

By Dimitris Karapiperis, CIPR Research Analyst

◆ **INTRODUCTION**

Weather and extreme climate events, such as hurricanes and flooding, have significantly increased and intensified over the past several decades, causing billions of dollars in financial losses on an annual basis. These losses are of concern to the insurance industry as insurers are directly exposed through the coverage they provide for damages resulting from natural catastrophes. Governments are also financially exposed to natural catastrophes through government-provided insurance protection and their obligation to provide aid to victims and funds to restore and rebuild damaged communities, as economic losses typically far exceed insured losses.

Insurers, governments and other public entities, in order to reduce their financial vulnerability, as well as increase needed capacity to cover rising losses, can turn to reinsurance and the capital markets to shift part of the risk to them. Early on in the development of alternative risk transfer, it was only insurers using financial instruments such as catastrophe bonds (cat bonds) to pass part of their risk to investors. A number of public disaster programs and governments have also started recently employing these tools to better manage their exposures.

◆ **COSTLY NATURAL CATASTROPHES ON THE RISE**

The need to shift some of the risk from insurers and public insurance programs—and increase capacity to finance natural disaster risk beyond traditional insurance coverage—is primarily driven by the increasing frequency of multi-billion-dollar natural catastrophes, especially since the early 1990s.

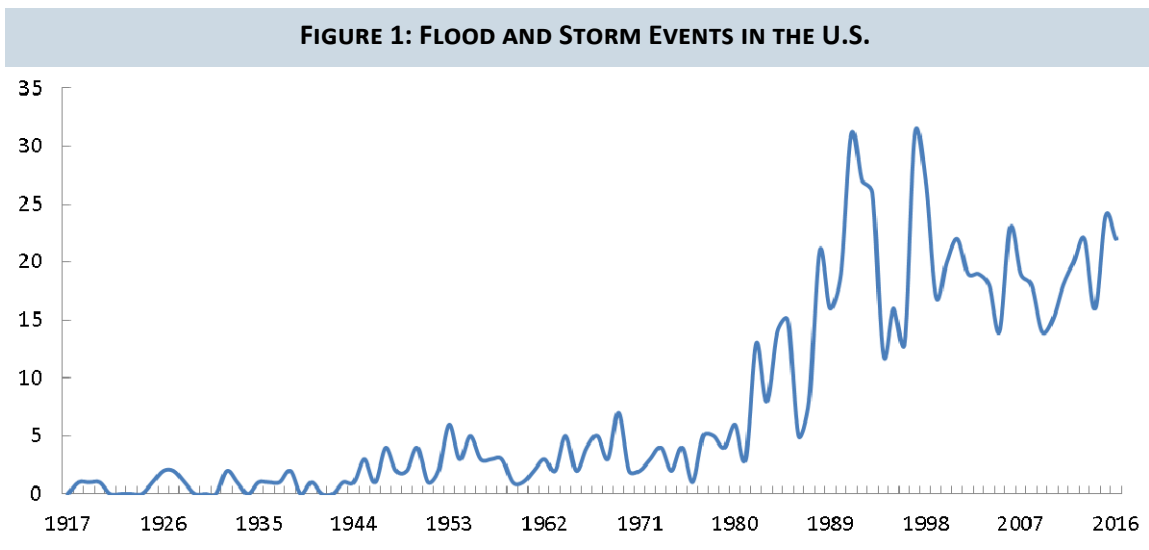
To provide some historical context for the changing natural catastrophe profile of the country, the experience in the 100-year period from 1917 to 2016 can be instructive. The number of storms, hurricanes and floods—which are the most frequent and catastrophic event types affecting the U.S.—markedly increased during this period. In the first half of the century, the annual average was 1.6 events, while in the following 50 years, the average jumped to 14 events a year. In the past 25 years, not including 2017, the annual average rose even higher, to 19.7 events a year (Figure 1).¹

In terms of insured losses, the annual average for billion-dollar catastrophes for the five-year period from 2012 to 2016 was 10.6 billion-dollar events, nearly double the 1980–2016 annual average of 5.5 billion-dollar events² (Figure 2 on the following page).

From an insurance perspective, it is the rate of growth of the frequency of high-loss natural catastrophes that raises weather and climate risk to one of the highest concerns and a primary focus for the property/casualty (P/C) insurance industry, state insurance regulators, and state and federal governments. It was not until the 1990s the insurance industry started experiencing billion-dollar events on a regular basis. While since 1980 the long-term average is five billion-dollar events, it has increased to an average of eight billion-dollar events since 2000.

