DO CATASTROPHE BONDS STRENGTHEN OR WEAKEN THE REINSURANCE MARKETPLACE?

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Abstract

A limitation of insurers' ability to underwrite risks was their limited capacity to absorb extremely large claims, mainly from natural catastrophes. Alternative ways of financing these huge risks were introduced in the 1990s by tapping into the capital markets, using bond instruments. These became known as catastrophe (cat) bonds. This paper describes their history and operation. Their strengths and weaknesses are then reviewed, followed by an assessment of their future. Finally, an answer is suggested to the question posed by the title of this paper.

บทคัดย่อ

ข้อจำกัดของความสามารถของผู้รับประกันภัยในการพิจารณาความเสี่ยง คือความสามารถที่จำกัดในการรับปริมาณการจ่ายค่าสินไหมเป็นจำนวนมาก ซึ่งส่วนใหญ่เกิดจากมหันตภัยทางธรรมชาติ ในปี พ.ศ. 2533 มีการแนะนำทางเลือกของการจัดการความเสี่ยงสูงเช่นนี้ โดยใช้ตลาดสังหาริมทรัพย์โดยใช้พันธบัตรเป็นเครื่องมือ ซึ่งเป็นที่รู้จักกันว่าพันธบัตรหายนภัย งานวิจัยนี้อธิบายประวัติและการจัดการโดยมีการทบทวนจุดแข็งและจุดอ่อน ตามด้วยการประเมินภาพอนาคต และในตอนท้าย มีการตอบคำถามที่กำหนดในหัวข้องานวิจัย

INTRODUCTION

Capital markets have been at the forefront of innovation in the reinsurance marketplace in the last decade. They have developed various instruments that allow reinsurers to efficiently manage and transfer risk (Punter, 2000). This paper reviews the mechanics of non-life catastrophe bonds, one of a range of Insurance Linked Securities (ILS), and evaluates their importance and impact with the purpose of determining whether they strengthen or weaken the reinsurance industry.

Catastrophe bonds serve as an additional method of risk transfer, available to sponsors who wish to cede insurance risk to an investor base that is showing increasing appetite for this asset class. The use of catastrophe bonds has increased as they have promoted

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transparency, innovation and risk transfer to investors who have brought capacity to an industry which has been volatile in recent years due to a number of large natural catastrophes.

In general, catastrophe bonds have received relatively little press or academic attention. Until recently, most research in this area was not formally published, with reinsurance companies tending to keep their strategy and utilisation in this area private. The same is true for the investors in this asset class. The author has thoroughly researched this topic by reading industry reports, news sources, broker publications, banking presentations, press releases, consultancy papers and reinsurance reports.

This dissertation is now split into three main sections. The next section reviews the background of the catastrophe bond market and explains how these instruments came about and operate. This is necessary as the product needs to be understood before its relative strengths and weaknesses can be assessed in the following section which is the main body of the text. It reviews the catastrophe bond market and product in detail, addressing all areas, which will assist in answering the question raised by the title of this dissertation. Then, the next section addresses considerations around the future growth of this sector, which is particularly important given the relative infancy of this market. Lastly, the dissertation concludes with an assessment of whether catastrophe bonds strengthen or weaken the reinsurance market place.

BACKGROUND AND MECHANICS OF CATASTROPHE BONDS

Background of Catastrophe Bonds

In 1992, Hurricane Andrew, a category 5 storm, caused $17bn of insured loss in Florida (Insider Quarterly, 2011). The industry loss was more than twice that which was expected by insurance risk managers, and ultimately several insurers were forced to file for bankruptcy. Insurers and reinsurers were unwilling to offer the same level of coverage in fear of a repeat event. With capacity constrained in the traditional reinsurance markets, the securitisation of insurance risks was developed to respond to the increased demand. Insurance Linked Securities, specifically catastrophe bonds, emerged as an alternative source of capacity for the industry and also as a diversifying non-correlating asset for investors (Dickinson, 2000).

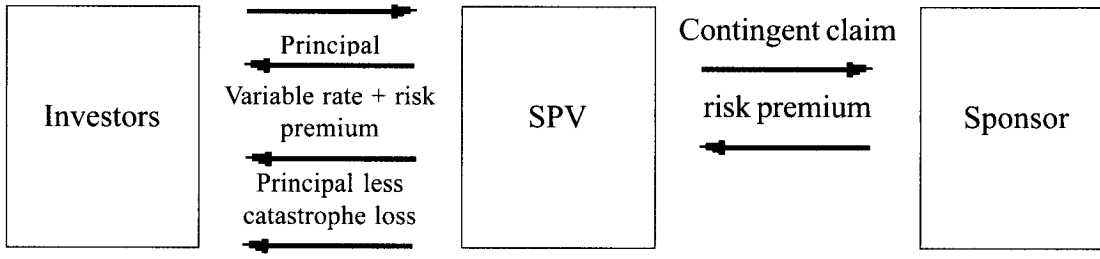
Since the early 1990s, the catastrophe bond market has undergone considerable growth, spurred on one hand by an insurance industry looking for greater capital relief, and on the other hand by investors attracted to assets offering low correlation to traditional asset classes.

