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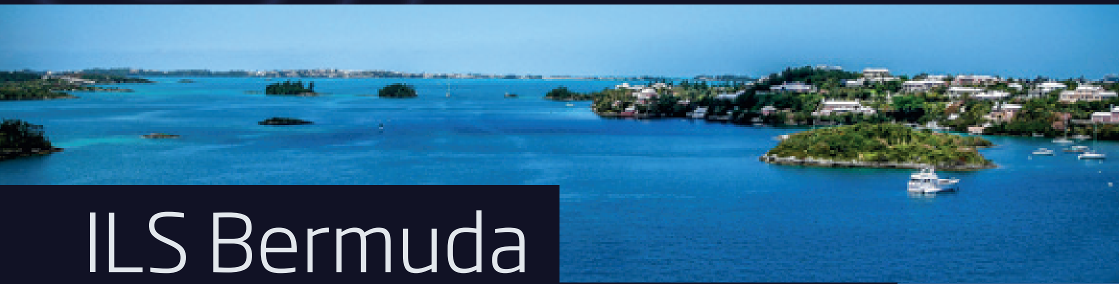

ILS Bermuda Executive Roundtable 2017

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PCS

FOREWORD

Welcome to the third Artemis ILS Bermuda Executive Roundtable, in which participants discussed a mix of challenges and opportunities for the sector as it continues to expand its remit and push for growth, on the back of an extremely active loss year for sponsors and investors.

Naturally, much of the initial discussion focused on third-quarter 2017 catastrophe losses, what this might mean for the ILS sector in the near-term, and whether post-event market conditions create an opportunity for ILS players.

Comparisons between 2017 and other notable catastrophe loss years, such as 2005 and 2011 were made, and roundtable participants debated the potential for ILS capacity to influence renewals and the expected hard market, in a way not seen before.

The impact on the retrocession and ILW markets were noted, and the group of industry experts were keen to explore the trapped collateral issue, which has become a hot ILS industry topic, in the wake of an estimated $100 billion of catastrophe losses in Q3 alone.

When discussing the future of ILS and where the sector could play a role, the constantly evolving and expanding cyber market was highlighted, as was the growing challenge and opportunity new and advanced technology brings to numerous parts of the value chain.

The potential for ILS to play a more meaningful and influential role in the catastrophe arena in emerging markets was also discussed by roundtable participants, alongside the need to develop new, uncorrelated solutions for both existing and new investors.

Steve Evans
Owner and Editor in Chief, Artemis

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CLOCKWISE FROM LEFT, LEFT-HAND PAGE: Patrick Gonnelli – *TigerRisk*, Ari Chatterjee – *Hannover Re*, Tom Johansmeyer – *PCS*, Alex Mican – *PCS*, Steve Evans – *Artemis*

CLOCKWISE FROM LEFT, RIGHT-HAND PAGE: Tim Tetlow – *Hudson Structured*, Brad Adderley – *Appleby*, John Williams – *Armour Holdings*, Bob Forness – *MultiStrat*

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PARTICIPANT INDEX

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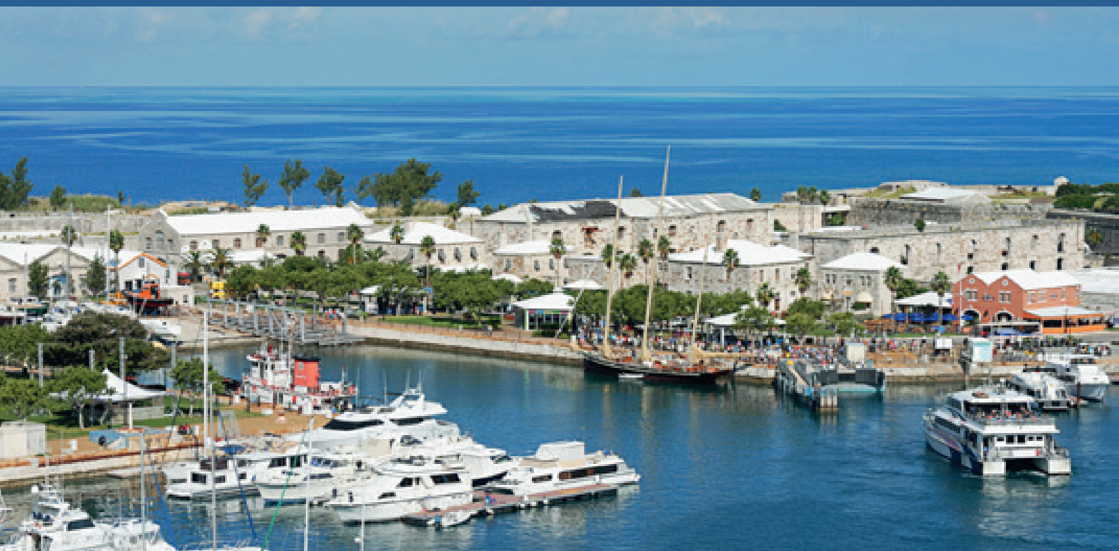


STEVE EVANS

Let's begin by talking about recent loss events, which have aggregated in a way that nobody has seen for some years. Now the market's had time to digest the events, what are you seeing in terms of response from both traditional and alternative sides of the market, at this stage?

