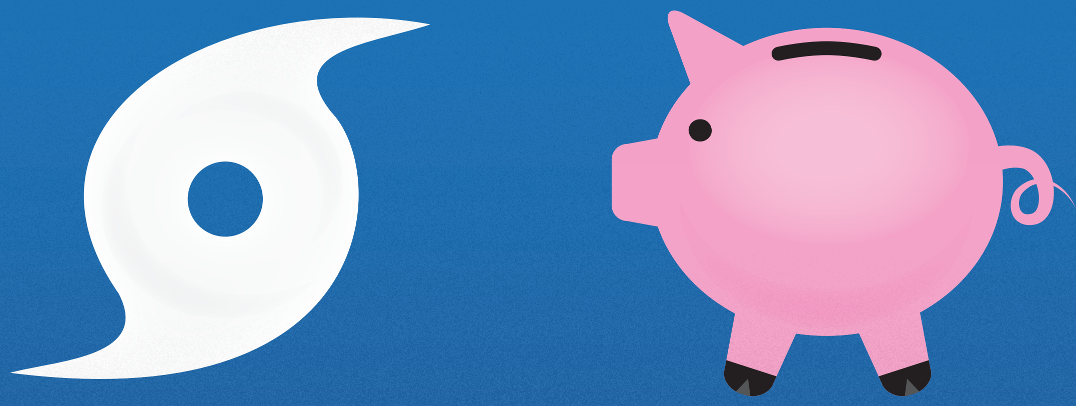
The government steps in to take almost all claims above this threshold, with the JER and insurers splitting only 0.2 percent of losses.

Modelled insured losses



Source: Modelling firms as cited; each magnitude scenario taken by the firms are listed

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

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

– 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 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.

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.

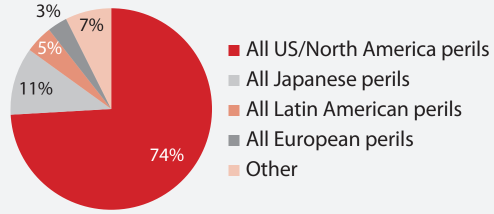
However, it remains the market's peak exposure with a corresponding price advantage compared to the types of catastrophe business that diversify a reinsurer's portfolio.

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 discussed here.

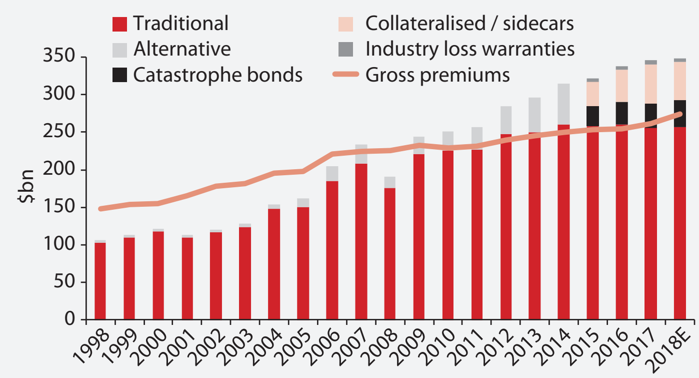
They typically offer "all natural peril" catastrophe cover, which may involve exposures that are unmodelled or less well-modelled – such as wildfires or floods.