Catastrophe Bond Mechanics

Catastrophe bond notes are issued by a special purpose vehicle (SPV), sponsored by the insurer. The SPV is a legally independent entity that is set up for the sole purpose of

arranging the catastrophe bond transaction. The SPV is used to transfer the proceeds of the issuance from investors and invest it in high quality, liquid securities. The diagram below illustrates the risk transfer mechanism of a catastrophe bond. (Figure 1)

Figure 1: The Risk Transfer Mechanism of a Catastrophe Bond



At the outset, investors in the bonds lodge their principal with the SPV which acts as the trustee for the transaction. The sponsor in return will pay a pre-defined coupon to investors via the SPV on a regular basis, usually annually. In the event of a catastrophe the sponsor can recover the funds from the SPV if a qualifying triggering event occurs. If during the period of the issuance there is no qualifying event, the principal is returned to investors in addition to the coupon payments which they have already received.

The set-up of the SPV serves several purposes. The use of an SPV mitigates the credit risk in the transaction, as neither the party seeking insurance cover nor the party providing it needs to worry about either counterparty becoming insolvent. This differs from a swap arrangement where the protection buyer may bear substantial counterparty risk. If the catastrophe bond is triggered, the SPV will distribute the bond principal to the sponsor. It also helps to isolate specific catastrophe-specific risks from the sponsor's portfolio.

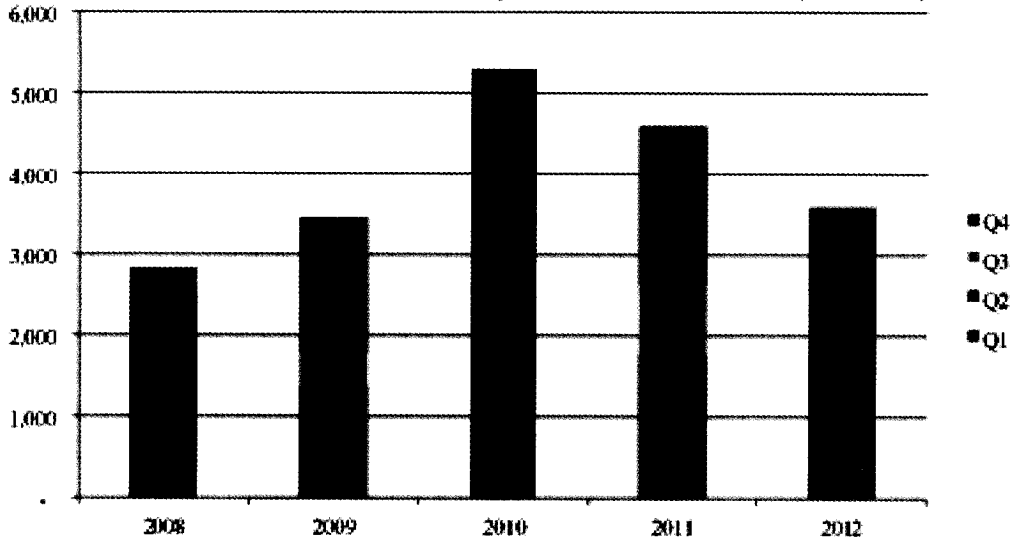
A REVIEW OF STRENGHTS AND WEAKNESSES OF CATASTROPHE BONDS

This section will review some of the statistics about the current state of the catastrophe bond market and its impact on the reinsurance market. It will analyse product strengths and weaknesses from the viewpoint of both sponsors and investors. The analysis will also address potential barriers to growth in this sector.

Market Activity

Despite above-average natural catastrophe activity, 2011 ended with $4.4bn of new catastrophe bond capacity. 2012 got off to a strong start with over $3.5bn in new issuances in the first half alone. With outstanding risk capital of more than $14.9bn at 30th June 2012 (Aon Benfield, 2012), catastrophe ('cat') bonds increasingly represent a viable alternative to traditional reinsurance for some companies. (Figure 2)

Figure 2: Cat Bond Issuance by Quarter, 2008-2012 (USD mn)



Source: Aon Benfield, 2012

The European Insurance and Occupational Pensions Authority (EIOPA) recently noted that the increased volume of catastrophe bond issuance is astonishing, given that three catastrophe bonds were total losses. 2011 saw the largest amount of losses in catastrophe bond market history. The catastrophe bond market not only kept functioning but actually increased in activity which is testament not only to the market participants but also to the need for reinsurance capacity that the catastrophe bond market provides (Artemis, 2012e).

