

**INSURANCE LINKED SECURITIES UPDATE 2011: JAPAN
EARTHQUAKE TESTS MARKET**

by

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We previously reported on the history and recent trends of insurance-linked securities (sometimes referred to as “event-linked securities” or “ILS”).¹ These securities were developed as an alternative means for insurers and reinsurers to spread risk from high-severity, low probability events, such as natural catastrophes or pandemics, by tapping capital markets.

The recent earthquake off the coast of Sendai, Japan, has the ILS market in flux, with investors and sponsors cautiously waiting as information continues to be gathered. A number of catastrophe bonds (or “cat bonds”), and at least one longevity-risk based bond (which operate similarly to cat bonds, allowing life, health and pension insurers and reinsurers to access capital markets to spread the risks of unforeseen deviations from life expectancy), face exposure. The quake has brought to light some of the mechanics – and potential hitches – of these various products, as the claims process begins in earnest.

The Sendai Earthquake

On March 11, 2011 a massive earthquake off the coast of Sendai, Japan, created a tsunami that severely damaged much of Japan’s Northeast coast. The most recent numbers indicate that the event has resulted in over 12,000 deaths, with over 14,000 still missing. The quake registered a magnitude 9.0 on the Richter scale – making it the fourth highest ever recorded – and caused a massive tsunami reportedly up to 124 feet high² that pummeled Japan’s Northeast coastline, causing extraordinary damage to homes, buildings, roads, railways, other infrastructure and, most notably, several of Japan’s nuclear reactors, the radiation from which continues to cause further injury and property damage as repair and clean-up efforts continue.

¹ See John Pitblado, *The Latest in Insurance Linked Securities: Changes in the Catastrophe Bond Market and the Emergence of the Longevity Bond* (ReinsuranceFocus.com, March 1, 2010) (<http://02ec4c5.netsolhost.com/blog/wp-content/uploads/2010/02/Special-Focus-2-10.pdf>).

² See Kyodo, *38-Meter-High Tsunami Triggered by March 11 Quake: Survey* (April 3, 2011) (<http://english.kyodonews.jp/news/2011/04/82888.html>).

Total damage estimates range from \$120 billion to over \$300 billion,³ which means the Sendai quake is likely to eclipse the approximately \$125 billion cost of Hurricane Katrina in 2005, which currently is the largest loss figure for a single catastrophic event, and the only other recorded event to have triggered coverage under a cat bond.⁴ However, there is mixed reporting on the manner or degree to which the cat bond market will be affected.

Indemnity vs. Parametric Trigger

One issue that has come to the fore as a result of the Japan earthquake is the varied actuarial models employed by cat bond sponsors, and particularly the trigger mechanism. An indemnity-based trigger bond is based on the sponsor's actual losses, operating more or less like traditional excess coverage. Thus, when a sponsor's losses reach a threshold dollar amount, the bond is triggered. An "industry index" indemnity trigger is based on a similar model, but calculated across an industry-wide loss index, such as the total of insured losses particular to an event or geographic area, and tend to involve more complex modeling.

On the other hand, a so-called "parametric trigger" bond is triggered based on certain objective criteria of the event itself, such as the magnitude of an earthquake, or maximum wind speed of a hurricane, in a defined geographic area. A parametric index incorporates a similar parametric model, but like its indemnity based cousin, involves more complex modeling.⁵

³ See World Bank, *The Recent Earthquake and Tsunami in Japan: Implications for East Asia* (http://siteresources.worldbank.org/INTEAPHALFYEARLYUPDATE/Resources/550192-1300567391916/EAP_Update_March2011_japan.pdf) (March 21, 2011) (estimates range from \$122 billion to \$235 billion). See also Tomoko Hosaka, *Japan Disaster Likely to be World's Costliest* (Associated Press, March 23, 2011) (noting Japanese government estimate of up to \$309 billion) (http://news.yahoo.com/s/ap/20110323/ap_on_bi_ge/as_japan_earthquake_economy/print).

⁴ See Reuters, *Japan Quake Set to Trigger Catastrophe Bonds* (noting "Only one cat bond has ever paid out to its sponsoring insurer because of a natural disaster – Kamp Re 2005, a \$190 million deal triggered by Zurich Financial Services AG's losses from Hurricane Katrina.") (Financial Post, March 30, 2011) ([http://business.financialpost.com/2011/03/30/japan-quake-set-to-trigger-catastrophe-bonds/\[3/31/2011 09:49:47\]](http://business.financialpost.com/2011/03/30/japan-quake-set-to-trigger-catastrophe-bonds/[3/31/2011 09:49:47]))

⁵ See Swiss Re Capital Markets, Ltd., *Applications of Structured Finance Techniques to Insurance Companies' Balance Sheet* (<http://www.casact.org/affiliates/cae/1006/albertini.pdf>) (Oct. 20, 2006).

ILS Exposure in Japan, Trigger Uncertainty

A total of ten cat bonds have been identified as potentially exposed to the Sendai quake, worth a combined \$2 billion. Of these, nine utilize parametric triggers.⁶ Three of the bonds use index values based on peak ground accelerations for their parametric trigger, and rely on data provided by the Kyoshin network of earthquake reporting stations, called “K-Net.”⁷ However, several of the K-Net stations were apparently rendered unable to process and report data due to losses sustained to the reporting stations as a result of the event.

