

Reinsurance Market Outlook

January 2016



Contents

Executive Summary:	
Demand Growth from Diversifying Sources—Reinsurer Capital Stable	1
Reinsurer Capital Remains Strong	2
Reinsurance Demand Growth Begins to Take Off	5
Third and Fourth Quarter 2015 Catastrophe Bond Review	10
Rating Agency Criteria Continues to Evolve	13
Regulatory Developments on the Horizon	16
M&A Activity Update—Continued Pressure	20
2015 Global Catastrophe Losses Decrease for Fourth Consecutive Year	21
Flood Remains a Major Global Growth Opportunity	25
Economic and Financial Market Update	29
Bank Leverage Continues a Slow Decline	37
Contact Information	38
About Aon Benfield	39

Executive Summary: Demand Growth from Diversifying Sources—Reinsurer Capital Stable

The value proposition of reinsurance improved further and insurance companies continued to incorporate reinsurance capital with modestly better pricing, terms and conditions into their underwriting capital structures at January 1, 2016. Global reinsurance capital remained unchanged at USD565 billion since Q2 2015, and down 2 percent from the year end 2014. Alternative capital increased further in Q3 2015 to USD69 billion, essentially doubling the property catastrophe reinsurance capacity of the market.

Meeting demand growth from diversifying sources for our clients was an important step for the reinsurance market in 2016. Leading reinsurers invested heavily in skills and processes to allow more of our clients' risks to be managed in the reinsurance market. These commitments will need to continue and broaden beyond the early-movers to allow us to continue to meet growing demand in six areas: (a) US mortgage credit risk—driven by regulatory interest in risk pricing and spreading; (b) life and annuity risk—driven by massive global retirement demographics; (c) government risk depopulation and risk transfer—driven by the near intersection of the cost of risk transfer and governments' cost of risk financing; (d) regulatory and rating agency capital model adoptions and enhancements—driven by global equivalence goals; (e) tactical reinsurance transactions—driven by the realization that capital management focused reinsurance buying leaves risk and account retentions at levels that can drive business unit underperformance; and (f) emerging insurance risks such as cyber and corporate gig-liability programs—driven by higher levels of losses and board level risk appetite.

Adverse currency fluctuation and unrealized investment losses impacted reinsurance capital, offset by stable operating earnings aided by continued light catastrophe activity. Total alternative capital was up 8 percent through Q3 2015 and remains impactful to the overall market for risk transfer. Many more traditional reinsurers have incorporated alternative capital into their underwriting capital structures and enhance offerings to their primary insurer customers (longer contract duration, eased reinstatement terms, hours clauses, etc.). Barring a significant shift in supply and demand dynamics, we maintain our estimate that alternative capital will reach USD120 billion to USD150 billion by 2018. The hedge fund reinsurance model was challenged by investment management results in 2015 and this may impact the pipeline of potential new entrants in 2016.

Our outlook for April 1, 2016 renewals is positive. Insurers are likely to find improvements in pricing terms and conditions that are similar to what we achieved for clients at January 1, 2016.

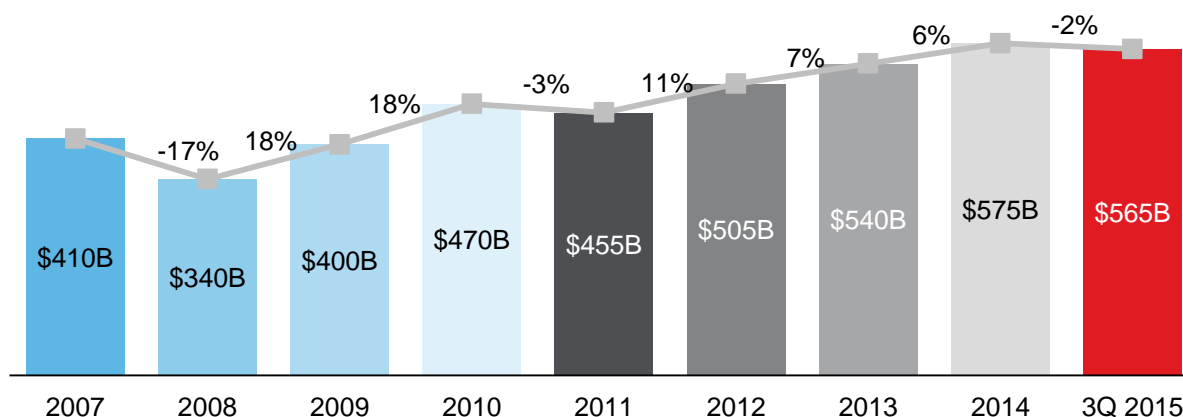
Note: This reinsurance market outlook report should be read in conjunction with our firm's views on rate on line, capacity and retention changes for each cedent's market. Our professionals are prepared to discuss variations from our market sector outlook that apply to individual programs due to established trading relationships, capacity needs, loss experience, exposure management, data quality, model fitness, expiring margins and other factors that may cause variations from our reinsurance market outlook.

