

# **Catastrophe Bonds: Looking Forward**

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## Introduction

With the increased concentrations of wealth in catastrophe-prone areas<sup>1</sup>, and with forecasts of increased frequency of extreme catastrophes<sup>2</sup>, property losses from these devastations are projected to increase over time. Associated with increased expected catastrophe losses is increased concern about extreme, “tail end” events, those believed to have less than a one percent chance of happening<sup>3</sup>. These events are so rare that experience doesn’t help to accurately predict them<sup>4</sup>. For a property insurer, these events can be financially debilitating. As a consequence, admitted insurance companies do not always have the capacity to assume these correlated and potentially fatal risks.

One alternative is for a property owner to secure coverage through Excess and Surplus, E&S, lines of insurance, (i.e., from non-admitted insurers) with the capacity to insure the particular catastrophe risk. A second potential alternative, which is the focus of this report, is a financial instrument that allows extreme exposures to be covered directly by the capital markets, rather than the insurance market. This alternative is a Catastrophe Bond. The number and value of Catastrophe Bonds have grown tremendously (see Figure I) and are projected to continue this growth pattern<sup>5</sup>. The question addressed in this report is: could Catastrophe Bonds compete with E&S coverage?

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<sup>1</sup> Lewis, Michael. "In Nature's Casino." *The New York Times*. The New York Times, 25 Aug. 2007. Web. 10 Feb. 2014.

<sup>2</sup> "Natural Disaster Trends." *EM-DAT*. The International Disaster Database, n.d. Web. 15 Feb. 2014.

<sup>3</sup> *Ibid.*

<sup>4</sup> *Ibid.*

<sup>5</sup> Dubinsky, William. "Spreading the Load--The Past, Present, and Future of Catastrophe Bonds." *Newsletter Insurance and Finance* 13 (Feb. 2014): 1-3. Print.

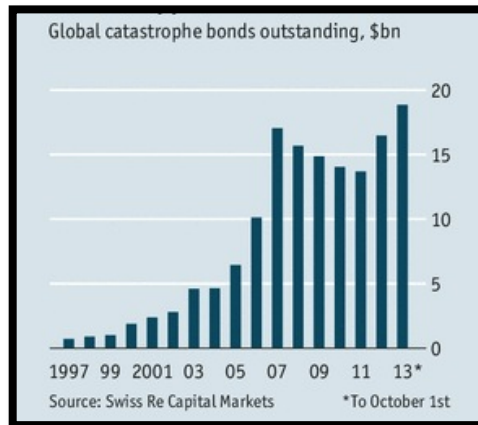


Figure 1: Illustrates the growth in value of outstanding Catastrophe Bonds from 1997 to 2013<sup>6</sup>.

## Background on Catastrophe Bonds

### *History*

The Catastrophe Bond was first introduced as a financial instrument following the estimated \$15 billion losses generated by Hurricane Andrew<sup>7</sup> in 1992. Large insurance and reinsurance companies executed the pioneer issuances and since Hurricane Andrew, each major catastrophe, especially within the United States, has boosted the issuance of Catastrophe Bonds even further<sup>8</sup>, with a record level of issuance of nearly \$20Bn outstanding in 2013<sup>9</sup>.

### *Structure*

Catastrophe Bonds are structured differently than most financial instruments and different than E&S lines of insurance as well. The issuer of the Catastrophe Bond creates a Special Purpose Reinsurance Vehicle, SPRV, whose sole purpose is to transfer insurance risk

<sup>6</sup> *The Economist*, October 5, 2013.

<sup>7</sup> *The New York Times*, August 25, 2009

<sup>8</sup> *The Economist*, October 5, 2013.

<sup>9</sup> Dizard, John. "Catastrophe Bonds: Package of Perils Is a Sound Investment." *Financial Times*. Financial Times, 28 June 2013. Web. 14 Feb. 2014.

directly to the capital markets via investment securities<sup>10</sup>. This vehicle is most often manifested as an offshore bank account, partially due to favorable taxation<sup>11</sup>. The SPVR then attracts investors who provide capital up front, i.e., the SPVR issues the bond to investors. The SPVR invests this capital in money market funds backed by US Treasuries, ensuring no risk of default<sup>12</sup>.