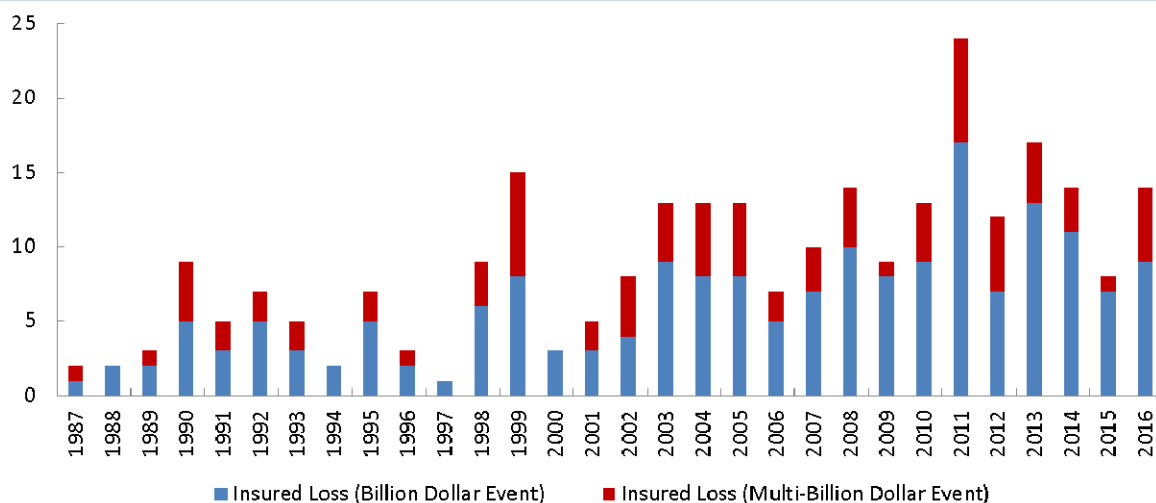
(Continued on page 12)

¹ Storm and flood events to be included in EM-DAT used for this figure must fulfill at least one of the following criteria: 1) 10 or more people killed; 2) declaration of a state of emergency; and/or 3) call for international assistance.
² Aon Benfield. 2017. "2016 Annual Global Climate and Catastrophe Report."



Source: EM-DAT: The Emergency Database.

FIGURE 2: GLOBAL BILLION-DOLLAR INSURED WEATHER EVENTS*



* Adjusted for Inflation Using 2016 U.S. Consumer Price Index.
Source: Aon Benfield.

Nine of the top 10 costliest natural catastrophes in U.S. history were hurricanes and floods, and all but one occurred after 2000. Moreover, the top 10 costliest hurricanes in the U.S. were all multi-billion-dollar events affecting, in all but one case, multiple states and ranging from \$5.7 billion to \$49.8 billion in insured losses (Figure 3 on the following page).

In 2016, insured losses from storm and flood events in the U.S. totaled almost \$20 billion, surpassing the 2015 total by approximately \$4 billion.³ In the first half of 2017, direct insured property losses from catastrophes in the U.S. totaled \$17.1 billion, up from \$13.9 billion in first half of 2016 and from the \$13.0 billion average first-half direct catastrophe losses for the past 10 years.⁴ Also, according to the most conservative preliminary estimates, the insured losses from the three recent hurricanes (Harvey, Irma and Maria) total more than \$70 billion.⁵

Regardless of whether one agrees anthropogenic climate change is the primary cause of extreme weather and climate events, the fact remains meteorological natural catastrophes have increased both in frequency and severity. From an insurance perspective, if natural catastrophes continue to occur at this rate, it is largely expected the amount of insured losses will keep increasing, possibly reaching a level that could, at some point, threaten the industry’s financial stability.

While part of the increase in insured losses caused by natural catastrophes may certainly be a result of changing climate patterns, a significant part is due to huge increases in devel-

opment in populous coastal regions. One catastrophe modeling company has estimated catastrophe losses would likely double every decade or so due to growing residential and commercial density, as well as more expensive construction.⁶

◆ REINSURANCE AND ALTERNATIVE CAPITAL

Insurers are at the front lines of providing protection from natural catastrophes to people and businesses at risk. The scale of insured losses caused by natural catastrophes, especially since 2000 (Figure 3 on the following page), could potentially exceed the collected premiums and capital an exposed insurance company has available to pay claims. Insurers, in order to make sure all their policyholders are protected—in addition to insulating themselves from catastrophic risk—seek and buy reinsurance coverage.

Reinsurance, which is often described as insurance for insurers, is a contract of indemnity between a reinsurer and an insurer. It is an essential mechanism by which insurers manage their risks and expand capacity. As the flow of third-party alternative capital into the alternative risk transfer market has increased in recent years, primary insurers can, and often will, turn to the capital markets instead of traditional reinsurance to shift part of their catastrophe risk.

(Continued on page 13)

³ www.iii.org/fact-statistic/facts-statistics-us-catastrophes.

⁴ Ibid.

⁵ Milliman. 2017. “Surveying the damage: The impact of Harvey, Irma, and Maria on the alternative capital market” October 2017.