Reinsurer Capital Remains Strong

Reinsurer capital declined 2 percent at Q3 2015 to USD565 billion compared to year end 2014. Most capital positions were impacted by unrealized investment losses and/or adverse foreign exchange movement. Despite a modest decline from its peak position in 2014, reinsurance transactions remain supported by high quality capital.

Differentiators for reinsurers going forward are increasingly apparent. Underwriting expertise, breadth and depth of coverage, and responsible servicing translate to strong broker and client relationships. Tailored solutions for clients are more widely accepted by reinsurers and have led to growth in a number of lines of business. Many have put even further focus throughout 2015 on client intimacy, enhanced risk analytics, broader product and distribution capabilities, and capital market relationships while at the same time simplifying and streamlining their businesses wherever possible to maximize operating efficiencies.

Exhibit 1: Change in global reinsurer capital



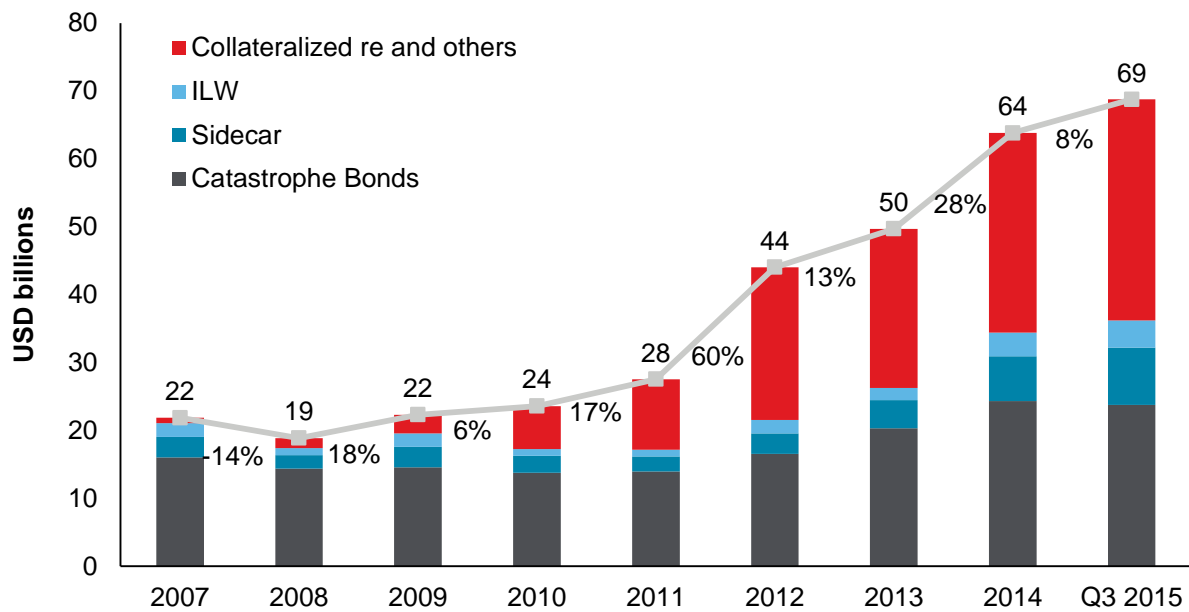
Source: Individual company reports, Aon Benfield Analytics

Reinsurance markets at January 1, 2016 continued to broaden the spectrum of coverage and type of placements they will support. Across many programs, reinstatement terms improved, more multi-year coverage was available, and reinsurers worked with insurers to develop unique structures, and support new insurance strategies and lines of business. More of this trend is expected in 2016 as reinsurers maintain strong capital positions and find continued pressure from the alternative markets.