If a catastrophe occurs, the issuer of the Catastrophe Bond uses the funds collected by the SPRV to cover losses. If there is no catastrophe the investors are repaid their principal plus a specified return (see Figure II)<sup>13</sup>. Essentially the buyer of a catastrophe bond is selling catastrophe insurance<sup>14</sup> outside of the insurance market.

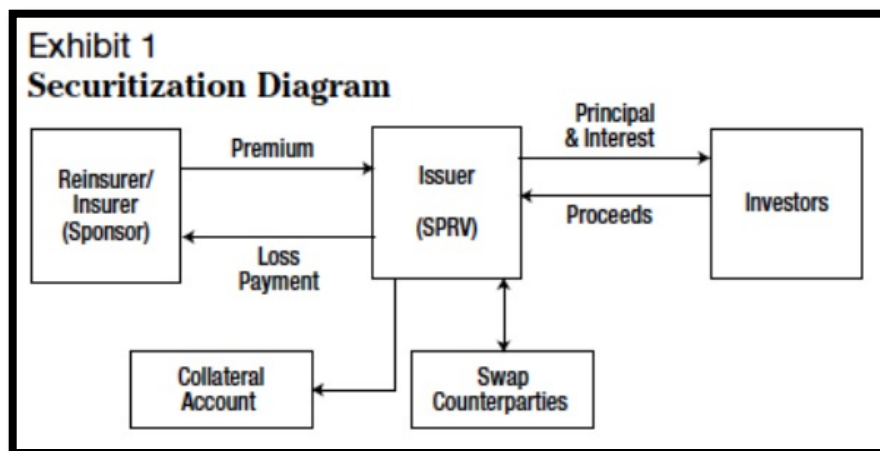


Figure II: Illustrates, in more detail, the structure of cash flows for Catastrophe Bonds<sup>15</sup>.

<sup>10</sup> "Catastrophe Bonds: Spreading Risk". Proc. of Catastrophe Bonds: Spreading Risk, Rayburn House Office Building, Washington, D.C. N.p., 8 Oct. 2002. Web. 12 Feb. 2014.

<sup>11</sup> To counter this the National Association of Insurance Commissioners issued the Special Purpose Reinsurance Vehicle Model Act, which mandates that SPRV's established to carry out Catastrophe Bonds are not subject to US taxation policies to further encourage domestic issuance of these bonds. *Special Purpose Reinsurance Vehicle Model Act. National Association of Insurance Commissioners, 2002. Web. 19 Feb. 2014.*

<sup>12</sup> *Financial Times*, June 28, 2013.

<sup>13</sup> Investment in the Catastrophe Bond can be segregated into different tranches, each with unique levels of risk and return, tailoring to the varying risk appetites of investors. Example: in 1997, United Services Automobile Association issued a \$447M Catastrophe Bond with the first tranche having a lower return (LIBOR plus 273 basis points, 2.73%) in the event of a trigger, but no risk of principal, solely a loss of interest. The second tranche had a significantly higher return (LIBOR plus 576 basis points, 5.76%), but the potential for a significantly higher loss (principal and interest), in the event of a trigger. *Zolkos, Rodd. "1997 RISK MANAGEMENT: CATASTROPHE BONDS TAKE RISK FINANCING BY STORM." Insurance News. Business Insurance, 21 Dec. 1997. Web. 15 Feb. 2014.*

<sup>14</sup> *The New York Times*, August 25, 2009

<sup>15</sup> "Rating Natural Catastrophe Bonds." *A.M. Best Methodology*. A.M. Best Company, 19 Jan. 2012. Web. 20 Feb. 2014.

Whereas insurance contracts rely on an indemnity trigger, Catastrophe Bonds can be dependent on other trigger types: industry loss, modeled loss, and parametric transaction. While these alternative trigger types do not offer perfectly correlated matching between the issuer's losses and payout, as is the case with indemnity triggers, they potentially offer an efficiency gain by reducing moral hazard and adverse selection<sup>16</sup>.