Perils analysis – cat bonds still on risk

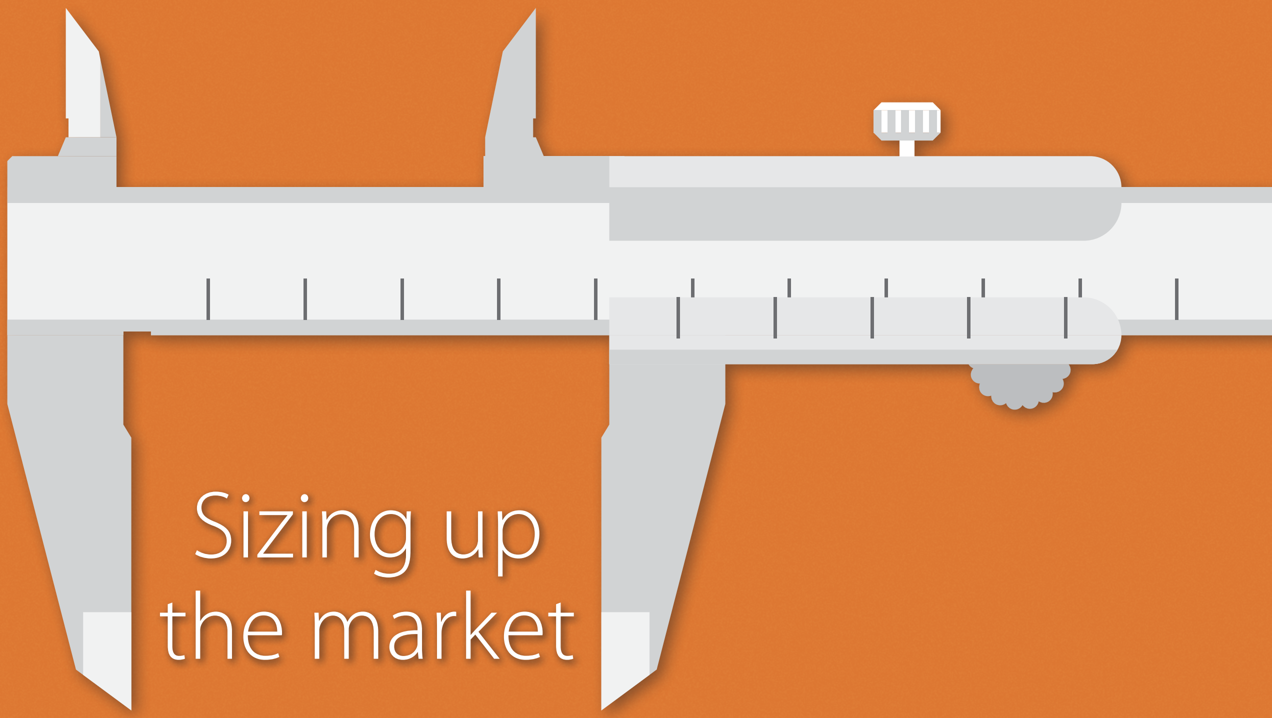


Limit of peril volume by contribution to expected loss
Source: *Trading Risk*

Dedicated reinsurance sector capital and gross written premium



Source: JLT Re



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.

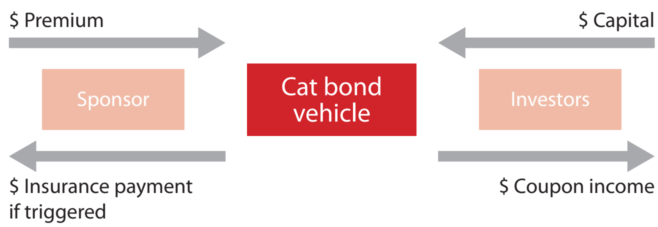
The niche industry loss warranty market is also relatively commoditised and easier to access, with a variety of risk-return options.

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

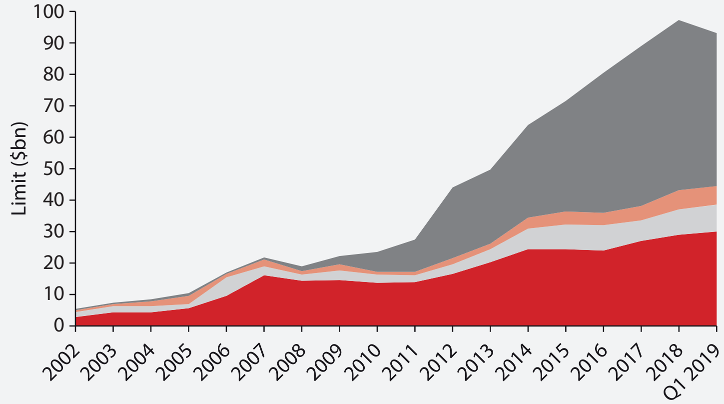
Finally, other small niches such as retro business

What is a cat bond?