⁶ www.iii.org/issue-update/spotlight-on-catastrophes-and-insurance-issues.

NATURAL CATASTROPHES, INSURANCE AND ALTERNATIVE RISK TRANSFER (CONTINUED)

The growing need for reinsurance coverage and the infusion of cheaper alternative capital sources have intensified the competitive pressures in the reinsurance sector, particularly in lines exposed to natural catastrophes.¹⁰ With alternative capital possibly crowding out some of the more expensive traditional reinsurance, a number of reinsurers have also been issuing cat bonds and partnering with alternative capital investors to help them with underwriting and with forming companies.¹¹

According to Aon Benfield, alternative capital capacity, which is provided by capital market investors, has more than tripled since 2011 and, as of June 30, 2017, it stood at \$89 billion.¹² At \$516 billion as of June 30, 2017, traditional reinsurance capital rose by a more modest 20% during the same period.¹³ Consequently, rapidly rising alternative capital now (June 30, 2017) represents nearly 15% of the total global reinsurance capital, from just 6% in 2011, as more large institutional investors in search of yield and the diversification benefits of an uncorrelated asset class have entered the market. Some institutional

investors, such as pension funds, enjoy a competitive advantage over traditional reinsurers. Their cost-of-capital targets are typically lower than reinsurers' weighted average cost of capital, enabling them to profitably assume catastrophe risks at prices uneconomical for traditional reinsurers.¹⁴

Collateralized reinsurance is the largest and fastest-growing component of the alternative risk transfer market, followed by the still-appealing and growing cat bonds, as new sponsors are coming in to this area of the market. Industry loss

(Continued on page 14)

⁷ The top 10 list includes hurricanes occurring through 2016.

⁸ Losses include property coverage only. Flood damage covered by the federally administered NFIP is excluded.

⁹ Amounts adjusted for inflation through 2016 by the Insurance Services Office Inc. (ISO) using the gross domestic product (GDP) implicit price deflator.

¹⁰ S&P Global Ratings. 2017. "Global Reinsurance Highlights."

¹¹ Insurance Information Institute. 2015. "Alternative Capital and its Impact on Insurance and Reinsurance Markets." March 2015.

¹² Aon Benfield. 2017. "Reinsurance Market Outlook." September 2017.

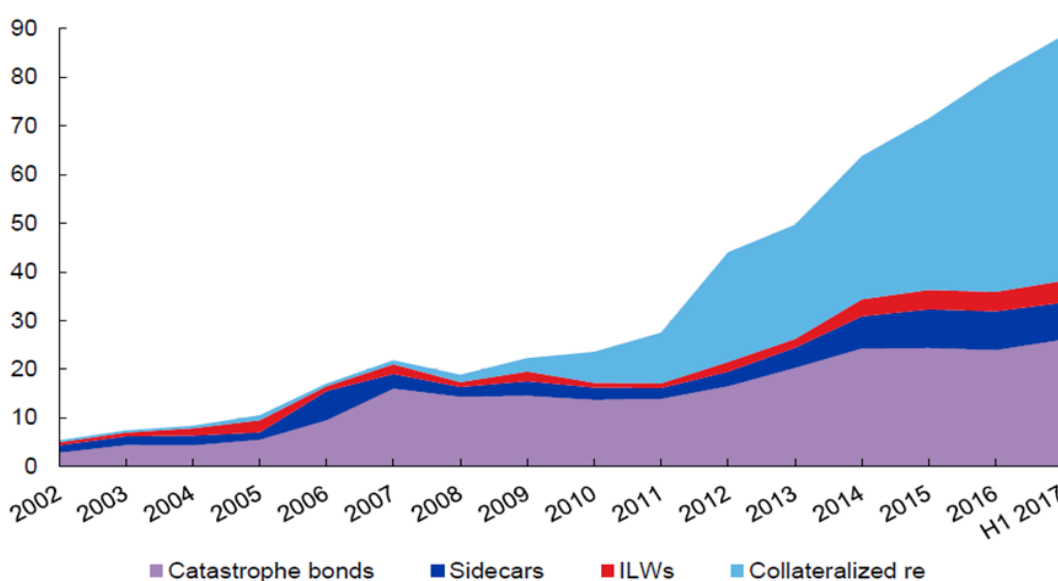
¹³ Ibid.

¹⁴ S&P Global Ratings. 2017. "Global Reinsurance Highlights."