Alternative capital

Alternative capital continues its climb to USD69 billion and now represents over 12 percent of overall reinsurer capital. Despite a slight decline in capital from catastrophe bonds, overall alternative capital increased 8 percent over year end 2014. Collateralized reinsurance continued its trend with more than a 10 percent increase to USD32.8 billion, now representing nearly 50 percent of the overall capacity provided by the alternative markets. Sidecar capacity made the most significant movement in 2015 ending Q3 with approximately USD8.5 billion in capital, an increase of close to 30 percent over year end 2014. ILW increased slightly to USD4 billion and catastrophe bond capital decreased 2 percent through Q3 2015 ending the quarter at USD23.9 billion.

Exhibit 2: Bond and collateralized market development

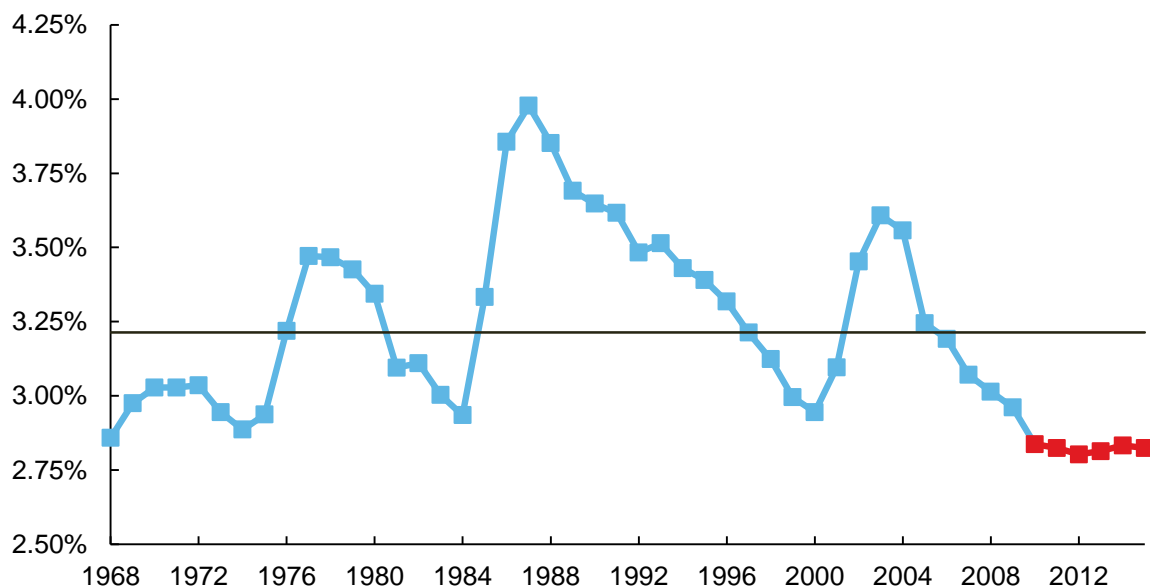


Source: Aon Securities Inc.

The great moderation

For several years we have been reporting US property casualty premium as a percentage of GDP to show a proxy for the impact of the industry on the overall economy. The graph below shows this fascinating time series over the last 48 years, including a projection for 2015.

Exhibit 3: Net written premium to GDP



Source: Aon Benfield Analytics

Over the last five decades the penetration of the industry has oscillated around its long-term average of 3.2 percent. For industry veterans the graph tells the well-known history of the malpractice/inflation/asset hard market of the 1970s, the casualty/liability/LMX spiral induced hard market of the 1980s and the more recent fall out from 9/11, and the soft market of the late 1990s. But today, the graph has a new feature: the unprecedented stability of the last six years. Since 2010, and including an estimate for 2015 based on half year US property casualty results combined with a Q3 forecast of current GDP, premium to GDP has ranged only four basis points, from a high of 2.84 percent in 2010 to a low of 2.80 percent in 2012. Our estimate for 2015 is 2.82 percent, down one basis point on 2014. Are underwriting cycles dead?