A catastrophe 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.

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, its 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 Eurekahedge 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 2.81 percent last year.

ILS returns, 2006-2018

Annualised return (%)	4.33
Sharpe ratio (X)	0.69
2018 return (%)	-3.92
Return since 2006 inception (%)	77.85

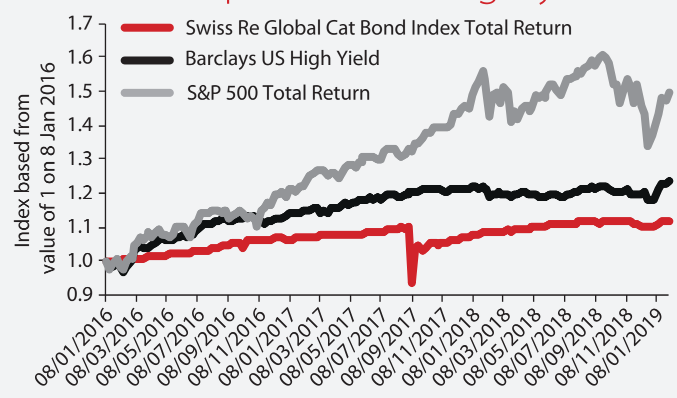
Source: Eurekahedge ILS Advisers index, data as of February 2019

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.

Cat bond performance 2016-present: HIM losses tip ILS below high-yield



DISCLAIMER: Swiss Re Cat Bond Index Total Return ("Index"), calculated by Swiss Re Capital Markets ("SRCM"), is a market value-weighted basket of natural catastrophe bonds tracked by SRCM, calculated on a weekly basis; past performance is no guarantee of future results. For full disclaimer details please see Bloomberg.