FIGURE 3: TOP 10 COSTLIEST U.S. HURRICANES (IN BILLIONS)⁷

Rank	Date	Location	Hurricane	—Estimated Insured Loss ⁸ —	
				Dollars When Occurred	In 2016 Dollars ⁹
1	Aug. 25–30, 2005	AL, FL, GA, LA, MS, TN	Katrina	\$41.1	\$49.8
2	Aug. 24–26, 1992	FL, LA	Andrew	\$15.5	\$24.5
3	Oct. 28–31, 2012	CT, DC, DE, MA, MD, ME, NC, NH, NJ, NY, OH, PA, RI, VA, VT, WV	Sandy	\$18.8	\$19.9
4	Sept. 12–14, 2008	AR, IL, IN, KY, LA, MO, OH, PA, TX	Ike	\$12.5	\$14.0
5	Oct. 24, 2005	FL	Wilma	\$10.3	\$12.5
6	Aug. 13–14, 2004	FL, NC, SC	Charley	\$7.5	\$9.3
7	Sept. 15–21, 2004	AL, DE, FL, GA, LA, MD, MS, NC, NJ, NY, OH, PA, TN, VA, WV	Ivan	\$7.1	\$8.9
8	Sept. 17–22, 1989	GA, NC, PR, SC, UV, VA	Hugo	\$4.2	\$7.3
9	Sept. 20–26, 2005	AL, AR, FL, LA, MS, TN, TX	Rita	\$5.6	\$6.8
10	Sept. 3–9, 2004	FL, GA, NC, NY, SC	Frances	\$4.6	\$5.7

FIGURE 4: DEPLOYMENT OF ALTERNATIVE CAPITAL (2002–2017 IN \$BILLIONS)



Source: Aon Benfield.

warranties and sidecars are by far the smaller components of alternative risk transfer but, nonetheless, successfully maintaining a steady presence in the market (Figure 4).

At more than \$50 billion as of June 30, 2017, collateralized reinsurance has been the real growth engine of the alternative reinsurance capital in the past decade.¹⁵ Collateralized reinsurance is most comparable with traditional reinsurance, particularly if it is fronted by a traditional reinsurance company, essentially being a fully collateralized version of a reinsurance program.¹⁶ The collateral amount covering in full all potential claims, minus fees and charges, is put up by investors and kept in escrow for the life of the contract.

For institutional investors, such as hedge funds, collateralized reinsurance allows a broader risk exposure than cat bonds at a relatively lower cost. A concern for insureds and regulators is the special purpose vehicles set up for this type of transaction tend to be non-rated and thinly capitalized entities, and the availability of the escrowed collateral can be dependent on the exact separate trust agreement language.¹⁷

Alternative risk transfer growth will likely continue to outpace traditional reinsurance. Gaining more market share would sharpen competition, thereby squeezing traditional reinsurers' margins and making them more vulnerable to large catastrophe losses.¹⁸

◆ THE EVOLVING USE OF CATASTROPHE BONDS

As an alternative to traditional insurance and reinsurance, and as an innovative risk transfer product, cat bonds have enjoyed a long and successful history, having grown significantly since they were first issued in the mid-1990s.¹⁹ Cat bonds were first seriously contemplated following Hurricane Andrew in 1992, as rising reinsurance prices and questions regarding the ability of traditional reinsurance to absorb extreme catastrophe losses led to thinking about alternative capital.²⁰ Until about five years ago, cat bonds were the primary investment vehicles to attract investors from the capital markets seeking favorable returns and willing to take on insurance risk uncorrelated to their existing investment portfolios.

Sponsoring a cat bond allows insurers to reduce their overall reinsurance cost and free up capital to underwrite new insurance business. As an alternative to traditional reinsurance, cat bonds are attractive, particularly for low frequency, high severity catastrophes. It was actually the insurance and traditional reinsurance market that facilitated the creation

(Continued on page 15)

¹⁶ www.artemis.bm/blog/2017/07/24/collateralized-reinsurance-drives-alternative-capital-growth-in-q1-aon.

¹⁷ Aon Benfield. 2017. "Reinsurance Market Outlook." September 2017.

¹⁸ S&P Global Ratings. 2017. "Global Reinsurance Highlights."

¹⁹ www.artemis.bm/deal_directory/cat_bonds_ils_issued_outstanding.html.

²⁰ Insurance Information Institute. 2015. "Alternative Capital and its Impact on Insurance and Reinsurance Markets." March 2015.

NATURAL CATASTROPHES, INSURANCE AND ALTERNATIVE RISK TRANSFER (CONTINUED)

of cat bonds after realizing, for some peak exposures, it was ideal to transfer the risk to the capital markets in order to take advantage of their depth and liquidity.

Among the main benefits of cat bonds as compared to traditional reinsurance are: increased market capacity; competitive pricing; multi-year commitment allowing for pricing stability; and counterparty security as the claims-paying ability (credit rating) is not an issue. Conversely, the advantages of traditional reinsurance are: easy to understand; when supply is plentiful, pricing and terms are attractive; straightforward regulatory and accounting treatment; and proven historical track record.