Failed predictions of a “new normal” or “this time it is different” abound in the financial and economic press, so we need very solid evidence before calling the end of cycles. The evidence must provide true structural reasons why we believe in the change—evidence we believe is provided today by alternative capital.

Historically, why were there underwriting cycles? There are many theories—including shock catastrophic losses and the inevitable lags in claims reporting and loss development—but frictions in the capital markets, impeding the flow of capital into stressed markets, provide the most compelling explanation. Paralleling the development of catastrophe models since the last 1980s, the most important development in insurance over the last twenty years has been radical improvements in the technologies available to deploy capital very quickly, as and where needed: the story of alternative capital. After each shock loss since Andrew in 1992 we have seen new capital deployed more and more quickly into the market hot spots. And today we have capital moving in aggressively even where there are no hot spots, simply because it provides a more efficient risk bearing mechanism for insureds—in the form of side cars, permanent hedge fund sponsored insurers, and other similar mechanisms.

The lower cost underwriting capital may be permanent, as we discuss elsewhere, and it is having profound changes on how insurance companies structure their balance sheets and bear risk. Most of the alternative capital flowing to the industry in the last six years comes from pension funds, which have a very long dated view of investing in sectors that are uncorrelated with equity, interest rate, and credit risk. This capital needs to be incorporated into the underwriting capital of insurers, whether accessed directly through a sponsored vehicle, or indirectly through reinsurance (which in turn leverages the new capital). This new capital may be a more efficient risk engine in the market. Failure to leverage this new engine may result in an industry with less competitive rates and a gradual erosion of GDP share.

Today it is essential the management and board of insurers perform a thorough review of the new opportunities available in the market to ensure their capital risk engine is running at maximum efficiency. It is important to recognize these new opportunities can exist at many different points in the risk spectrum and are not merely limited to the catastrophe risk-driven tail that has been the focus of the last decade. Your Aon broker or banker will be happy to provide you with a customized summary of the most compelling new offerings we have seen in the market to determine how they could lower your cost of underwriting capital and improve your competitive position in the market.

Reinsurance Demand Growth Begins to Take Off

A number of factors are expected to impact the demand for reinsurance throughout 2016. From rating agency and regulatory changes to insurers seeking to expand into new lines of business, our expectation is for increased demand in the next 12 months. Many seasoned buyers are re-evaluating their buying strategies, moving away from buying only to protect tail risk and towards recognition that new capital potentially provides cheaper risk capital at many different points along the risk spectrum. Early adopters of cheaper underwriting capital will secure an early mover advantage in the market to help drive premium growth.

Exhibit 4: Key topics impacting reinsurance demand

Topic	Impact	Commentary
US Mortgage Credit Risk	Increase	2015 saw a significant increase in the volume and magnitude of reinsurance and insurance transactions focused on US residential mortgage default risk. Over USD3.5 billion of limit was placed across 14 separate transactions in support of credit risk transfer efforts of the two Government Sponsored Enterprises (GSEs), Fannie Mae and Freddie Mac. Starting in 2013 these entities, encouraged by their regulator the Federal Housing Finance Agency (FHFA), began exploring a range of risk transfer solutions to move mortgage default risk, which historically had been retained net, to private capital. We are working towards upwards of 50 active (re)insurers in the space supporting deals. Anticipated annual GSE demand for risk transfer is as high as USD6 billion.
Life and Annuity Risk	Increase	The combination of retirement demographics, low interest rates, and increasing longevity are driving resurgence in demand for life and annuity reinsurance. Leading reinsurers are investing in skills to rebuild a reinsurance market to meet the demand for the embedded equity, interest rate, and biometric risks for life insurers.
Privatization of Government Risk	Increase	A number of opportunities to privatize government risks continued in 2015 with more opportunity available. Florida Citizens depopulated and cut premium and exposures in half over the last two years creating reinsurance demand from private insurers accepting the risk, while Citizens itself has also consistently increased its reinsurance demand in recent years despite the depopulation. In addition, the Florida Hurricane Catastrophe Fund secured private market reinsurance for the first time in 2015. On the horizon, flood risk also maintains a lower ratio of insured to economic losses when contrasted against other major catastrophe perils, and remains a substantial global growth opportunity for the insurance industry.