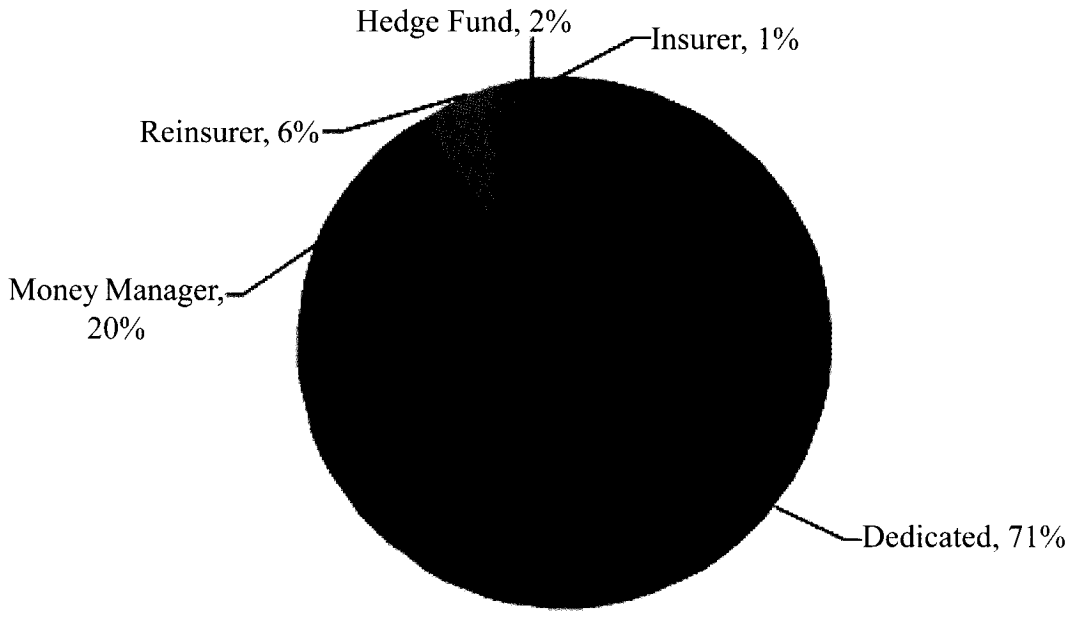
Market Participants

Before the introduction of catastrophe bonds, the stock market was the primary channel by which insurance risk was transferred to the capital markets. By purchasing stock, investors are able to indirectly acquire insurance risk and become the ultimate risk bearers of the risk insured. This method of investing exposes investors to an entire portfolio of risks assumed by the insurer as well as other company-specific risks. Cat bonds allow investors to participate directly in specific, well-defined insurance related risks without having the investment diluted by the business risk of the company or any systemic risk.

Dedicated fund managers remain the core of the catastrophe bond investor base, providing stable capacity to sponsors. These funds continue to raise capital, especially from large pension funds. During the Eurozone sovereign debt crisis, US life insurance companies, global pension funds and global money managers have shown increased interest in the catastrophe bond market. (Figure 3)

A recent report from PricewaterhouseCoopers found that some Sovereign Wealth Funds are considering increasing their exposure to insurance risk through investments in Insurance Linked Securities. Given the size and scale of some Sovereign Wealth Funds, these

Figure 3: 2010-2011 Investor Base by Type



Source: Swiss Re, 2012

could be a major source of capital to the catastrophe bond market (Pricewaterhousecooper, 2011).

Pension funds are increasingly viewing catastrophe bonds, which are largely insulated from financial market downturns, as a good way of counterbalancing their exposure to the stock and bond markets which have seen much volatility since the 2008 financial crisis. These funds are also enticed to the class by the yields available which have risen due to recent natural catastrophes. Typical catastrophe bonds yields of 5% to 7% are well above the low single-digit returns typically available on government bonds or corporate debt. This is analysed in detail later.

The BBC Pension Trust recently gave a 76mn mandate to Nephila, an ILS fund, to manage, some of which will be invested in catastrophe bonds (Artemis, 2011a). It is expected that this trend will continue as pension funds and other asset managers educate themselves on this asset class and understand the benefits that it could bring to their investment portfolios.