A possible disadvantage of cat bonds issued by insurers may be related to their regulatory treatment regarding the allowed reinsurance credit. To ensure meaningful transfer of risk and collectability of reinsurance receivables, only indemnity cat bonds, triggered by the sponsor insurer's actual losses without any basis risk, are allowed to count as reinsurance ceded and to be reported accordingly.

Cat bonds are structured so payment of interest or principal to the ceding insurance company depends on the occurrence of a catastrophe of a defined magnitude, or one causing an aggregate insurance loss in excess of a stipulated and agreed-upon amount. If one of the designated catastrophic events takes place, all or part of the principal is paid to the ceding insurance company, investors' coupon payments cease or are reduced and, at maturity, there is either zero, or a reduced amount of principal, repaid. On the other

hand, if the catastrophic event does not occur, investors get the enhanced coupon for the term of the bond, typically three years, and receive the principal back at maturity.²¹

The first cat bond was a \$477 million deal issued in 1997 by Residential Re, a Cayman Islands reinsurer created by USAA to transfer its exposure to catastrophe losses from U.S. hurricanes²² and, in the two decades since, the cumulative issuance has swelled to approximately \$90 billion²³ (Figure 5).

From 1997 to 2005, the market for cat bonds grew by an average of 25% per year. After hurricane Katrina in 2005, models were recalibrated to include increased assumptions for severity and frequency of hurricanes and enhancement in loss modeling. With the increase of risk perception and modeled expected loss, cat bond spreads widened along with reinsurance rates.²⁴ The first major cat bond default, Kamp Re, happened during that period, after being triggered by Hurricane Katrina with investors losing 75% of their principal.²⁵

The financial crisis seriously tested the cat bond market, along with the overall structured securities market, as investors exited positions, generally selling at a discount, to pro-

(Continued on page 16)

²¹ Risk Management Solutions. 2012. "Cat Bonds Demystified."

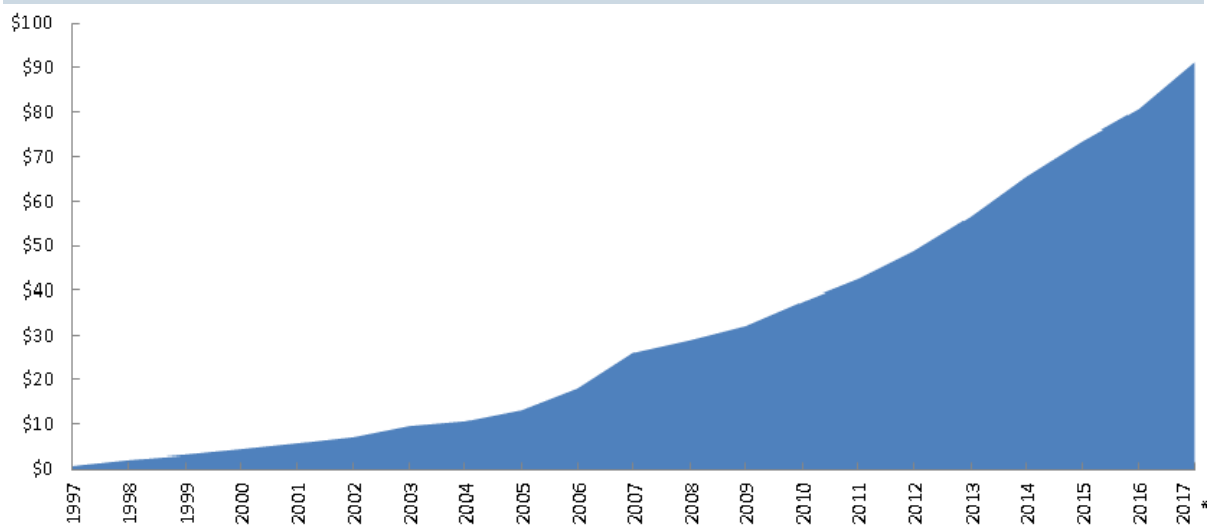
²² www.businessinsurance.com/article/19971221/ISSUE01/100010623/1997-risk-management-catastrophe-bonds-take-risk-financing-by-storm.

²³ www.artemis.bm/deal_directory/cat_bonds_ils_cumulative_issuance.html.

²⁴ Partner Re. 2015. "The Drivers of Catastrophe Bond Pricing," PartnerReviews, October 2015.