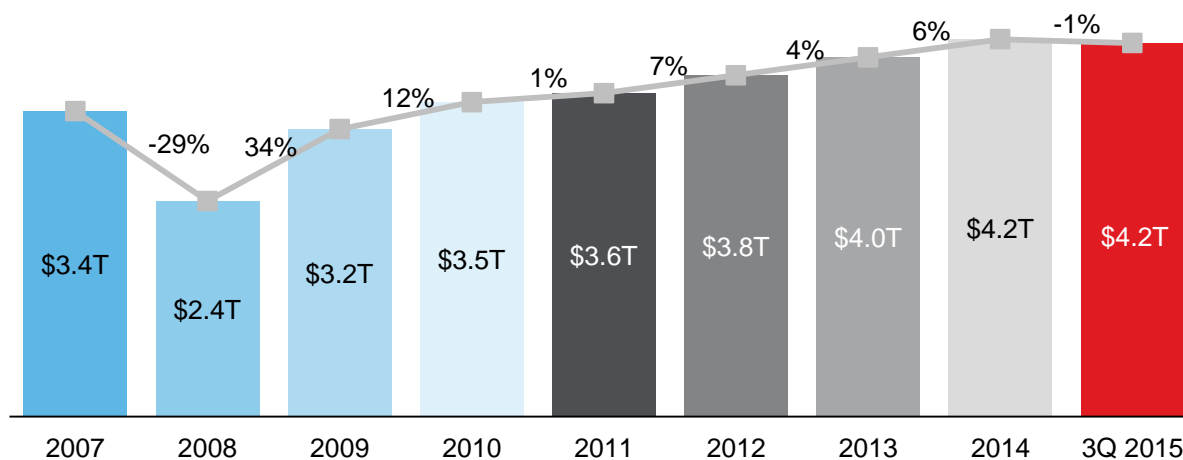
Topic	Impact	Commentary
Regulatory and Rating Agency Capital Model Adoption and Enhancement	Increase	The effective date of Solvency II has resulted in regulators around the world focusing attention on the path towards equivalence, updating capital models, and incorporating new stress tests within the regulatory framework. There will be increased reinsurance demand as companies manage capital requirements and risk tolerances. Rating agency A.M. Best is releasing a request for comment on a new BCAR model in Q1 2016 that will evaluate capital adequacy at various confidence intervals. While the industry is well-capitalized overall, some companies will be meaningfully pressured at higher confidence intervals leading to increase in demand for reinsurance. Also, Fitch released a factor based model for EMEA and APAC with Latin America on the horizon, which may influence some demand.
Tactical Reinsurance Transactions	Increase	Large reinsurance buyers seeking to recapture diversification benefits by raising retentions across multiple divisions have left business units vulnerable to outsized volatility from higher risk and account retentions. The combination of excess reinsurer capital and multiple cases of business unit underperformance have led to the exploration of more tactical reinsurance transactions.
Emerging Insurance Risks	Increase	Strong insurer capital positions and a reinsurance market focused on securing new premium has led to line of business expansion. Flood, cyber, and corporate giga liability are potential expansion opportunities for the market.
Potential M&A Activity	Slight Decrease	Conditions remain right for mergers and acquisitions within the industry. A synergistic opportunity for many such mergers is consolidating reinsurance programs and retaining more risk on a larger balance sheet. However, demand for reinsurance, such as adverse development covers, can enhance capital adequacy of targets and provide due diligence cover for acquirers.

Source: Aon Benfield Analytics

Insurer capital remains in strong position

Insurer capital remains relatively flat since year end 2014 at USD4.2 trillion. Insurance companies globally benefited from low catastrophe loss activity.

Exhibit 5: Change in insurer capital



Source: Aon Benfield Analytics

Growth opportunities started to take hold in 2015

2015 was a positive year for growth opportunities in the reinsurance market and much of this also supported growth in the insurance market. Mortgage, cyber, and flood reinsurance all supported opportunities in primary market development while some government related entities also effectively secured more reinsurance capacity than in years past. This trend is expected to continue in 2016.