Once investors have identified the best assets within the cat bond universe, the daunting task still remains of sourcing them. Catastrophe bonds are traded on the secondary market, although it should be noted that bid-ask spreads are often wide with limited availability, particularly for more popular issuances. Nevertheless, this is an important market as it allows investors to rebalance portfolios and realise gains and losses without holding issuances till maturity.

An Uncorrelated Investment Class

Catastrophe bonds offer diversification to investors, and if properly structured, can offer attractive risk-adjusted returns that are largely uncorrelated from the traditional markets. This is largely due to their main driver, extreme natural catastrophes, which by their definition, bear no correlation to any macroeconomic or financial event.

Investors are attracted to the sector because of the historical risk-return profile offered by catastrophe bonds which have offered returns comparable to high-yield bonds, while showing volatility similar to high-grade bonds. According to Swiss Re data, since 2002 (Swiss Re, 2012), catastrophe bonds have been approximately twice less volatile than AAA rated corporate bonds, three times less volatile than high-yield bonds, and five times less volatile than stocks, all the while producing a greater return, as the Table below highlights (Figure 4).

Figure 4: Catastrophe Bond Relative Risks and Returns, 2002-2011

	Swiss Re Cat Bond Total Return Index	**Barclays BB High Yield Bond Index**	**S&P 500 Index**	**Barclays AAA Corporate Index**
Average Annual Return	8.13%	8.17%	-1.06%	5.80%
Annual Volatility	2.75%	8.93%	16.04%	6.33%
Sharpe Ratio	2.23	0.69	-0.19	0.60

Source: Swiss Re, 2012

The pension fund of Barclays is rumoured to be looking to invest in catastrophe bonds, as their Chief Investment Officer, Tony Broccardo, recently stated at a hedge fund conference that "these instruments are truly uncorrelated", referring to how little prices in the industry are linked to traditional equity or bond markets (Reuters, 2012).

Competing / Complementing Traditional Reinsurance

Catastrophe bonds as part of an overall risk transfer strategy can give sponsors leverage in getting better pricing from traditional reinsurers. Chi Hum, Global head of ILS distribution at GC Securities, recently commented: "Cat bond components in issuers' risk transfer programs can provide leverage in seeking better pricing from reinsurers. Other characteristics that issuers are finding attractive are that cat bonds are fully collateralised and that multiyear cat bond programs can stabilise risk transfer pricing" (Investment News, 2012).

A recent test for the catastrophe bond market was the renewal of Zenkoyren's Muteki transaction which suffered a full loss of principal after the Tohoku earthquake in March 2011. Despite the total losses that investors suffered the price increase was only 20% higher than the expiring issuance. This is a positive development for the catastrophe bond market with pricing decoupling from traditional reinsurance market where rate increases were much higher.

The largest single catastrophe bond issuance was sponsored by Citizens Property Insurance in June 2012 with $750m in notional limit placed. Citizens' CEO, Barry Gilway, claimed that the catastrophe bond placement saved as much as $18m in comparison to the options available in the traditional reinsurance market (Artemis, 2012i). This is a great example of a sponsor using the catastrophe bond market to complement their traditional reinsurance programme, with quantifiable cost savings.

It should be noted that some market participants have also voiced their concerns regarding market pricing and the costs of issuance. Mark van Zanden, Head of Outward Reinsurance at Catlin, recently commented that even though the catastrophe bond market has become more competitive recently, it was still only trading roughly in line with traditional reinsurance prices. Meanwhile potential sponsors have cheaper and quicker options to source protection from capital markets than going through the process of a public catastrophe bond issuance (Trading Risk, 2011).

Transaction Costs / Issuance Size

One of the main advantages of a catastrophe bond is the relatively large limit of cover that can be purchased, coupled with the ability to fix pricing throughout the life of the issuance. Catastrophe bond issuances are often in the range of $150m-$500m in notional limit, making a large placement possible due to the availability of capital from investors in these products. In comparison, it may be difficult to place a comparable amount of peak peril cover in the reinsurance market due to the relative tight supply from market participants.

Transaction costs and lead-in time are important issues when considering catastrophe bonds as a form of a risk transfer solution. Such disclosure can be hugely complex for the sponsor. The process usually involves a significant amount of internal and management resource as well as third parties such as investment banks, lawyers and rating agencies. These costs vary from transaction to transaction but can be significant, often running into millions of dollars for a large-scale issuance. These make small issuances, say in the region of $50m-$100m, uneconomical due to the high fixed costs.