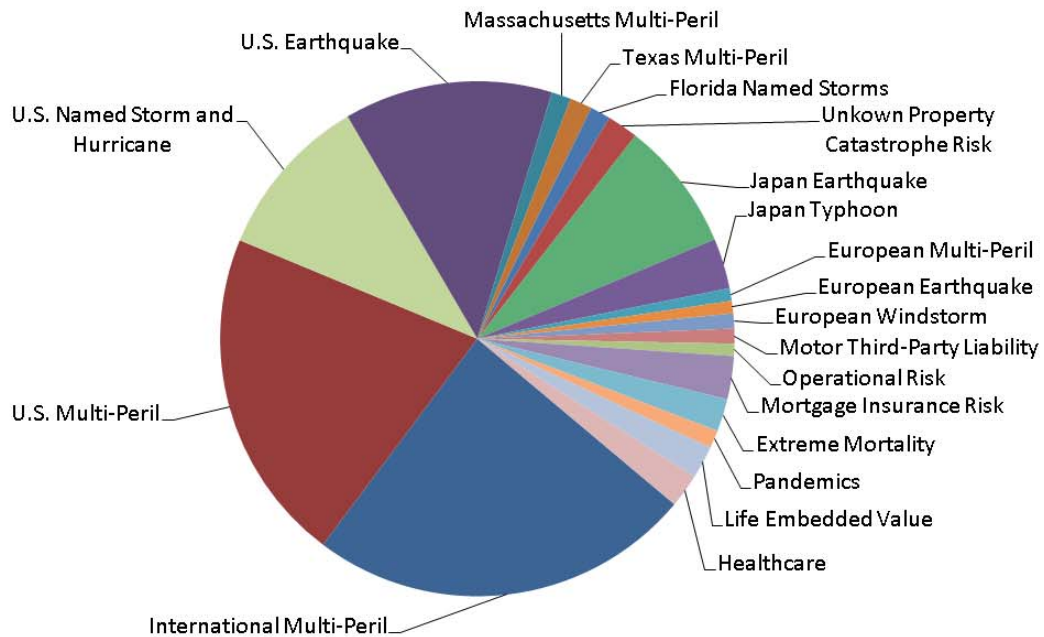
²⁵ www.artemis.bm/deal_directory/kamp-re-2005-ltd.

FIGURE 5: CATASTROPHE BONDS CUMULATIVE ISSUANCE BY YEAR (BILLIONS)*



* Includes other Insurance-Linked Securities. Source: Artemis.

FIGURE 6: CATASTROPHE BONDS AND ILS RISK CAPITAL BY RISK OR PERIL



Source: Artemis.

protect their liquidity. While the crisis showed cat bonds were not fully immune to the vagaries of the credit markets, they only experienced a low degree of correlation with other asset classes whose performance had been severely compromised.

Only four cat bonds defaulted during the global financial crisis when Lehman Brothers, the derivatives counterparty in the transactions, collapsed. The collateral structure used in these deals which incurred losses included liquidity swaps, a commonly used structure needed to facilitate draws. The structure is no longer in use and it is not found in any of the outstanding cat bonds.²⁶

Challenging conditions in the structured securities market following the global financial crisis affected the demand for insurance risk by investors, slowing cat bond issuance for a couple of years. Issuance eventually started recovering by 2011 and surpassed the pre-financial crisis record of \$8.3 billion, reaching a new record of \$9.1 billion in 2014.²⁷ Issuance in the first half of 2017 rose beyond \$9.7 billion, the most ever recorded in a single year. The cat bond market has grown to a new all-time record, with nearly \$30 billion outstanding, despite having to manage a record \$6.5 billion of maturities in the first half of 2017.²⁸

Cat bonds are the largest part of the overall insurance-linked securities (ILS) market, accounting for about 88% of the total

ILS capital outstanding by type of catastrophe risk or peril (Figure 6). Cat bonds have been primarily used by property/casualty insurers and reinsurers to transfer major risks on their books, such as hurricanes, to capital market investors.

The profile of ceding entities has become more diverse in recent years, as government, public agencies and corporates have joined primary insurers, who still dominate the cat bond market, followed by reinsurers. Among primary insurers, most are U.S.-focused large and regional entities, while large global insurers are conspicuous by their absence.²⁹

Several non-insurer entities—ranging from corporates such as Disney and Universal Studios to governments and agencies such as the California Earthquake Authority and international organizations such as the World Bank—are increasingly using cat bonds and similar risk transfer tools to manage their exposure to natural catastrophes.³⁰

(Continued on page 17)

²⁶ www.artemis.bm/blog/2013/02/12/the-death-of-the-total-return-swap-in-the-cat-bond-market-is-almost-upon-us.

²⁷ www.artemis.bm/deal_directory/cat_bonds_ils_issued_outstanding.html.

²⁸ Artemis. 2017. "Q2 2017 Catastrophe Bond and ILS Market Report."

²⁹ Swiss Re. 2017. "Insurance-Linked Securities Update," Volume XXVII, August 2017.

³⁰ Kunreuther, H., Michel-Kerjan, E. and Tonn, G. 2016. "Insurance, Economic Incentives and other Policy Tools for Strengthening Critical Infrastructure Resilience: 20 Proposals for Action." The Wharton School, University of Pennsylvania, December 2016.