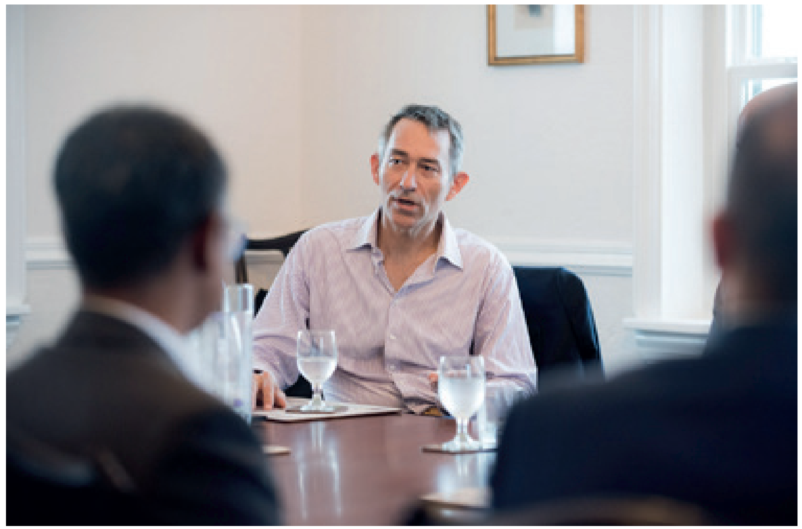
PATRICK GONNELLI

I still think there's a lot of time left to see how these losses develop, I don't think anything has been determined, and a lot will play out in the coming months. As far as risk appetite and new markets coming in, I think that will change and be highlighted in the coming months. From a client perspective, and what we're seeing at TigerRisk Partners, the market is functioning as it's supposed to, claims are being paid fast by both the ILS funds and traditional markets. So, from a broker perspective the market is functioning in an efficient and proper manner.

TIM TETLOW

Firstly, I'd like to stress that my comments today are of my own opinion and not that of my firm, but if you think about this in the context of 2005, we are sort of roughly in the same ball park in terms of industry loss numbers. But it feels to me that there's much more functionality going on in the market, there's much more order, there's not the panic of 2005. I would attest that some of the resilience in the market is a consequence of ILS capacity coming into the market in the period since 2005 and as the pension fund pool of capital is both much broader and less demanding in terms of returns than private equity capital.

Tim Tetlow –
It feels to me that there's much more functionality going on in the market



BRAD ADDERLEY

So, what we're saying then, it seems, that this event is almost one of our best marketers. The fact that before everyone wanted ILS, would the ILS actually pay out, would they think that the collateralised re practices would actually pay the claim, would they run somehow, would they somehow breach contractual terms. What I'm seeing from the people actually involved in paying claims and processing claims, you're actually seeing claims being paid, which is something we don't read about, and which is fantastic.

PATRICK GONNELLI

During these events, we need to highlight the positives of our market, as opposed to what can go wrong. The Industry has a negative perception to begin with, but it needs to be highlighted that we are the backstop of economies, not only in the U.S. but around the world. I think that is an important message to get out to society. Right after the events we saw markets come in and look to reload and provide backups, so there was capacity available to a certain degree.

None of the counterparties that I trade with were running for the hills and most came back looking to deploy more. Our integrated cat risk trading desk at TigerRisk Capital Markets and Advisory (TCMA) is active in trading both ILWs and CAT Bonds. We have a unique perspective of which companies were active during the storms (live cats) and post the storms in both markets.

BRAD ADDERLEY

What we're seeing is people reloading up, you know some serious amounts of new money, or additional money coming back in. So, it doesn't look like investors in this space have been scared by the losses, and people are definitely coming in with significant size, it's not someone adding 10 or 20 million.

STEVE EVANS

And are these both existing and new investors you're seeing?

BRAD ADDERLEY

In some cases, I don't know, actually, if they're new or not, but I just look at the long list of investors and to be honest, if someone's willing to put in a large portion of funds, with commitments for future funds, that's a good sign.

BOB FORNESS

To your point earlier about order, to go back to KRW in 2005, there was a lot of pressure on companies to publish loss estimates very early. Once time passed the revisions started, always upward, becoming embarrassing for some. More than a decade later we now have HIM. Companies are taking their time to assess their losses and provide better numbers. Avoiding the race to give estimates, relying on better systems, and applying more discipline will improve confidence among investors in the market.

JOHN WILLIAMS

It's market knowledge that some of the reinsurance claims are being paid within half an hour. There's a rush to see who can be the first payer. But I think the uncertainty issue about the size of actual losses, and we've only mentioned three losses here, there are several other potential losses which are unusual. Hurricanes in the East Atlantic hitting Ireland. The California wildfires are going to be large losses. They're in different types of programmes. Puerto Rico is an interesting loss, where Lloyd's will have a disproportionately large share through the binders and delegated authorities that they issue, it's also an international loss and a U.S. loss, so a large Spanish insurer for instance has got a big exposure.