It took the California Earthquake Authority 18 months to complete its first catastrophe bond transaction in August 2011. Their CFO, Timothy Richison, found the process challenging but worth the effort involved as the quasi-public organisation had achieved its goal of finding diversified capital with a facility that it can use for future issuances, "The intent here was if we are going to put that much time and effort into something, we wanted something that would be repeatable" (SNL Blogs, 2012a). They went on to issue their second and third series of notes shortly thereafter, taking advantage of the initial groundwork and investment after the first issuance (Artemis, 2012h).

Efforts are being made by some market facilitators to lower transaction costs and barriers to entry for issuers. Barclays Capital recently announced that they have launched a platform that aims to streamline the issuance of catastrophe bonds. The platform will

allow for transactions of any size, both smaller and larger than the $150m which Barclays Capital say is typical of cat bonds (Artemis, 2011b). The flexibility this platform offers issuers in terms of issuance size, public or private transactions and lower issuance costs should attract more interest to this asset class.

Multi-year Capacity

Unlike most of the traditional reinsurance market, the catastrophe bond market offers coverage on a multi-year basis. This allows sponsors to achieve pricing certainty for their reinsurance cover and allows forward planning by securing pricing for the entire risk period at inception.

Multi-year capacity allows sponsors to issue protection on a revolving basis. If a sponsor requires $300m in coverage from the cat bond market they may issue $100m in three-year notes each year over three years. This enables them to renew cover on a rolling basis, enabling them to make step changes to their programme as necessary. This partially shields the issuer from the volatility of the market pricing cycle and thus decreasing earnings volatility. The Swiss Re sponsored 'Successor' catastrophe bond series are a good example where ten series of notes were issued between 2006 and 2012.

Multi-year coverage can have some downside as future costs are locked in at issuance. In a softening rate environment this may lead to catastrophe bonds costing more than traditional reinsurance alternatives.

External Market Events

Following the collapse of Lehman Brothers in September 2008, the catastrophe bond market was temporarily closed as investors remained cautious with their outlook for the wider financial market.

Patrick Thiele, CEO of Partner Re, cautioned reinsurers, stating that they may be putting the security of their organisations at risk, arguing that Insurance Linked Securities such as catastrophe bonds were much more volatile than traditional reinsurance and that the market was closed for a long period during the height of the credit crunch (SNL Report, 2010).

This is an important consideration, but it should be remembered that most sponsors use these instruments to complement reinsurance and their other risk transfer strategies, instead of replacing them in their entirety.

Counterparty Credit Risk / Disputes

Catastrophe bonds remove some of the credit risk and the willingness to pay element in comparison to traditional reinsurance. Traditional reinsurance contracts can give rise to coverage and payment disputes. Catastrophe bonds are structured to avoid such disputes and to pay out promptly, minimising the loss development period. Sponsors value the fact that funds are made available quickly after a loss event. This is reassuring as

catastrophe bonds are often utilised for protecting "tail" risks, such as 1-in-100 year events, in which traditional reinsurers' balance sheets would be expected to be materially impacted.

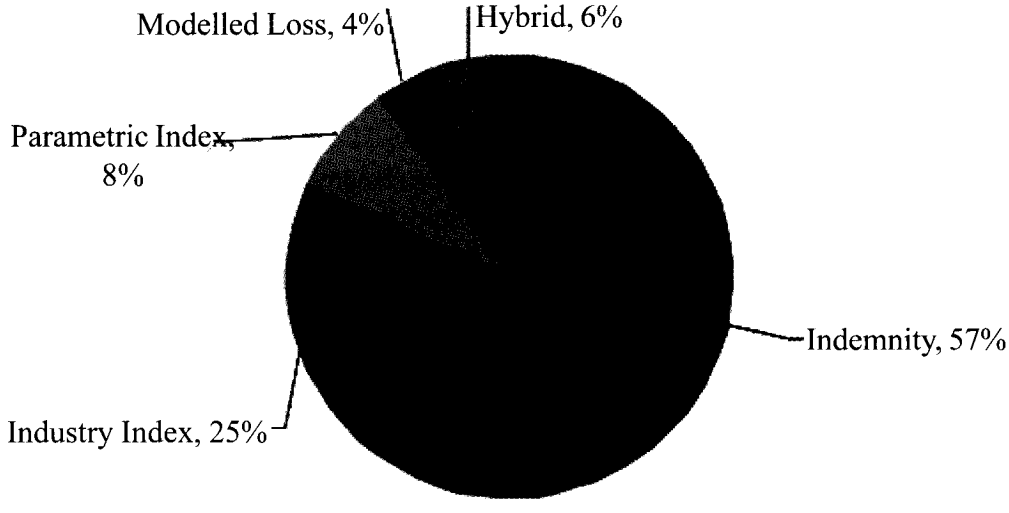
Even with appropriate due diligence, disputes may arise between the sponsor, SPV and investors. The Nelson Re catastrophe bond issuance by Glacier Re in 2008 is currently the subject of a dispute. These notes were thought to have suffered a loss following Hurricane Ike but there has been disagreement between the sponsor and the administrators of the SPV over whether any payment is due under the terms of the notes as the exact business that was intended to be covered was unclear (Artemis, 2012d). The dispute over the contracts that were covered under the agreement went to arbitration in January 2012 and no resolution has been found to date. This is a prime example of why terms and documentation for catastrophe bond transactions need to be water-tight with all eventualities considered. Had the original contract documentation specified the exact business that was covered under the transaction then this dispute may not have occurred.