## **Advantages of Catastrophe Bonds**

### ***Investor Return***

Expounding on investor returns, *The Economist* reported that investor demand for Catastrophe Bonds is strong, as investors, specifically pension funds, are fervently searching for high-yield assets that are uncorrelated with stock markets<sup>17</sup>. The Chief Executive of Amlin even went as far as to say that fund managers are “plowing capital into insurance through securities such as Catastrophe Bonds”<sup>18</sup>. Yields on Catastrophe Bonds are significantly higher than LIBOR<sup>19</sup> as well as most index returns (see Figure III). In relation to US treasuries, Catastrophe Bonds average an eleven percent higher return<sup>20</sup>.

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<sup>16</sup> Harrington and Niehaus. 191-192

<sup>17</sup> *The Economist*, October 5, 2013.

<sup>18</sup> Gray, Alistair. "Amlin Chief Warns against 'herd' Investing in Catastrophe Bonds." *Financial Times*. Financial Times, 19 Aug. 2013. Web. 14 Feb. 2014.

<sup>19</sup> Zolkos, 1997.

<sup>20</sup> *The Economist*, October 5, 2013.

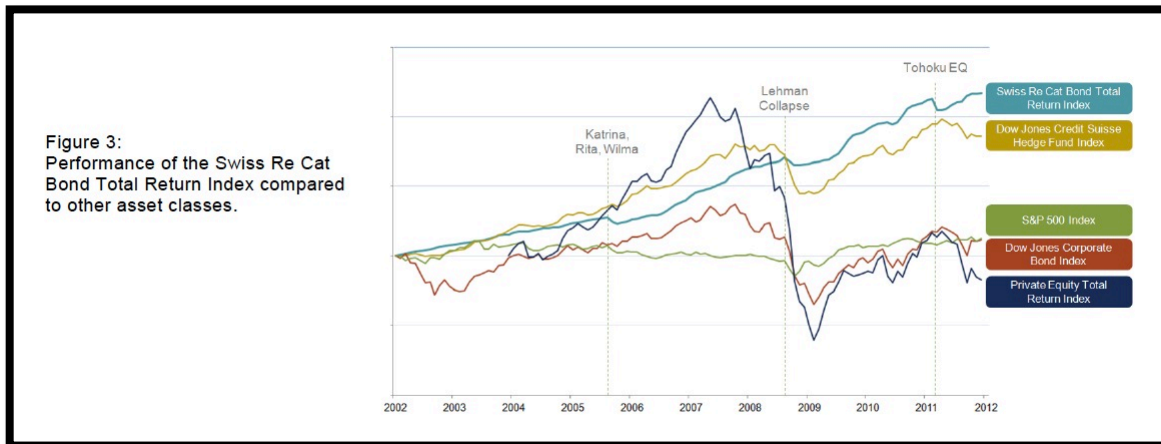


Figure III: Graphical representation of returns on indexes, as well as the Swiss Reinsurance Company's Catastrophe Bond Total Return Index (Turquoise)<sup>21</sup>.

## Secondary Market

Investors can take advantage of another upside of Catastrophe Bonds: the presence of a secondary market for resale<sup>22</sup>. If the Catastrophe Bond purchased no longer meets the needs of the investor, the bonds can be resold in the secondary market, ridding the initial investor of their capital tie-up. This resale market is projected to become increasingly more robust as the volume of Catastrophe Bond transactions rises<sup>23</sup>.

## Access to Capital Markets

A Catastrophe Bond is a unique tool in that it allows for coverage through direct access to the capital markets. The capital markets essentially fund traditional insurance coverage as well, including E&S Lines, but less directly, through equity financing by the insurance company. By directly issuing a Catastrophe Bond, the issuer secures debt financing of potential losses, thus capitalizing on lower tax costs relative to those

<sup>21</sup> "Global Risks 2014 Ninth Edition." *Insight Report*. World Economic Forum, n.d. Web. 15 Feb. 2014.

<sup>22</sup> [http://commdocs.house.gov/committees/bank/hba84418.000/hba84418\\_0.HTM](http://commdocs.house.gov/committees/bank/hba84418.000/hba84418_0.HTM)

<sup>23</sup> Kerney, Gary. "Mid-Market Cat Bonds: A Checklist for Growth." *Property Casualty 360*. Summit Business Media, Mar. 2013. Web. 25 Feb. 2014.

experienced by an equity-financed insurer. The higher tax costs incurred through equity financing are reflected in insurance premiums.