So, it's going to be a while before we see the outcome. Because these are big losses, and it takes a long time to come out with the right number.

STEVE EVANS

And they're complex losses to deal with, as well?

JOHN WILLIAMS

Well Harvey is particularly complex, so I think it's good that people aren't rushing to come to a number, but it's probably going to be larger than people originally thought. And the disparity you see in the modelling agencies, on Maria from AIR comparative to the other modelling agencies, just shows you that none of these models are definitive, shall we say.

Which comes back to the point about ILS, parametric, when you're writing this stuff, did you model it correctly? And probably the answer is, there is no model that is correct, it's just a question of what is the margin of error around the size of loss, the strength of the event, and the distribution of those losses.

BOB FORNESS

How accurate your predictions and realistic disaster scenarios prove to be and how investors react will determine your true results. So, it's not a single model issue, it's your reputation in terms of what you told investors to expect and what you delivered.

JOHN WILLIAMS

I think that's a very good point. We believe that this is not a huge capital event for the industry. But it is a reputational event, especially for new established managers, who would have told their realistic disaster scenarios to their investors, and other companies that may have been writing more property business than they did in the last large losses that we had. Are their estimates of their realistic disaster scenarios to investors, within the range that they said they would be?

So, we might see a shift in new capital coming in, from maybe one manager to another, and that's whether it be a traditional manager or traditional capital or ILS capital, so I think that's one of the most interesting things of the market shifts.

STEVE EVANS

The trapped collateral issue is one that's been in the headlines a lot recently. Is it as big an issue as people are making out? Is 1/1 going to be difficult as a result, or are we just going to see everybody going out to borrow money from the banks to cover what's trapped?

TIM TETLOW

I think the banks will only get involved to a certain point. So, the question is, how confident can the bank be that they are releasing trapped capital that has no chance of being hit from reserve development? There are a few banks that provide Funds at Lloyd's and their methodology seems to be predicated around the capital models that are validated and signed off by Lloyd's. So, the question is, will those banks have a framework that they are happy with to think about this different risk? In order to say, 'I think there's no chance of a loss.'

BRAD ADDERLEY

It's interesting. The fact that it's trapped means there's no certainty whether it's going to be a claim or not, or increase in reserves. So, that by its natural analysis means that, how can I lend against it? Or how can I release it? Because I, my cedent, don't even know if this is going to be a claim.

So, yes, I'm being conservative. I think that the amount of times we see as lawyers, talking about roll-overs and trapped collateral, and who takes a hit, is it the cedent who's willing to keep the investor happy so the investor will stay with them? Talking about whether investors will move around or not, or is it the investor who is going to take the hit? I have a feeling this year you're going to see more people saying, 'The investor is going to take the hit', just because there is so much uncertainty. Whether it's the reserving, modelling, what the claims is, the complexity of the loss, things that we don't get involved in.

So, I do think there is going to be a trapped collateral issue, and I'll be interested to see what people come up with, as the new revised documents, this year, for new investors, to try and make sure they adequately protect it the following year. Especially if a cedent sees more capital coming in, they're going to say, 'Well, I can hold onto this money from someone else, because I've already got more capital coming in, so I don't necessarily have to keep them as happy as before,' shall we say.

BOB FORNESS

And what's the duration of the trapped collateral? How short-tail will some of these exposures be. There are difficult potential issues in terms of windstorm and flood claims, the amount of collateral that is appropriate to maintain, and how long it will take for some claims to be paid out. There's still claims being paid on catastrophes that go back many years.

Bob Forness – **There's still claims being paid on catastrophes that go back many years**

PATRICK GONNELLI

I think it has to be broken down by market segment. On the retro side where there are only a handful of markets that trade in large limits, that could create some issues because they are going to have to go out and raise money to reload. Trapped collateral or lack of capital on the retro side, will play out in the coming months. I could possibly see less capital being available at 1/1 on the UNL retro side. On the reinsurance side, it's a broader market with more players, and I think that market will function smoother at 1/1.

JOHN WILLIAMS

So, we are in the business of providing relief for trapped collateral, we've already had enquiries, so it is going to happen. There is a worry out there. I think our view is, generally it is not a capital event for the entire investor community because a lot of them are very large financial institutions, allocating a very small amount of their available capital to managers in the catastrophe reinsurance space. What it is, it's going to be a manager driven issue, where managers won't have the capacity to be able to fill the market.

And going back to that realistic disaster scenario, those guys will be driven to try and come up with solutions for their own businesses. And other than that, the investors will sit back and say, 'Find me a solution else you're not going to get paid.' So, you've got to look at it as an economic issue, how the market has to come up with some solutions for the trapped capital, that is going to be trapped and it can be trapped for multiple years. It's going to be very interesting.