Mortgage

2015 saw a significant increase in the volume and magnitude of reinsurance and insurance transactions focused on US residential mortgage default risk. Over USD3.5 billion of limit was placed across 14 separate transactions in support of credit risk transfer efforts of the two Government Sponsored Enterprises (GSEs), Fannie Mae and Freddie Mac. Starting in 2013 these entities, encouraged by their regulator the Federal Housing Finance Agency (FHFA), began exploring a range of risk transfer solutions to move mortgage default risk, which historically had been retained net on their balance sheets, to private capital. These transactions represent new premium to the market at a time when the industry is desperately seeking ways to deploy its natural skill set in portfolio risk management in non-correlated lines of business.

The majority of these transactions occur either in the capital markets via the issuance of credit linked notes called Structured Agency Credit Risk notes (STACR®) by Freddie Mac and Connecticut Avenue Securities (CAS) by Fannie Mae or in the (re)insurance market via Freddie Mac's Agency Credit Insurance Structure (ACIS®) or Fannie Mae's Credit Insurance Risk Transfer (CIRT™) deals.

ACIS® and CIRT™ are aggregate excess of loss programs that cover known portfolios of mortgages recently acquired by the GSEs. They have terms as long as 12.5 years with a fixed attachment point and floating limits that reduce over time as loans in a covered portfolio come out of the pool due to prepayments from mortgage refinances or sales. These transactions offer attractive economics for (re)insurers on an asset class that does not correlate to the lines of business that currently drive (re)insurance risk accumulation and rating agency capital. The USD3.5 billion of limit placed in 2015 is likely to generate in excess of USD750 million of premium during the life of the transactions.

2014 and 2015 also have seen the reemergence of monoline mortgage insurers as significant buyers of reinsurance as a supplement to their capital. The mortgage insurance industry has returned to profitability as the pre-crisis portfolios have largely stabilized and the new business written post crisis is widely considered to be some of the best business written in the history of the industry. Mortgage insurers have repaired their balance sheets and are seeking reinsurance partnerships to amplify their capital base in the wake of changes to the capital requirements imposed on them by the FHFA, Fannie Mae, and Freddie Mac. Many mortgage insurers are also seeking to establish longer term reinsurance partnerships as an enhancement to their risk management strategy that prior to the crisis saw limited use of private third party reinsurance.

Aon Benfield is leading the way in building market capacity to support the GSEs large risk transfer appetites. We continue to invest in analytical tools to assist the markets in their due diligence of these innovative opportunities. We are working towards upwards of 50 active (re)insurers in the space supporting deals, as well as USD6 billion of projected annual GSE risk transfer.

Cyber

Reinsurance capacity for cyber risk is available and continues to be viewed as a growth area for a fair number of reinsurers. While there is still headline risk from recent data breaches such as Anthem, Inc., Premera Blue Cross, Experian / T-Mobile, and Ashley Madison, it still remains an opportunity for many who are willing to invest in resources to understand the dynamics of cyber as a peril and product.

The demand for cyber insurance coverage and products continues. Some carriers have seen their portfolios grow by more than 20 to 30 percent over a 12 month period. Demand for reinsurance has been created for a number of reasons including aggregations to risk in certain industries, the potential of systemic exposure to large scale event risk, and the overall unknown based on a growing and evolving exposure.

Keeping pace with insurance demand, reinsurers continue building specific expertise and in some cases have dedicated specific underwriters to understanding this exposure. Reinsurance capacity and expertise are expected to develop over the next several years as growth in cyber risk (re)insurance continues; however, existing reinsurance markets that support cyber are under careful watch for their growth and aggregations of exposures.

Life annuities

More companies are looking for alternatives to manage their variable annuity risk besides economic hedging using capital market instruments. Some direct writers are bulking up their macro hedging programs, others are looking for indemnity-based reinsurance market solutions, and some are looking at product risk reduction solutions like controlled volatility-based underlying investment solutions. Key pressures on the annuities market include financial reporting changes and evolving capital standards in Europe and the United States that are driving a need for faster and more flexible enterprise risk management software solutions.

In North America two SIFIs have invested in new hardware and software to help with analytics and bolster controls and in Europe we have seen companies respond to Solvency II internal modeling challenges by stitching together various third party and internal tools and process to help with increased forecasting requirements. The speed, transparency, and flexibility of PathWise® as an enterprise business solution is helping clients with these issues and all their toughest business challenges in Europe, North America, and Asia.