The missing data from K-Net reveal an issue that could prove problematic to parametric trigger modeling, which was developed in part as a means to speed up trigger information, since data pertaining to wind speed, quake magnitude and the like are generally available immediately, whereas indemnity-based triggers can often take months or years to determine whether a designated layer of coverage will be reached.

However, a situation such as that involving K-Net begs the question of depending on local reporting sources for parametric data. These issues will fall to the “calculation agents” – actuarial firms that model the risk when a bond is being developed.⁸ These modeling firms are usually designated a reporting period in which they must produce a report post-event to the bond’s sponsor, typically in the 30 – 45 day range.⁹ Those reporting periods are likely coming due as of this writing for the Sendai quake, so answers as to the total exposure, at least for the nine parametric trigger bonds implicated, should be forthcoming.

Because two of the bonds are tagged to a more complex parametric index, rather than the pure parametric trigger employed by most of the bonds, time will now tell which model proves more or less capable, accurate, transparent and attractive to sponsors and investors who are carefully watching and evaluating the ILS market through this important test.

In addition to cat bonds, at least one mortality bond also faces uncertainty as a result of the Sendai quake, due to the mounting death toll and large number of people still reported as missing. Standard & Poor’s downgraded a Swiss Re mortality bond, which covers life

⁶ See Sarah Mortimer, *Japan’s Incomplete Quake Data Slows Cat Bond Trigger Decision* (Reuters, March 17, 2011) (<http://www.reuters.com/article/2011/03/17/catbond-japanese-quake-idUSLDE72G1FG20110317?pageNumber=1>).

⁷ See Mortimer, *supra*.

⁸ *Id.*

⁹ *Id.*

insurance, with a parametric trigger of a death toll of 50,000.¹⁰ While it presently appears unlikely that the death toll in Japan will reach that number, the Sendai quake raises additional questions, particularly given the damage to the nuclear reactors, which may cause potentially event-linked deaths well into the future, and likely beyond the temporal limitation of any given bond (which typically have defined temporal durations similar to policy periods in traditional insurance). Indeed, as of this writing, the Japanese government has raised its assessment of the danger posed by the nuclear plant destruction on an international scale overseen by the International Atomic Energy Association from 5 to 7, the highest on the scale. Only Chernobyl had previously been assessed a 7 on the scale.¹¹

Thus, the lens of experience will provide sponsors and investors in the ILS market with a view to ways in which these products can be refined, and particularly which trigger mechanisms worked best for sponsors and investors during this important market test. It is possible that we could see the first litigation over the trigger mechanisms as a result.

Impact on the Market

The Sendai quake has wrought uncertainty in the ILS market. After a year of remarkable growth in 2010, and a number of new issues early in 2011, the market dipped considerably as a result of the Sendai quake.

Swiss Re's Global Cat Bond Performance Total Return Index – which tracks all 100 cat bonds currently in existence – dropped 4.25% as of April 4, 2011, although the market appears to be recovering, rising a bit through April 11, 2011, to only a 3.7% drop since the quake.¹² As a result of increased reporting due to the reporting periods for the calculation agencies, the market will react accordingly as those numbers come in, and likely begin to even out.

Commentators disagree on the ultimate effect the Sendai quake will have on the market. Initially, some noted that because the quake did not affect Tokyo, many of the Japan earthquake cat bonds were not triggered – likening the geographic and parametric restrictions on any given

¹⁰ Reuters, *supra*.

¹¹ See Ryan Nakashima and Shino Yuasa, *Japan Equates Nuclear Crisis Severity to Chernobyl* (Associated Press, April 12, 2011) (<http://www.seattlepi.com/news/article/Japan-equates-nuclear-crisis-severity-to-Chernobyl-1332532.php>).

¹² See Artemis, *Catastrophe Bond Index Slide Begins to Slow* (Alternative Risk Transfer, Catastrophe Bond, Insurance-Linked Securities and Weather Risk Management Blog, April 11, 2011).

bond to “hole in one” insurance.¹³ If few cat bonds are ultimately triggered, it will likely increase interest in investment, but could signal an increase in premium. It may also cause sponsors to seek to broaden and otherwise revise the terms of new issues going forward. Moreover, because most existing bonds cover wind and hurricane disasters in the U.S., a shift in focus to Japan and other non-U.S. locations could result in an increased ability to diversify a portfolio of these bonds, which could positively impact the secondary market for these instruments.¹⁴

The second quarter especially, and the remainder of 2011 will be revealing, as the ILS market continues to absorb the experience of the Sendai quake. Going forward, it will be interesting to see what trends emerge as new bonds are issued, in terms of the triggers employed, geographic locations, and other issues raised by the unfolding disaster in Japan.

This article does not constitute legal or other professional advice or service by JORDEN BURT LLP and/or its attorneys.

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¹³ See Bryan Keogh, Oliver Suess and Jesse Westbrook, ‘Hole-in-One’ Cat Bonds Are Top Asset Eluding Quake’s Grasp (Bloomberg, March 22, 2011) (<http://www.bloomberg.com/news/2011-03-22/-hole-in-one-cat-bonds-rank-as-top-asset-eluding-japan-disaster.html>).

¹⁴ See *id.* See also, Willis Capital Markets & Advisory, *ILS Market Update Q1 2011: The Market Digests a Major Catastrophe Event* (April, 2011) (http://www.willis.com/Documents/Publications/Services/Capital_Markets/WCMA_ILS_Newsletter_Q1_2011.pdf)