BRAD ADDERLEY

If you think of roll-over, or released capital, might not be in until three weeks into January, it could now be three months, and I think that's a big difference. The question I have now is, were people buying less protection over the last seven years because there's been no claims, no losses, were they getting complacent? And do we now expect as a group, to see substantially more retro cover or more reinsurance or more protection, because everyone has woken up a bit and said, 'You know what, we talked about it happening, but it's a bit different when you do get smacked in the face.' I told you I was going to smack you, I did smack you, therefore I'm going to buy the headgear now.

TOM JOHANSMEYER

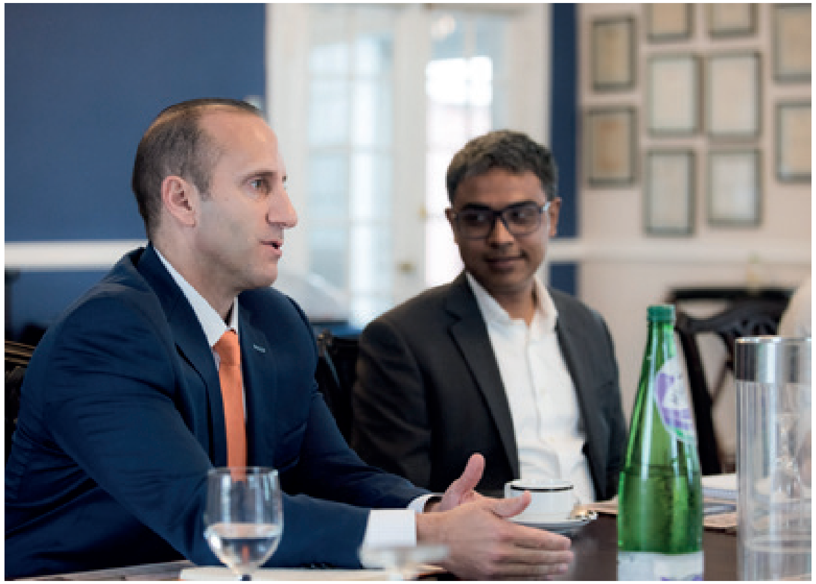
Look at the erosion of capital after the financial crisis. That was probably a more severe reduction of capital than just cat events, right? You looked at what a lot of capital these companies had on their books, significant declines due to asset value, not to mention some storms and so forth. And, nobody really changed their behaviour because we're having that conversation.

STEVE EVANS

So, you've got a lot of capital that is going to be trapped, and people out trying to replace that for 1/1. Usually when they trap capital for reserves they end up releasing some of it, which flows back into the funds. Do we see the ILS market as much bigger by the June renewals as a result?

TIM TETLOW

We debated whether it should be June or January, and I thought, I would like to say June. And June because in the 2005 events and rate response activity was instructive. We saw rates go up obviously straight after the events. Then at 1/1/2006 they went up again, and our thinking at AXIS where I was at the time, was that they hadn't gone up enough. We had made our own estimates of the impact of catastrophe model change and rating agency response on capital charges and the market seemed to be underestimating its supply-demand function. We kept money on the side, and then rates went up even more in June.



So, then the question is 'What happens here?' Are we going to get a flood of money coming back before June from very short-term trapped capital, because of the cascading drops in the trapped capital tables and the timing of the events, or not? And I don't know. It also critically depends on reserve development patterns for underlying insureds.

BOB FORNESS

And then the question is for those choosing to reload, both traditional and alternative investors, and those now coming in off the sidelines, where will they allocate capital? Is this a 2004 to 2005 question? Should you expect there to be more storms in 2018? Are you a new capital investor looking at a second and third loss vehicle because pricing in the retro market will change? Or, do you go in and you reload on a traditional basis, and go for spread and diversification? It will be interesting to see how new money inflows will respond.

STEVE EVANS

It would be interesting to hear your thoughts on the ILW market, where a lot of capacity is likely going to payout as a result of recent events. Are these events enough to scare people into realising they need to hedge more intelligently? And can that help the ILW market, and maybe even parametrics?

PATRICK GONNELLI

If traditional ultimate net loss (UNL) retro gets too expensive, then people will blend in more ILW products in traditional and bond form. After 2004 and 2005 I saw a big increase in ILW trading because the UNL retro capacity was short in supply and it became too expensive.

Retro has been bought over the last ten or so years because it's been cheaper every year and clients buy more retro in a soft market. I think if UNL retro gets too expensive, the large companies with the bigger balance sheets will buy less. They will take more net and manage their portfolios better than they have in a soft market. PCS has done a fantastic job with the estimates so far. The initial estimates have come out a lot quicker and have been a larger percentage of what everybody perceives the ultimate loss to be.

If the final estimates from PCS are in line with the industry's perception and modelled estimate of the losses this will only continue to increase the confidence in the ILW product and further reduce the concerns around negative basis risk.

TOM JOHANSMEYER

It's interesting though, the past year we've been hearing more and more about ILW purchases, even before the events, for a variety of hedging reasons more related to soft market opportunity than the losses. So, we've had that ILW activity happening over the last year. The market's expanded pretty significantly from what I understand. Now you've got the losses so the ILW cover is in place already, unintended consequence with some good upside to it.