Manager list

Manager by type	Total AuM in ILS $mn (estimated)	AuM within UCITS funds if applicable	AuM within '40 Act funds if applicable	Notes	ILS strategies	Established in ILS	Base
Specialist ILS manager							
Nephila Capital	10,700			Acquired by Markel in Q4 2018	Various multi-instrument funds and single-investor mandates, also invests in weather	1998	Bermuda
LGT Insurance-Linked Partners	8,100	650		Former Clariden Leu ILS team moved to Swiss alternatives manager in 2012. Team of 50 (20 portfolio managers; 30 support staff). Manages own rated reinsurance carrier Lumen Re	Various funds and bespoke mandates	2005	Switzerland
Credit Suisse Asset Management	~8,000			Manages rated reinsurance vehicles Kelvin Re and Humboldt Re	Various funds with different risk levels	2003	Switzerland
Fermat Capital Management	6,650	1,700		Independent ILS manager	Cat bond focus	2001	US
Stone Ridge Asset Management	5,729		5729	Independent US mutual fund manager	Cat bond and sidecar funds	2013	US
Securis Investment Partners	5,600	63.8		Northill Capital owns majority stake	Life, non-life and mixed strategy funds	2005	UK
Leadenhall Capital Partners	5,450	425		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
Renaissance Underwriting Managers	4,666			Reinsurer subsidiary	Medici cat bond fund; Upsilon funds write collateralised reinsurance/retro; DaVinci takes quota share focused on cat reinsurance book and new PGGM joint venture Vermeer writes high-layer US business.	1999	Bermuda
Aeolus Capital Management	4,500			Majority-owned by Elliott Management	Retro and collateralised re	2006	Bermuda
Elementum Advisors	4,200			Independent manager; sold 30% stake to White Mountains in May 2019	Multi-instrument funds	2009	US
AlphaCat Managers	4,156			Part of AIG's Validus reinsurance business. AuM from 1 Jan 2019, last public disclosure	Runs lower-risk and higher-risk funds, BetaCat cat bond tracker fund and direct mandates	2008	Bermuda
Schroder Secquaero	2,807	1,314		Fully owned by Schroders since July 2019	Six funds: two cat bond; three multi-instrument, of which two include life risk; one life fund. Four segregated mandates	2008	Switzerland
Markel Catco	2,000			Runs a public listed fund and private funds; AuM includes lost capital	Retrocession writer	2011	Bermuda
Pillar Capital Management	1,750			Previously Juniperus; part-owned by TransRe	Collateralised re focus, runs two funds and fund-of-one mandates	2008	Bermuda
Hudson Structured Capital Management	1,700			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 cat, life/health, casualty, other risks and various instruments. Cat opportunities fund; $75mn InsurTech venture fund	2016	US/Bermuda
Amundi Pioneer Investments	1,650			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
Twelve Capital	1,611			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	1,600			Hiscox-owned asset manager; Hiscox capital $55mn	Two co-mingled diversified funds; single-investor funds; one insurance sidecar	2014	Bermuda
Axis Ventures	1,500			Reinsurer subsidiary; also oversees $600mn Harrington Re joint venture not tracked here	Alturas 2019 sidecars and private vehicles	2014	Bermuda
Scor Investment Partners	1,400			Asset management affiliate of reinsurer established 2011	Multi-instrument	2011	France
Axa Investment Managers	1,131	149.7		Affiliate of insurer; invests third-party funds only	Various funds and mandates; UCITS fund added 2017	2007	France
NB Insurance-Linked Securities (Iris)	1,000			Acquired by Neuberger Berman from Cartesian Capital in Nov 2018	Focus on index strategies via ILWs, cat bonds and other ILS. Investment vehicles include: open-ended funds in Cayman Is and Delaware, Luxembourg SICAV, Bermuda-listed shares of segregated account and managed accounts	2009	Bermuda
New Ocean Capital Management	1,000			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
Mt Logan (Everest Re sidecar)	940			Includes some Everest Re capital	Quota share of Everest Re book		
Coriolis Capital	765	35		Agreed sale to Scor Investment Managers expected to close shortly	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, commingled 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	450			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	436	410		Independent asset manager	Cat bond focus, long only strategies	2010	Switzerland
Oppenheimer Funds (Invesco)	366		332	Mutual fund manager; runs ILS vehicle and invests via multi-strategy funds	OFI 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
Blue Capital Management	350			Sompo International subsidiary; runs two public funds; private funds and private sidecars.	Collateralised reinsurance (regional focus)	2012	Bermuda

Manager by type	Total AuM in ILS $mn (estimated)	AuM within UCITS funds if applicable	AuM within '40 Act funds if applicable	Notes	ILS strategies	Established in ILS	Base
Brit (Sussex)	300			Brit Insurance sidecars	Sussex market-facing; Versutus quota share	2018	UK
PartnerRe	269			Reinsurer offering quota share sidecars	Lorenz sidecar of largest accounts $195mn; new 2019 sidecar global cat risk, Torricelli $67mn		US
Tangency Capital	265			Independent manager launched by trio of reinsurance execs	Quota share retrocession portfolio	2018	London
Eskatos Capital Management	260			Azimut Group subsidiaries Eskatos and Katarsis Capital Advisors manage and advise the ILS fund respectively	One fund: Eskatos AZ Multistrategy ILS fund; small longevity exposure	2008	Luxembourg
Lutece	250			BTG Pactual Asset Management bought in Jul 2018 after Jan 2018 launch by former reinsurance broker Erik Manning and ex-Ariel CFO Angus Ayliffe	Initially a focus on retrocession	2018	Bermuda
Lombard Odier	150	110		Swiss private bank launched ILS fund in 2016	Cat bond funds	2016	Switzerland
Merion Square	150			Joint venture between Rewire Holdings and life settlements investor Vida Capital		2019	US
Leine Investments	150			Reinsurer Hannover Re has seeded the fund with up to $150mn	Cat bonds and collateralised re		
Sumitomo Mitsui DS Asset Management (Tokyo)	105			Advised by Mitsui Sumitomo Insurance	Also manages $500mn third-party capital	2014	Japan
Tenax Capital	58			Fosun bought majority stake in equities/ILS manager Tenax in July	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 Lloyd's insurer Ark	ILW tracker fund	2013	Bermuda
Entropics Asset Management	25			Independent ILS manager	ILS	2015	Sweden
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
IBI ILS Partners	Not disclosed			Joint venture between Roman Muraviev and IBI Investment House		2017	Israel
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		
Total	**87,859**						