Basis Risk

Catastrophe bonds are usually either issued using indemnity-based triggers which are familiar to reinsurers, or industry-index or parametric-index which are more familiar to capital market investors. Indemnity triggers are more closely linked to the underlying risk being covered in comparison to either an industry-index or parametric-index which introduce an element of basis risk, i.e. the gap between the insured loss and reinsurance recovery.

Indemnity triggers are generally more difficult to structure and place as a catastrophe bond, which is sometimes reflected in the higher cost for this type of issuance. Nevertheless, the trend in 2012 has been toward indemnity triggers which represent over half the issuances in the period. (Figure 5)

Figure 5: 2012 Catastrophe Bond Triggers



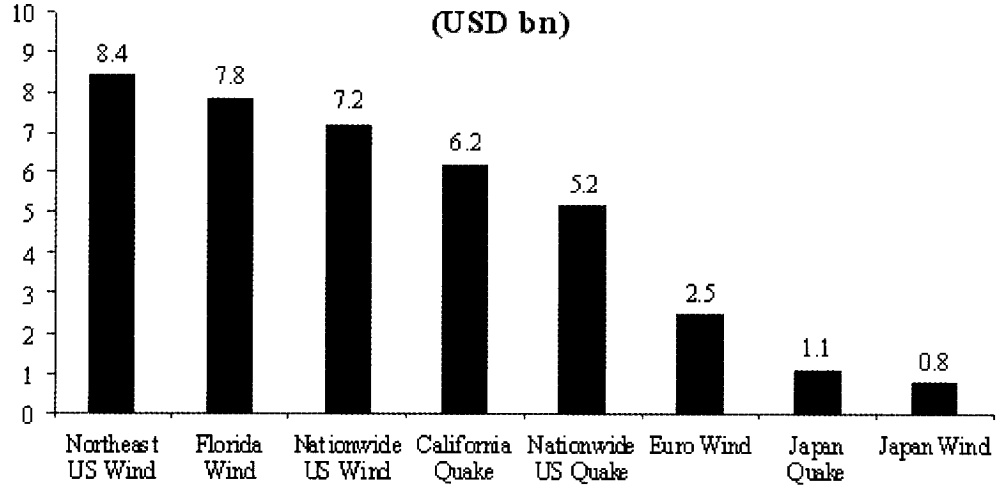
Source: Swiss Re, 2013

Sponsors should be made aware of the basis risks that underlie non-indemnity based triggers and should make efforts to truly understand the potential implications with this type of issuance.

Lack of Diversification within Issuances

Greater capital inflows into the catastrophe bond market will enable sponsors to tap the capital markets for increased capacity. The most prevalent peak peril, US windstorm, usually offers the highest spread-to-risk multiple and an opportunity for investors seeking to diversify their broader portfolios. For dedicated catastrophe bond investors, growth in non-peak perils will help balance their exposure to US windstorm and other peak perils.

Figure 6: On-Risk Capacity by Territory/Peril at 30th June 2012



Source: Willis, 2012

Diversification of territories and perils within issuances is an important consideration for investors. With the catastrophe bond market saturated with US windstorm issuances, investors have been keen to see non-peak risks to diversify their exposure to this sector.

Niraj Patel, a senior portfolio manager at Genworth Financial recently noted there are important considerations to be made before allocating more capital to this area, "There may be a large pipeline, but if every deal is Florida hurricane, for us, the pipeline really isn't there" (SNL Blogs, 2012b).

For many catastrophe bond funds, in order to achieve a well-diversified portfolio of issuances they require a constant supply of attractively structured bonds. In a recent review, Guy Carpenter noted: "While current appetite for additional US wind risk is limited, there is significant investor appetite for other peak, non-peak and diversifying perils including US earthquake, European wind and Japanese wind and earthquake perils as well as other global diversifiers" (GC Capital, 2010). These diversifying deals could lead to greater demand from investors resulting in lower coupons that would otherwise

be payable. This could lead to below-market pricing issuances available to some sponsors making this alternative risk transfer product a cost-effective solution in comparison to other risk transfer products.