Interestingly, about 10 years before the introduction of cat bonds in the U.S., the earliest cat bond deal involved the Swedish government agency Svensk Exportkredit, which sold earthquake loans to Japanese insurers. The \$5 million bond was issued in December 1984 with a 20-year maturity. The insurers bought the bond, accepting lower-than-normal coupons in return for the right to sell the bonds back to the issuer at the nominal value should an earthquake over a defined magnitude occur.³¹

The World Bank designed and launched the MultiCat Program in 2009 to provide a cat bond issuance platform to be used by governments and other public entities to access the capital markets for coverage against natural catastrophe risks. The first cat bond issued under this program was the \$290 million MultiCat Mexico 2009 to provide parametric insurance to Mexico's Fund for Natural Disasters (FONDEN) against earthquake and both Pacific and Atlantic hurricane risks.³²

The World Bank also issued a \$30 million deal in 2014 to provide reinsurance to the Caribbean Catastrophe Risk Insurance Facility (CCRIF) to transfer natural catastrophe risk of 16 member countries to the capital markets at highly competitive prices.³³

Another World Bank-supported cat bond was the IBRD/Fonden 2017 to provide Mexico with financial protection of up to \$360 million against losses from earthquakes and tropical cyclones.³⁴ The deadly 8.1 magnitude earthquake in Mexico in September 2017 has placed this bond at risk, which could eventually be a 100% loss.³⁵

The New York Metropolitan Transit Authority (MTA), a public-benefit entity governed by the state and city of New York, has also chosen to issue cat bonds to manage its catastrophe risk exposure. The MTA has issued two \$125 million cat bonds: MetroCat Re (Series 2013-1) and MetroCat Re (Series 2017-1). The first deal provided storm surge reinsurance protection for MTA's captive insurance company, the First Mutual Transportation Assurance Company (FMTAC), while the second added coverage for risk from earthquake exposures.³⁶

The California Earthquake Authority (CEA), the publicly managed residential earthquake insurance provider, has issued a number of cat bonds since 2011, starting with Embarcadero Re (Series 2011-1) to the most recent issuance in May 2017, Ursa Re (Series 2017-1), which secured \$925 million of reinsurance protection.³⁷

The use of cat bonds alongside traditional reinsurance has significantly helped the CEA to reduce its risk-transfer costs and better manage its risk exposure, thereby increasing the amount of protection it benefits from. The claims-paying capacity of the CEA now exceeds \$15 billion, which is sufficient to pay covered losses if a major earthquake were to strike California today. Using cat bonds has also helped reduce homeowners insurance rates, as savings flow through to consumers.³⁸

Helping the CEA to offer more affordable earthquake coverage to Californians and providing risk transfer should a major event occur, cat bonds play a key role in making sure the CEA has the ability to not only back up its nearly 1 million policies but also to expand coverage.³⁹

Florida Citizens Property Insurance Corporation (Citizens), a not-for-profit insurer of last resort created by the Florida Legislature in 2002 and governed by the state, has been using cat bonds to manage its risk exposures, and it is responsible for the largest cat bond issuance in the world. The \$1.5 billion Everglades Re (Series 2014-1) offers reinsurance protection against hurricanes on an annual aggregate basis using an indemnity trigger.⁴⁰ With this cat bond, in the event of up to a one-in-70-year storm, Citizens would have enough funds to pay all claims without needing assessments from Florida's taxpayers. According to Citizens, the risk to taxpayers was effectively reduced by more than 80%.⁴¹

The high estimated losses from hurricanes Harvey and Irma also brought to the forefront the potential utility cat bonds could have for the federally administered National Flood Insurance Program (NFIP). In 2016, the NFIP, recognizing the need to reduce the amount of flood risk it holds, secured its

(Continued on page 18)

³¹ <http://en.entropics.se/blog/first-cat-bond-ever>.

³² <http://treasury.worldbank.org/cmd/htm/MULTICAT-PROGRAM.html>.

³³ <http://treasury.worldbank.org/cmd/htm/FirstCatBondLinkedToNaturalHazards.html>.

³⁴ www.worldbank.org/en/news/press-release/2017/08/04/world-bank-bonds-to-provide-360-million-in-catastrophe-protection-for-mexico.

³⁵ www.artemis.bm/blog/2017/09/08/mexico-m8-1-earthquake-puts-fonden-2017-catastrophe-bond-at-risk.

³⁶ www.artemis.bm/blog/2017/05/16/new-york-mtas-new-metrocat-re-2017-cat-bond-priced-below-mid-point.

³⁷ www.artemis.bm/blog/2017/08/01/california-quake-insurance-on-the-rise-cat-bonds-an-innovation-cea.

³⁸ www.artemis.bm/blog/2017/08/01/california-quake-insurance-on-the-rise-cat-bonds-an-innovation-cea.