Note: This total will include some double-counting of assets as several ILS vehicles are heavily focussed 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

Manager by type	Total AuM in ILS $mn (estimated)	AuM within UCITS funds if applicable	AuM within '40 Act funds if applicable	Notes	ILS strategies	Established in ILS	Base
K2 Advisors	915			Hedge fund of funds manager; $11.6bn AuM	Invests with multiple ILS funds; buys cat bonds directly	2003	US
ILS Advisers	330			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	199.1		187.1	City National Bank-owned adviser targeting high-net-worth 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
Hatteras Reinsurance Fund							US
Total	**1,772.1**						

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

Manager by type	Total AuM in ILS $mn (estimated)	AuM within UCITS funds if applicable	AuM within '40 Act funds if applicable	Notes	ILS strategies	Established in ILS	Base
Aberdeen Asset Management	41			8% of £427.5mn Diversified Growth fund at end Q1 18; reinvested $33mn in Catco post-loss			
AP3	541			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	500			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		
Blackstone Alternative Asset Mgmt				$266bn asset manager; allocates to Nephila Capital through mutual fund	Blackstone Alternative Multi-Manager Fund		US
BlueMountain Capital	330			$21bn alternatives asset manager; employed Al Selius to manage ILS portfolio		2017	US
BNP Paribas	Not disclosed			Internal ILS fund			
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
Ontario Teachers Pension Plan	300+			Invests via third-party ILS managers and through internal team	Stakes in DaVinci Re, Catalina	2005	Canada
Quantedge	390			Hedge fund with $1,900mn overall AuM	Invests in cat bonds, collateralised re, sidecars, ILWs, cat bonds	2013	US
Tiaa-cref	Not disclosed			Manages $800bn overall AuM	Buys cat bonds directly		US
Total	**2,102**						

Source: *Trading Risk*

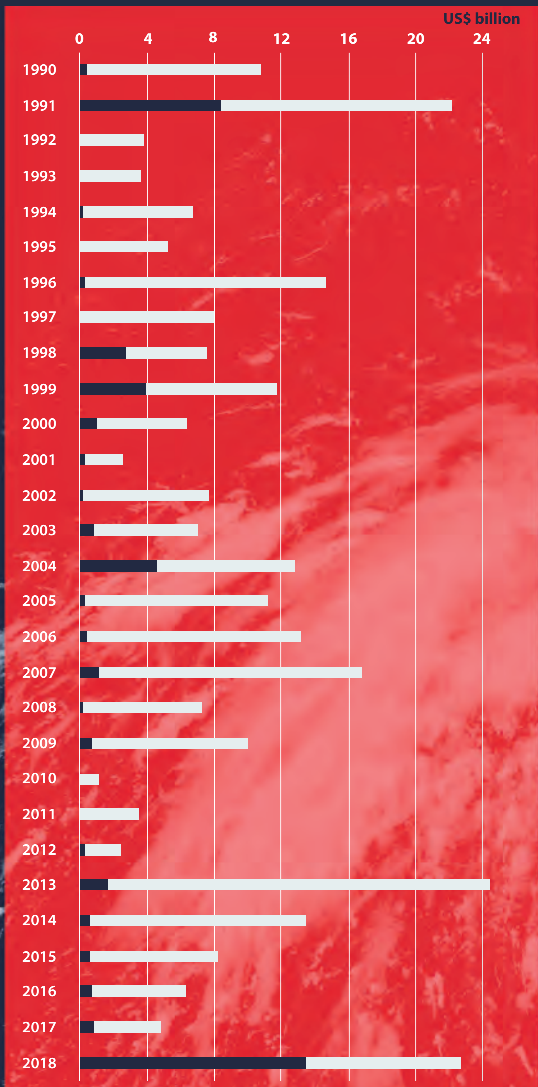
災 pronounced **wazawai** or **sai** in Japanese, was picked by the public as the Kanji symbol of the Year for 2018 for a good reason. Meaning "disaster" or "misfortune", the word summarises Japan's challenging year from natural catastrophes and extreme weather conditions.