Government held risk

While some government risk plans remain heavily reliant on future contingent liabilities of the public to fund losses, there are programs that have effectively transferred more risk to the private market in 2015. Significant growth opportunities still remain in this sector.

Florida Citizens Property Insurance Corporation (Citizens) continues to increase its overall reinsurance placement in the market, growing from a mere USD575 million in capacity secured in 2011 to a program that now provides more than USD3.9 billion in risk transfer protection. This private market reinsurance, along with coverage from the Florida Hurricane Catastrophe Fund and surplus could have fully funded more than 100 year event for each account in 2015. This compares very favourably to 10 years ago when the company was levying assessments for the High Risk Account following two major storm years. Years of low storm activity have helped to increase capital, but Citizens also employed meaningful measures to reduce risk through revising rating plans and further working with companies to depopulate risks from the portfolio.

In addition, the Florida Hurricane Catastrophe Fund, for the first time in history, secured reinsurance capacity in the private market to supplement its cash position.

Third and Fourth Quarter 2015 Catastrophe Bond Review

Catastrophe bond issuance for the 2015 calendar year totaled USD6.9 billion, contracting from the prior year in response to the prevailing competitive landscape within the (re)insurance market. The 2015 year was marked by a strong initial level of issuance, with a record setting first quarter, as momentum continued from the all-time high in property catastrophe bond annual issuance set in 2014. However, issuance was more tepid the rest of the year due to increased competition from traditional and collateralized reinsurers as well as an industry focus on mergers and acquisitions activity.

Nevertheless, total catastrophe bonds on-risk reached USD24.4 billion as of year end 2015 representing a new all-time market high, as has been the trend every year since 2012. Maturities for 2015 totaled USD6.8 billion, also a market high, resulting in a net market increase as annual issuance continues to outpace maturities.

During the second half of 2015, 10 catastrophe bond transactions closed totaling USD2.2 billion. Of note, four of the transactions included parametric triggers, which until recently has been a more unique feature in the market. Parametric triggers are particularly useful for non-insurance corporations, a key market segment for potential growth, where loss reporting and investor acceptance of indemnity triggers is more limited. Additionally, a broad array of perils and geographies were covered by the transactions including the first China-exposed catastrophe bond in market history, Panda Re Ltd. Series 2015-1, which provides earthquake coverage. The more typically covered, US nationwide, regional, and state specific coverages were placed, in addition to Turkey and Japan earthquake. One life and health catastrophe bond closed covering Australia, Canada, and United Kingdom extreme mortality (including deaths caused by terrorism events).

The following table summarizes the terms of the deals that closed during the second half of 2015.

Exhibit 6: Third and fourth quarter 2015 catastrophe bond issuance

Beneficiary	Issuer	Series	Class	Size (millions)	Covered Perils	Trigger	Rating	Expected Loss ¹	Interest Spread
Third Quarter									
China Property and Casualty Reinsurance Company	Panda Re Ltd.	Series 2015-1	Class A	\$50	China EQ	Indemnity	Not Rated	N/A	N/A
Hannover Rück SE	Acorn Re Ltd.	Series 2015-1	Class A	\$300	West coast EQ	Parametric	BB (Fitch)	0.74%	3.40%
Turkish Catastrophe Insurance Pool	Bosphorus Ltd.	Series 2015-1		\$100	Turkey EQ	Parametric Index	Not Rated	1.50%	3.25%
California Earthquake Authority	Ursa Re Ltd.	Series 2015-1	Class B	\$250	CAL EQ	Indemnity	Not Rated	2.55%	5.00%
Fourth Quarter									
National Railroad Passenger Corporation	PennUnion Re Ltd.	Series 2015-1	Class A	\$275	US HU (Storm Surge and Wind), EQ	Parametric	BB-(S&P)	1.99%	4.50%
Everest Reinsurance Company	Kilimanjaro Re Limited	Series 2015-1	Class D	\$300	US, CAN, PR HU and EQ	Industry Index	Not Rated	5.25%	9.25%
			Class E	\$325				3.00%	6.75%
United Services Automobile Association	Residential Reinsurance 2015 Limited	Series 2015-II	Class 3	\$125	US HU, EQ, ST, WS, WF, VE, MI	Indemnity	Not Rated	3.65%	7.25%
National Mutual Insurance Federation of Agricultural Cooperatives	Nakama Re Ltd.	Series 2015-1	Class 1	\$100	JP EQ	Indemnity	Not Rated	1.16%	2.875%
			Class 2	\$200				0.86%	3.25%
Swiss Reinsurance Company Ltd.	Vita Capital IV Limited	Series 2015-1	Class A	\$100	AUS, CAN, UK mortality	Mortality Index	BB (S&P)	0.99%	2.9%
Münchener Rückversicherungs-Gesellschaft Aktiengesellschaft	Queen Street IX Re dac			\$100	US HU, AUS CY	Multiple	Not Rated	2.82%	6.15%
Total Priced During Q3 and Q4 2015				\$2,225					