Market Innovation

The market for European natural catastrophe risk has enjoyed strong growth, largely due to the development of Pan-European Risk Insurance Linked Services (PERILS). PERILS aggregates industry-wide exposure and claims data for Europe, improving the transparency of catastrophe losses. Standardised, consistent, and timely data such as that from PERILS has facilitated recent growth in European catastrophe bond issuance which now has $2.5bn in notional limit outstanding, as shown in Figure 6.

Both sponsors and investors continue to push for development in the catastrophe bond space. At a recent ILS conference, Shiv Kumar, Managing Director at Goldman Sachs, discussed the fact that unrated tranches of cat bond notes were becoming increasingly common as issuers sought cover for riskier tranches of cover (Artemis, 2012c). He noted that investors had become increasingly comfortable with this as they increased their knowledge of this asset class and the sector in general. Growth in this area could assist in growing this market as sponsors have the ability to transfer riskier layers of cover to the capital markets, which should introduce greater competition against traditional reinsurers. Ultimately, the increased competition should result in a lower cost product for the sponsor.

Innovation in the catastrophe bond market was recently highlighted with Swiss Re America sponsoring the first issuance on behalf of two separate sponsors (Artemis, 2012c). This is the first issuance where multiple reinsureds have been bundled together to issue a single catastrophe bond. This structure enables a smaller sponsor to share issuance costs as these could otherwise be prohibitive in accessing this market. From an investor perspective these niche issuances give a level of diversification that may not be otherwise available in the catastrophe bond market.

Clariden Leu, the Swiss Private bank and investment manager, issued $120m of catastrophe bond lite notes in 2012 (Trading Risks, 2012). By transforming an Industry Loss Warranty into a catastrophe bond it can become an eligible investment which they can offer to investors in their funds. They are able to transform risk to their investors that are not readily available to investors, such as third-event products. By creating these catastrophe bond lite notes they have added an additional level of diversification within their funds.

This type of innovation solves another problem for the ILS manager as it gives them an alternative investment option when the catastrophe bond sales pipeline is sluggish. Clariden Leu has been forced twice to close its main fund after receiving an influx of capital that outpaced its ability to deploy in ILS products (Artemis, 2012a), an issue which is discussed further later.

Demand and Supply Imbalances

Whilst new investors to the catastrophe bond market are welcome, this also creates a supply issue; sometimes there simply aren't enough issuances to satisfy demand. Recent months have seen some funds restricting new subscriptions due to a lack of primary catastrophe bond issuance. The Sarasin Cat Bond Fund managed by Twelve Capital closed to new investors only four months after launch with a view to reopening when new issuances came to market. In a press release they commented that they closed the fund to new subscriptions as capital inflows to the fund exceeded the supply of catastrophe bonds in the primary as well as secondary market (Artemis, 2012g). Investment manager GAM also recently announced that they were operating a waiting list for new subscriptions to their GAM Star Cat Bond fund due to capacity constraints in the sector (Artemis, 2012f).

The slowdown in new catastrophe bond issuances last year prompted an increase in private placements as frustrated investors arranged bespoke transactions with issuers. In September 2011, Tokio Marine replaced their maturing $200m public catastrophe bond with a $160m private transaction (Insurance Insider, 2011). Guy Carpenter noted in a recent publication that $172m in risk capital was placed in late 2011 via Section 4(2) private placements (Guy Carpenter, 2011). This trend, if continued, could also help to broaden the market as private transactions can allow for smaller deals to be structured which can give an opportunity for sponsors to bring uncorrelated risks to the market.

Modelling Considerations

Catastrophe bonds are dependent on robust risk models. These provide the risk analysis catastrophe modelling and are also calculation agents in the event of a possible event that would trigger a payout. By using a third party modelling vendor with no links to the sponsor, the investors can feel comfortable that an outside, independent, expert opinion on the underlying risk can be trusted.

Software changes to RMS's hurricane model almost stalled cat bond issuance in 2011 as the market came to terms with higher-than-expected loss estimations for US windstorm issuances. 2011 resulted in 16 cat bond issuances by AIR, 3 by EQECat and only 1 by RMS. The RMS model has not been used in any 2012 issuances despite their recent announcement that they will "now use the long-term rate model to produce its Reference View of risk and the medium-term rate model as a sensitivity test for insurance-linked securities offering circulars" (RMS, 2012).

Much of the recent international catastrophe loss experience has been in regions where models in these regions are considered to be underdeveloped, with a lack of natural catastrophe and insurance loss data. These include Japan, Chile, Australia, New Zealand and Thailand. As insurance penetration continues to rise in these regions, efforts to collect and acquire the data needed to support robust models should accelerate and could bring these regions to the catastrophe bonds market relatively quickly.