But does that now flow forward, and do we see a continued commitment to the ILW trade because it was already happening? Do we see it because of the retro need? It's kind of strange that we saw an uptick in that market, and then the opportunity came.

PATRICK GONNELLI

I also see continued growth for the ILW because there are more funds in the business each year. Most of the time, funds will hedge with ILWs because it is the most efficient product to buy and funds do not need to share confidential portfolio data with the competition. Some funds try and buy UNL retro, but it's not been easy for them. When considering CAT Bonds and all the billions of notional issued in PCS ILW county or state weighted form there has been tremendous growth each year for the index-based product.

Patrick Gonnelli – **I also see continued growth for the ILW because there are more funds in the business each year**

I see this type of issuance continuing because traditional UNL top layer retro will get more expensive and to get to the single digits ROL/ spread it will need to be on an index basis either in a bond or traditional form.

JOHN WILLIAMS

So, are you saying that the retro guys are the real losers in this, they're not going to get their money back if they have to put their prices up to a certain point?

PATRICK GONNELLI

They are going to experience a lot of losses, but I think their investors are prepared for these types of losses. Whether they get the increases of 20%+ that they are estimating, I think some of them will because some companies have to buy, but I think buyers in general will test the bond market and use other products to compete against the UNL retro product.

TIM TETLOW

I think it's an interesting question as to whether effectively there's become a symbiotic relationship between reinsurers and ILS managers, not necessarily the companies that sponsor the managers, but more that the reinsurers are in many cases taking in cat risk, and then moving it out the back in some way, to an ILS manager.

So, then the question is - given what's happened - if rates are going to go up, how will the reinsurers respond given that some of them control the distribution flow or cat risk to the ILS capital? Do they sit there and go, 'Ok, is now the time to go large and increase our net position at the expense of the ILS guys? Or not?' I think this would really be a function of the rate level response but generally unlikely for this series of events due to the resiliency issues discussed earlier.

STEVE EVANS

Or do the ILS guys decide that this is the time to show how efficient their capacity is, and squeeze out traditional players? Or does that completely dampen any rate rises?

BOB FORNESS

There are carriers who've had a significant loss, but now plan to allocate more capital to those lines and take advantage of the pricing that's going to change. They may allocate half again the capital they had at risk with an intention of recovering from their loss over two or three years. Capital will come from other lines. This will be part of their plan as it has been before. Each storm being different, there will be opportunities.

There will be companies in need of capital in Texas and Florida. Which ones were hit hard? Will others be looking to grow as others withdraw capacity? Will this be an area for ILS investors to capitalize on? This exposure will be more concentrated. Will they pick up more primary exposure than expected?

BRAD ADDERLEY

My question is, whatever the rate increase or hard market, or whatever is going to happen, is it actually going to cover the losses that have occurred? Because we always hear, 'I can't wait for the next hard market, and it's going to be wonderful,' and so on, and I always question that the amount of money coming back in and the amount of rate increases being potentially so small, if you've lost $100 million and there's no investment return, really, are the rates going to go up enough to cover what you lost, so actually did it pay off? Or, is it actually better to have no losses, everyone moans about how bad the pricing is, but carry on?

Because we keep on hearing the same question that, 'Oh I want a hard market,' and I would be curious if someone said after a hard market, if you lost half a billion, did you actually make half a billion dollars back and make money? Because if you didn't, why would you want a hard market?

TOM JOHANSMEYER

Hard market, I don't even know if it's a relevant term anymore. You look at any of the rate-on-line charts that the big brokers publish, and you see the spike after 1992, and the spike gets smaller after 2000, and now it's just basically to the point where you're not seeing the spikes anymore. There's enough capital out there, people are managing it better than they ever have been, so it's easier for the industry to absorb major events like this, which means the post-event strike isn't going to come. And when you lose, it's going to take you that much longer to make it back.

Tom Johansmeyer – **Hard market, I don't even know if it's a relevant term anymore**

TIM TETLOW

From my side, for a long time you sit and think about the hard market, and once I became an ILS manager and I started to think about $27 or so trillion in the top 13 pension economies, and that size versus the size of our reinsurance market, it's just huge. They just need to turn the allocation dial on a little bit and ILS would be flooded. To me, it's actually becoming a much more efficient market now because of the depth of the capital pool.