³⁹ www.artemis.bm/blog/2017/08/01/california-quake-insurance-on-the-rise-cat-bonds-an-innovation-cea.

⁴⁰ www.artemis.bm/deal_directory/everglades-re-ltd-series-2014-1.

⁴¹ Insurance Journal. 2014. "Florida's Citizens Readies \$1.5 Billion Catastrophe Bond Deal," April 28, 2014.

first placement of reinsurance, which was expanded in the beginning of 2017 to \$1.04 billion. According to the Federal Emergency Management Agency (FEMA), this reinsurance helps the NFIP become more resilient and has set the foundation for a multi-year reinsurance program.⁴² Estimates suggest this reinsurance program will payout in full with losses from Hurricane Harvey alone.⁴³

Among legislative efforts toward the reauthorization of the NFIP, there are a number of bills calling for a greater use of alternative risk transfer tools such as cat bonds, which can be an important part of covering extreme flood events without the additional stress on government finances and the burden on taxpayers.⁴⁴

According to Standard & Poor's (S&P), there are significant modeling challenges for flood risk to be overcome before private capital participation in the NFIP in the form of cat bonds. Nevertheless, S&P suggests that, with reinsurer capital already in place and assuming greater assumption of NFIP risk in the near future by reinsurers, capital market investors would be asked to participate at a later stage to more efficiently spread risk. At this point, however, S&P believes it may be premature for the cat bond market to assume NFIP risk.⁴⁵

◆ CONCLUSION

Natural catastrophes have happened in the past and will undoubtedly continue to happen in the future, albeit with increasing frequency and higher severity, triggering rising economic and insured losses. The ability to efficiently spread and share natural catastrophe risk is essential for the solven-

ABOUT THE AUTHOR



Dimitris Karapiperis joined the NAIC in 2001 and he is a researcher with the NAIC Center for Insurance Policy and Research. He has worked for more than 20 years as an economist and analyst in the financial services industry, focusing on economic, financial market and insurance industry trends and developments.

Karapiperis studied economics and finance at Rutgers University and the New School for Social Research, and he developed an extensive research background while working in the public and private sector.

cy of the insurance industry, the fiscal health of the government, the growth of the economy and the general welfare of all citizens. Expanding insurance can be a catalyst for resilience, as capacity and take-up rates increase. Tapping the capital markets through financial instruments such as cat bonds issued by insurers, in addition to government entities and public insurance programs, could help improve coverage, pricing, and relief and recovery efforts.

⁴² www.fema.gov/nfip-reinsurance-program.

⁴³ www.artemis.bm/blog/2017/09/15/nfip-or-bust-the-reinsurance-layer-certainly-is-but-once-or-twice.

⁴⁴ www.artemis.bm/blog/2017/06/22/nfip-reform-bills-progress-including-calls-for-flood-cat-bonds.

⁴⁵ www.artemis.bm/blog/2017/06/08/flood-cat-bonds-flood-sidecars-how-can-the-nfip-de-risk-using-ils.



NAIC Central Office
Center for Insurance Policy and Research
1100 Walnut Street, Suite 1500
Kansas City, MO 64106-2197
Phone: 816-842-3600
Fax: 816-783-8175

<http://www.naic.org>

<http://cipr.naic.org>

To subscribe to the CIPR mailing list, please email CIPRNEWS@NAIC.org or SHALL@NAIC.ORG

© Copyright 2017 National Association of Insurance Commissioners, all rights reserved.

The National Association of Insurance Commissioners (NAIC) is the U.S. standard-setting and regulatory support organization created and governed by the chief insurance regulators from the 50 states, the District of Columbia and five U.S. territories. Through the NAIC, state insurance regulators establish standards and best practices, conduct peer review, and coordinate their regulatory oversight. NAIC staff supports these efforts and represents the collective views of state regulators domestically and internationally. NAIC members, together with the central resources of the NAIC, form the national system of state-based insurance regulation in the U.S. For more information, visit www.naic.org.

The views expressed in this publication do not necessarily represent the views of NAIC, its officers or members. All information contained in this document is obtained from sources believed by the NAIC to be accurate and reliable. Because of the possibility of human or mechanical error as well as other factors, however, such information is provided "as is" without warranty of any kind. **NO WARRANTY IS MADE, EXPRESS OR IMPLIED, AS TO THE ACCURACY, TIMELINESS, COMPLETENESS, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY OPINION OR INFORMATION GIVEN OR MADE IN THIS PUBLICATION.**

This publication is provided solely to subscribers and then solely in connection with and in furtherance of the regulatory purposes and objectives of the NAIC and state insurance regulation. Data or information discussed or shown may be confidential and or proprietary. Further distribution of this publication by the recipient to anyone is strictly prohibited. Anyone desiring to become a subscriber should contact the Center for Insurance Policy and Research Department directly.