It should be noted that modelling results for catastrophe bonds are only indicative of the risks as they are perceived using existing technology and available data. Both sponsors and investors may never truly understand the exposures that underlie a particular structure either today or in the future. The application of new technology, transparent and robust contract language, innovative structure and design should enable investors to get comfortable enough to buy into new catastrophe bond transactions.

External Factors

There are a number of external factors that could derail growth in the catastrophe bond market. An equity bull market could lead to investors allocating capital to this asset class if expected returns are higher than those from catastrophe bonds.

The current low interest rate environment is one of the factors that have driven growth in the catastrophe bond market as investors seek higher yields as well as diversification. When monetary policy is eased, it will be interesting to see the impact on the catastrophe bond market and whether capital flight materialises.

Don Kramer of ILS Capital Management, an industry veteran, recently commented that low interest rates had severely squeezed investment returns from Treasuries and other asset classes. Catastrophe bonds could offer yields that were unobtainable elsewhere, "In this environment, coming up with a high-yield, non-correlating product seems very attractive" (Royal Gazette, 2011).

FUTURE MARKET GROWTH

The catastrophe bond market has evolved in tandem with investor appetite. Risk periods are increasing and the covered territories and perils are also broadening. One of the key factors which could help the catastrophe bond market grow significantly is the enabling of new territories and perils to be included in transactions. This would appeal to both sponsors and investors. Continued innovation, support and perseverance of key participants in the market should ensure that the data and models required to quantify these risks are developed. The magnitude of losses in the AsiaPacific region has highlighted the need for further work in this area.

As the investor base continues to evolve and demonstrate its ability to understand and price new perils, additional activity involving risks previously unsecuritised in the catastrophe bond market would also spur growth.

More investors are being attracted to this asset class and its resilience to external factors such as the on-going financial market turbulence should see it continue to go from strength to strength. For the market to continue to grow, an expansion of classes of business covered needs to evolve. As evidenced in Figure 6 the market is currently focussed heavily on US, European and Japanese perils.

Looking ahead to opportunities in 2013 and beyond, the market is poised for continued growth. Repeat sponsors continue to demonstrate their commitment to the market.

Dedicated funds to the sector continue to raise money and will look to put that capital to work in the new issuance cycle. With a strong group of committed sponsors, a growing investor base, and attractive pricing, the fundamentals are in place for a strengthening catastrophe bond market.

In light of all of this, catastrophe bond investors need to set realistic objectives in terms of investment size. Whilst the market is still growing, it still remains small in comparison to the overall fixed income market.

CONCLUSION

This paper has reviewed the catastrophe bond market in detail and highlighted both the strengths and weaknesses of these capital market instruments from both the viewpoint of sponsors and investors.

In less than 20 years since the launch of the first catastrophe bond the market has grown to the point where it now represents a sizeable, growing area of the reinsurance marketplace. In comparison, reinsurance has had over 700 years to develop and mature, which makes the growth in catastrophe bonds all the more remarkable.

The catastrophe bond market has yet to mature and will likely face hurdles in the coming years by the factors identified earlier in this paper, such as issuance costs, minimum transaction size, lack of diversification, modelling constraints, and external market events.

Many sponsors have fully integrated catastrophe bonds into their overall reinsurance purchasing decision making. The growth in the overall market has provided a stable, consistent flow of new issues. As more transactions feature transparent index triggers, and robust risk models are developed, the supply-demand dynamics of the market will improve. Increased transparency will attract more investors and improve liquidity. This will benefit sponsors in the form of increased supply which translates into more attractive pricing, which in turn will result in elevated new issue volumes.

In response to the question posed by the title of this dissertation, "Do Catastrophe Bonds Strengthen or Weaken the Reinsurance Marketplace?" the answer evolving from this dissertation is that these instruments strengthen the market. Sponsors continue to value the catastrophe bond market as a viable and cost-effective complement to traditional reinsurance. Meanwhile investors continue to look at the opportunities available in this sector due to the non-correlating nature of this asset class.

There is room for the capital markets to broaden their offerings in the catastrophe bond

market, both in terms of risk and geography. One can expect to see more initiatives to emerge, similar to that of PERILS for European focused issuances, which will assist sponsors and investors in bringing new territories and perils issuances to the market.

The future for this market will be influenced by continued innovation, product development and support from the capital markets. Catastrophe bonds will play an ever increasingly important role and reinsurers should include them as part of their overall strategic decision making. They will continue to strengthen the reinsurance marketplace for years to come.

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