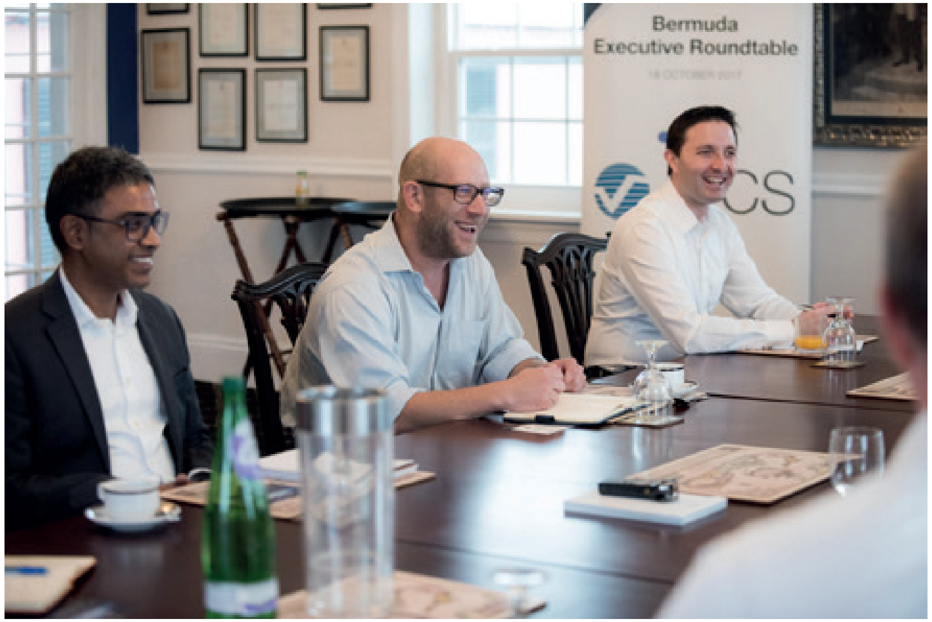
STEVE EVANS

With such a deep pool of capital do you think we're getting to a stage where losses can only affect rates in the directly impacted lines, or will we still see market-wide hardening events?

ARI CHATTERJEE

Cyber reinsurance market is witnessing some hardening due to the recent natural catastrophe events. We saw a few important cyber reinsurance markets unwilling to support unfavourable terms citing the recent hurricane events.

Cyber is a perfect diversifier to natural catastrophe reinsurance. It seems from what was reported by Artemis and PCS that the Equifax and Merck losses may result in a total loss to their cyber insurance towers. This is significant since the two losses together results in a 10% loss ratio for the entire cyber insurance market. Volatility of results is a key factor to consider for any cyber reinsurer.



TOM JOHANSMEYER

We're coming in at $275 million on Merck, which blew through the top of the tower, like Equifax. We've seen three losses through PCS Global Cyber this year: Southwest, Equifax and Merck, and together that's almost $500 million. Which, $500 million in cyber, how is that relative to the HIM losses in property cat? It's probably disproportionality large.

JOHN WILLIAMS

But doesn't that come back to the private market and the provision of limits, and new premiums. So, it goes to cyber, it goes to flood, which is the biggest peril in the world, and it's not covered, properly. Talking about those 'perfect' markets, there's all that money sitting out there that will insure flood, will insure earthquake, but earthquake penetration in California is woefully low at the individual consumer level. There's an enormous amount of business that can be generated in order to feed this capital.

BOB FORNESS

We focus on other lines of business, developing cat bond-like structures. For ILS investors, these represent an alternative. Right now, it's gone quiet for a few weeks as everyone is trying to focus on their losses in the cat space and collateral issues. Our view is these events will require a reassessment by investors. While they will continue to build their appetite for catastrophe risk, they will also explore other risk classes.

Some of what we offer in terms of casualty-linked investments will generate more interest, with less volatile, more predictable, attractive returns. Duration and exit options will require creative thinking. However, these alternatives will represent meaningful diversification.

TOM JOHANSMEYER

The reality is, we talk about all this money that's out there to cure it, and we talk about all this risk that's out there uninsured, why isn't it matching? Because someone is saying there's no way to write that risk reliably, in a way where a consumer will buy it? I don't know that I buy that, I think there's no way to write that risk the way we've been writing risk for hundreds of years.

STEVE EVANS

And then, we see people throw perils into catastrophe contracts which are non-modelled and not understood.

ARI CHATTERJEE

Models are key to bringing discipline in underwriting. Fortunately for cyber, there are a few interesting models emerging that may improve the transparency and enable better structuring and pricing of cyber reinsurance. In my opinion, cyber can be modelled more accurately than natural catastrophe since the data on key parameters surrounding the peril and the corresponding exposure can be observed and collected at near real-time which is difficult in many other perils. Beyond models, PCS introducing cyber loss index is a massive progress in the right direction to enable better transparency in the market.

STEVE EVANS

And what about things like the hours clause? Could anything like that come back to bite underwriters after recent events and result in some risk commensurate price increases rather than payback price increases?

BOB FORNESS

Harvey has the most exposure to the hours clause question given the duration and path of the storm the causes of loss. There will be legal avenues pursued in terms of coverage.

JOHN WILLIAMS

We've talked about the U.S. a lot, but also, they've had two wildfire events in Europe, and another storm event, too. So, it's not looking good anywhere really.

TOM JOHANSMEYER

They've had some big hail in Turkey this summer, and they don't really have hail there. We saw $300 million in hail losses in Istanbul, within a week. It was a small event, so one event was like 10-15% of the total for the two, and the other was massive, but the second hail storm I think had almost 900 million Lira, most of it auto.

BOB FORNESS

And for auto it is a tough question because the storms were different. Florida was really an evacuation event as many cars were driven away. In Harvey, far more cars were damaged or destroyed by floods. Insurers with both homeowners and auto will add up their losses. Some companies will have more exposure than they anticipated. And, so, where you see the normal aggregation of homeowners and auto but for a small number of companies there will be some severely impacted.