On the other hand, debt financing is typically associated with increased relative financial distress costs<sup>24</sup>. However, the expected financial distress costs of catastrophe bonds, relative to traditional subordinated debt, are reduced due to its payments being agreed upon before the catastrophe and conditional on an easily observable event<sup>25</sup>.

### ***Collateralization***

Insurers, including those writing E&S lines, do not hold funds exactly equal to their exposure, seeing as they are able to take advantage of diversification. Altogether, their reserves represent but a small fraction of the \$300bn in catastrophe-related payouts that major insurers are theoretically liable for<sup>26</sup>. With projections of above average frequency and severity of natural disasters (see Figure IV), there is an increased potential for insolvency. In the case of E&S coverage, due to lack of access to states' guaranty funds there would be no assistance in covering claims in the event of insolvency. As Catastrophe Bonds typically cover a single exposure, they take the approach of matching the capital held and the potential payout one-for-one. While intuitively, holding capital to cover an entire exposure may seem inefficient<sup>27</sup>, this full collateralization completely eliminates all credit risk; Catastrophe Bonds are immune to default risk by design<sup>28</sup>. In addition, as the capital is held in money market securities, managers cannot freely access it, which reduces agency costs<sup>29</sup>.

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<sup>24</sup> Niehaus, Greg. "The Allocation of Catastrophe Risk." *Journal of Banking and Finance* 26 (2002): 592-93. Print.

<sup>25</sup> Ibid.

<sup>26</sup> *The Economist*, October 5, 2013.

<sup>27</sup> Niehaus, 2002.

<sup>28</sup> Lakdawalla, Darius, and George Zanjani. "Catastrophe Bonds, Reinsurance, and the Optimal Collateralization of Risk Transfer." *The Journal of Risk and Insurance* 79.2 (2012): 449-76. Web. 25 Feb. 2014.

<sup>29</sup> Niehaus, 2002.

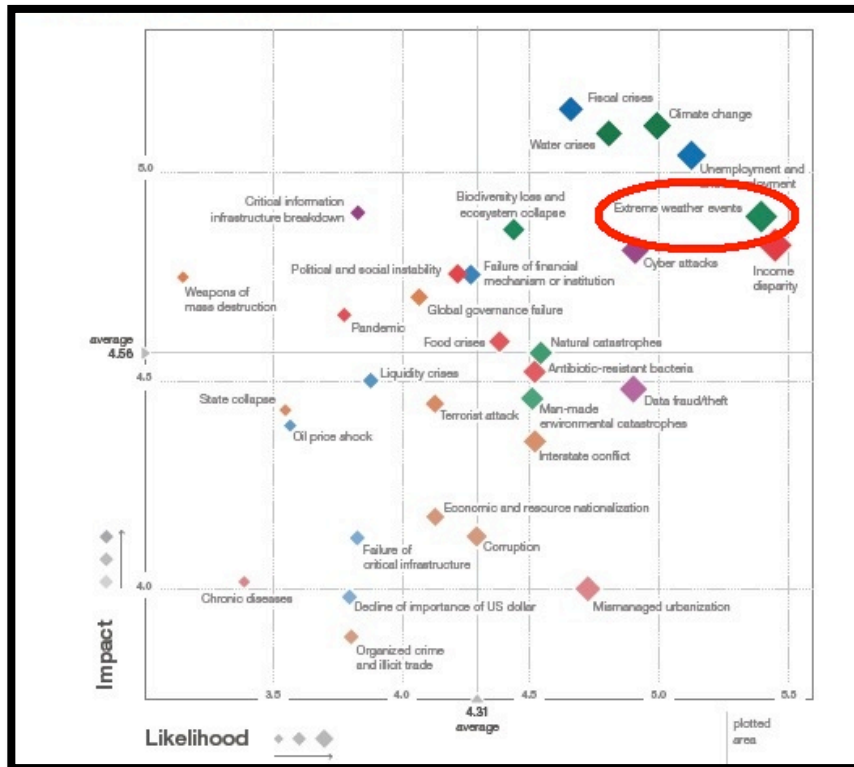


Figure IV: Illustrates projections of above average frequency and severity in predictions for extreme weather events<sup>30</sup>.