Source: https://www.swissre.com/risk-knowledge/mitigating-climate-risk/ natcat-2019/new-approach-to-weathering-the-storms.html

CATASTROPHIC METEOROLOGICAL EVENTS

in Asia **1990 - 2018**

Inflation adjusted via country-specific consumer price index and consideration of exchange rate fluctuations between local currency and US$.

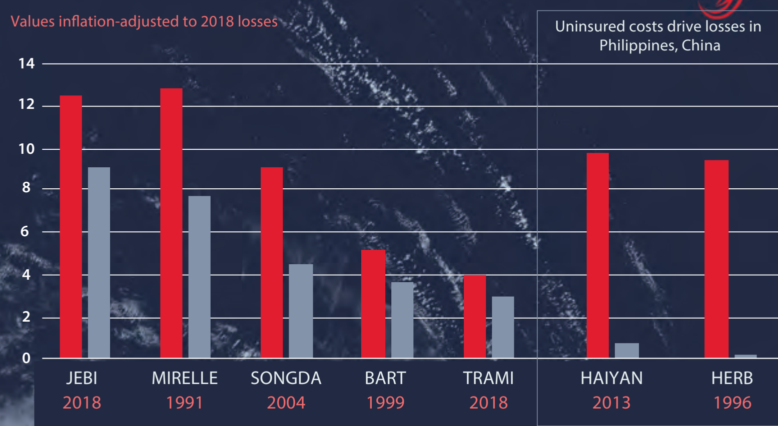


Source: Munich Re, NatCat SERVICE

COSTLIEST ASIAN TYPHOON LOSSES

and the costliest **uninsured storms**

Values inflation-adjusted to 2018 losses



Source: Munich Re, NatCat SERVICE

JEBI TIMELINE

Jebi industry loss estimates triple over past year

SEPTEMBER 4 2018: JEBI HITS

- Initial modelled losses range from $2.3bn to $5.5bn
- Underwriters suggest $5bn loss

OCTOBER 1 2018: TRAMI HITS OSAKA

- Underwriters warn losses closer to $7bn+; combination of Trami and Jebi expected to wipe out ~$1bn aggregate deals covering Japanese insurers

DECEMBER 2018

- Aon and Munich Re put Jebi at $8.5bn-$9bn

FEBRUARY 2019

- Underwriters say losses climbing above $10bn as claims move higher into occurrence reinsurance towers

MAY 2019

- Cat bond market expects $200mn loss as Akibare Re expected to pay out to Mitsui Sumitomo

JULY-AUGUST 2019

- Reinsurers cite losses of $15bn-$16bn

Source: Trading Risk

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

KEY PHRASE	DEFINITION
Loss ratio	Incurred losses divided by earned premiums (earned premiums include reinstatement premiums)
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

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Insurance Linked Investments

Non-Life and Life Strategies

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10 YEARS