TOM JOHANSMEYER

It's curious on Harvey with the personal lines, too. Because our preliminary number was combined APD [auto physical damage] and residential. But what I'm curious about is as the loss develops, how much more development are you going to see on the cars. Flooding a car on a comprehensive is pretty easy to understand.

BRAD ADDERLEY

I'm guessing the real issue now is what's going to happen next year. It wasn't just these events, people had a couple of losses the year before that started to pile up. So, we are saying what's happened now is not a capital event, even though there's been lots of different events, I just wonder if the first six months of next year bring some medium losses, and you started piling that on top of each other, do people start to suffocate?

Brad Adderley – **I'm guessing the real issue now is what's going to happen next year**

STEVE EVANS

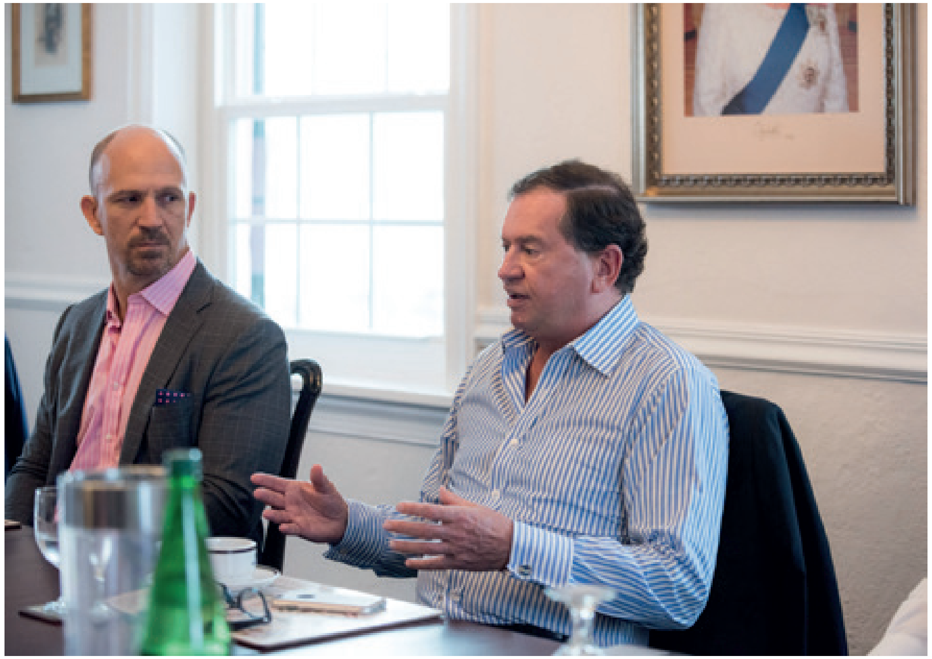
Ari, you briefly mentioned the cyber market, is this an area that you expect to see new business opportunities for ILS players in the coming months? And what thoughts do others in the room have about cyber and ILS?

ARI CHATTERJEE

Cyber can be interesting to ILS investors. Cyber as a peril has temporary correlation with the stock market which can be in-line with the natural catastrophe. Recent studies from Harvard Business Review and Ponemon institute exhibits that the effects of cyber-attack on stock markets are temporary. On an average, the companies could revive their stock values within seven days when they quickly responded to the incident and reflected on their superior security posture.

TIM TETLOW

For any of the companies that you've mentioned, have there been any filed D&O claims against the company, alleging that the Board were not performing their duties appropriately? We've seen one very interesting case in my opinion though, with Yahoo-Verizon. Their deal to combine had a re-negotiated price ultimately $350 million lower because of Yahoo's acknowledgement that there had been two very large breach events. I would think this a very tight case to look at as the quantum of damages is quite large and quite clearly defined often an issues in thinking about D&O claims.



ALEX MICAN

Yes, but I would argue that's just one single event, because it was exactly in the process of the company being bought. I've done some analysis on this, and for all the events that I've studied, I haven't seen anything that was related to a loss that would affect the aftermath of a breach event.

TIM TETLOW

But part of what we need to contextualise though is the size of insured cyber loss relative to the size of the company, and quite honestly, the limits purchased are tiny for many companies.