### ***Catastrophe Bond Setbacks***

With all of the potential benefits of issuing and investing in Catastrophe Bonds as opposed to pursuing an E&S line of insurance, why hasn't there been a mad dash and subsequent surge in demand and supply of these instruments? A handful of changes need to be put in motion for the Catastrophe Bond to truly be prevalent and a competitor for insurance:

- Increasing familiarity
- Addressing the midmarket investor base
- Standardizing the structure of Catastrophe Bonds, and
- Lowering of frictional costs<sup>31</sup>

<sup>30</sup> [http://media.swissre.com/documents/Global\\_Risks\\_Report\\_2014.pdf](http://media.swissre.com/documents/Global_Risks_Report_2014.pdf)



Unsurprisingly, established players in the insurance industry and capital markets are already addressing these obstacles.

## **Solutions**

### ***Increasing Familiarity***

Addressing the investor base is an obstacle that is steadily becoming less of a concern as major players start to engage in Catastrophe Bond issuances. Examples include Swiss Reinsurance Company<sup>32</sup>, Allstate<sup>33</sup>, and Disney Tokyo<sup>34</sup>. Familiarity and recognition of this financial instrument will escalate as it achieves increased levels of publicity and exposure with these very large, very public issuances. As the number of participating firms and number of issuances both increase, Catastrophe Bonds will be marketed to a larger pool of potential investors, further increasing familiarity.

### ***Advances in Technology***

Addressing the needs of the midmarket investor base, standardizing structure, and lowering costs are all issues currently being minimized with advances in technology. Oasis Loss Modelling Framework, LLC has developed new and readily available catastrophe modeling software to allow for underwriting on a much smaller scale by “bringing catastrophe modeling analytics to smaller insurance companies, the corporate risk buyer, government and even potentially to the general public<sup>35</sup>”. The advances in software were

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<sup>31</sup> <http://www.propertycasualty360.com/2013/03/08/mid-market-cat-bonds-a-checklist-for-growth>

<sup>32</sup> Khamayzer, Anya. "Swiss Re Underwrites Cat Bond for Euro Wind, Invests in Hong Kong Insurer." *Insurance News and Analysis for Risk Managers, Agents, Brokers, P&C Insurance Pros*. Property Casualty 360, 16 Oct. 2013. Web. 14 Feb. 2014.

<sup>33</sup> *The New York Times*, August 25, 2009

<sup>34</sup> "Owner of Tokyo Disneyland Sells Quake Bonds." *Los Angeles Times*. Los Angeles Times, 19 May 1999. Web. 22 Feb. 2014.

<sup>35</sup> "2013: The Year Cat Modelling Changes?" *Market News*. Lloyd's, 18 Jan. 2013. Web. 16 Feb. 2014.

released in January 2014<sup>36</sup>, very recently expanding the potential for smaller-scale modeling and underwriting. This increased potential for catastrophe modeling will allow for Catastrophe Bonds to be issued by smaller institutions to their current customers, thus addressing the midmarket base. This will also mean less reliance on outsourcing underwriting to large insurers and actuaries. In turn, this technology implementation will reduce the frictional costs associated with Catastrophe Bonds, in addition to the aforementioned reduction of tax and agency costs. Finally, with the expanded use of technologies and model templates such as those offered by Oasis, a more standardized, easily executable Catastrophe Bond has the means to flourish. With this standardized Catastrophe Bond, the amount of effort and resources expended will be reduced and the ease and speed with which Catastrophe Bonds can be issued will increase.

## **Conclusion**

With insufficiencies in primary insurance coverage, property owners have a handful of choices for additional coverage at their disposal, each with their pros and cons. One of these options is to seek out an E&S Line of insurance. An alternative solution is a Catastrophe Bond. This instrument is still relatively new in the market but the market is expected to grow due to numerous factors: advances in underwriting and modeling technologies, high investor returns, increasing familiarity, absence of credit risk, and the presence of a secondary market. As the compilation of these factors continue to make Catastrophe Bonds an attractive alternative, this instrument has the potential to be viable competitor of Excess and Surplus lines in the very near future.

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<sup>36</sup> "Oasis Launches Independent Catastrophe Modelling Initiative." Oasis Loss Modelling Framework, 28 Jan. 2014. Web. 20 Feb. 2014.

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