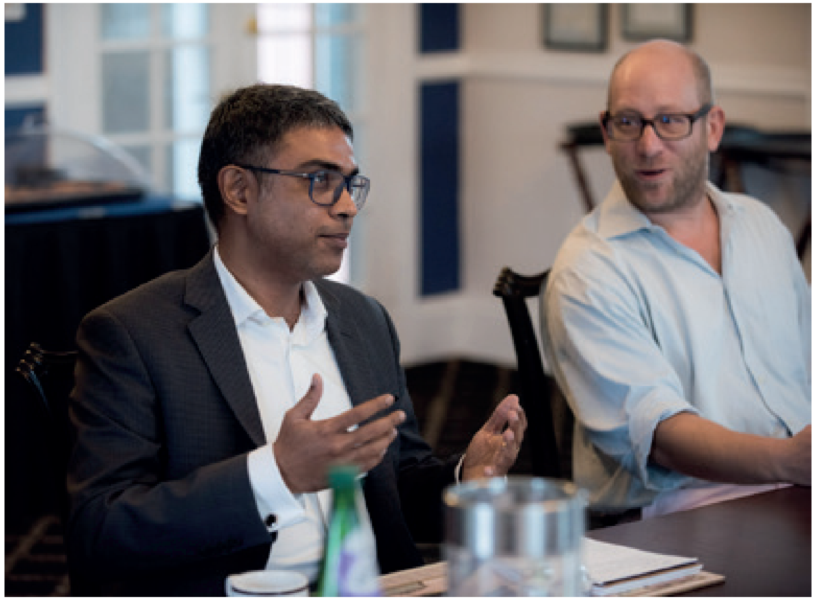
ALEX MICAN

Target and Home Depot actually put out, in their quarterly reviews, numbers with respect to the loss events. And aggregation, I think, for Home Depot in their annual reports, over the duration of one year and three months, was $290 million, while Target was $310 million over two years and two months. I do believe it to be direct expense costs and also, they were showing losses for earning per share, compared to what they and the market expected.

The public is getting comfortable with a breach, the reaction to a breach now compared to four years ago, let's say, people care less and move past it faster.

TOM JOHANSMEYER

People have been living in hurricane zones for years and they're comfortable with it, I guess this is just the natural flow of taking on risk personally.



STEVE EVANS

With the recent breaches, this is where reputational damage is the intangible, unmeasurable, but actually huge opportunity for someone to create hedges for, it's almost parametric in nature.

BOB FORNESS

We are heavy business email users so we're biased. The behaviour of typical consumers receiving scam emails and listening to news reports about hacking are making them immune. How do they respond to something they are unable to control?

ALEX MICAN

Think of the Equifax breach, the solution that they offered was to freeze your credit score for the rest of your life, as an option to the ones that were affected. How many of them do freeze and unfreeze their credit because they want to get a loan or a credit card or anything related to that? I'm not going to be bothered with that, and we are talking about 145 million people, which is basically half the population of the U.S.

ARI CHATTERJEE

Certain data types are far more valuable for the black market than others. For example, Social Security Numbers can be more valuable due to its permanency than credit card numbers. The attacker may decide to liquidate it slowly. Cyber like other anthropogenic perils is driven by profit motives whether monetary or propaganda-of-the-deed. Each successful attack often affects the near-term future attacks thus creating a nebula of temporally correlated events.

If social security numbers are stolen in a recent attack, the supply of such data increases thus reducing the prices on the black market. This may change the profit expectations of the attacker who may not be incentivized by such data. Similarly, a new successful malware often results in a wave of attacks reusing the underlying code.

ALEX MICAN

And I would add an interesting argument, think of that fact that as human nature we tend to use our personal data for passwords. The probability of using our personal data or some combination of it for passwords in the next two years, and the ability of a hacker to gain access into your corporate account or related to it, is major, basically.

STEVE EVANS

Finally, what growth areas do people see for the ILS space?

PATRICK GONNELLI

I see a couple of growth areas. One within the cat space, being some of the work that Global Parametrics is doing in underdeveloped nations. I think over time that has a lot of potential to grow in the ILS and traditional reinsurance market. The second one is the weather market. The weather market died off after the financial crisis, but now we're starting to see some more positive movements. More funds want to invest because of the non-correlation benefit and the market has had established models to analyse the risk for some time. As a hedge, it has a huge application across many industries around the globe.

TOM JOHANSMEYER

Not PD/BI[physical damage and business interruption]. If you've got weather thrown in with other factors, that for me would be the holy grail for insurance, and solve the real corporate problem. Weather, man-made stuff, human behaviour events, and so on.

JOHN WILLIAMS

Additional product for investors in insurance in ILS has got to be uncorrelated from what they're already involved in. So, you just talked about correlation between E&O and potentially cyber, and casualty, and different products. So, the industry has to come up with products which they can definitively say is not correlating with whatever else you may have.

BOB FORNESS

And, so, we need to compare products on a return, frequency, severity and duration basis. Does an investor only want a non-correlated investment or do they also want to manage float assets? The better we understand their needs the better we can deliver insurance-linked investment products for them.

JOHN WILLIAMS

The industry needs to come up with, as we get more sophisticated, different types of product that can be delivered to investors, and they can actually see what the risk is. Of course, the whole thing about insurance and reinsurance is using the fungibility of risk and making it all as complicated as possible so nobody actually knows how you're pricing it.

ARI CHATTERJEE

There is a tremendous opportunity for the insurers to be explored on emerging technology space, for example, Internet of Things, crypto-currencies, blockchain, industry 4.0. The pace at which the emerging technologies are growing it may be difficult for only a handful of insurance balance sheets to support the growth.

John Williams – **The industry needs to come up with, as we get more sophisticated, different types of product that can be delivered to investors**