¹ Annualized modeled expected loss; sensitivity cases if U.S. hurricane is a covered peril

Source: Aon Securities Inc.

Legend:

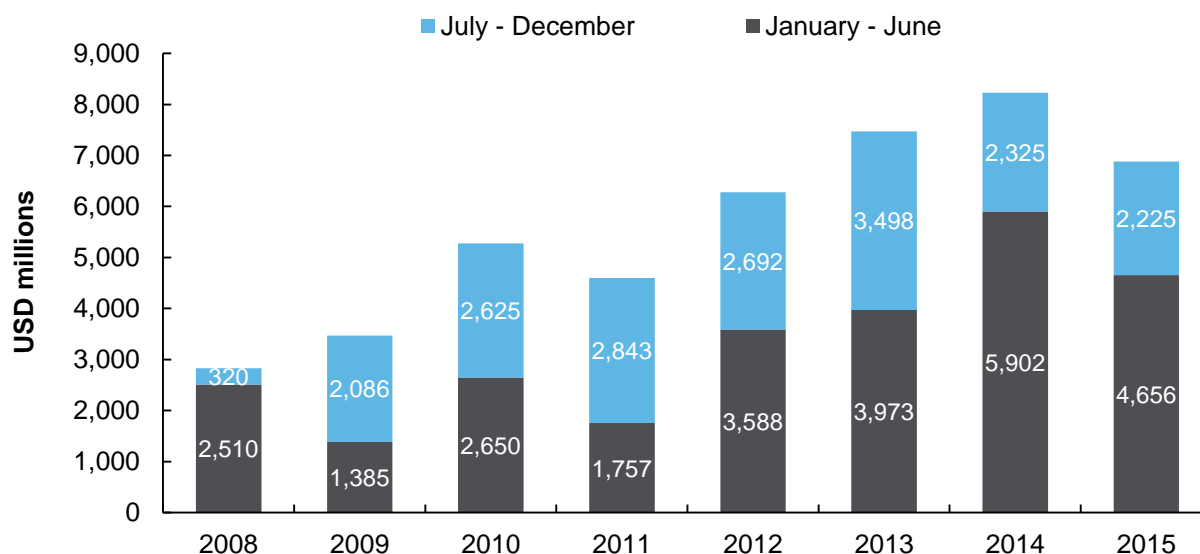
AUS – Australia	CY – Cyclone
CAL – California	EQ – Earthquake
CAN – Canada	HU – Hurricane
FL - Florida	MI – Meteorite Impact
EU – Europe	ST – Severe Thunderstorm
JP – Japan	WF – Wildfire
PR – Puerto Rico	WS – Winter Storm
US – United States	VE – Volcanic Eruption

The National Railroad Passenger Corporation (known as Amtrak) secured through its subsidiary Passenger Railroad Insurance, Ltd., USD275 million in parametric index per occurrence cover for earthquakes, as well as storm surge and wind resulting from named storms. The parametric index is based on data collected from calculation locations within regions of the New York City metropolitan area and Delaware for storm surge as well as select Northeast and Mid-Atlantic States for wind. This footprint aligns with the center piece of the network's passenger rail transportation system, Amtrak's Northeast Corridor. PennUnion Re Ltd. was the second transaction to benefit a non-insurance corporation through use of a parametric trigger in the second half of 2015. It followed Acorn Re Ltd., a transaction fronted through Hannover Rück SE on behalf of Oak Tree Assurance, Ltd., a Vermont captive insurance company owned by the Kaiser Foundation Health Plan, Inc.

Everest Reinsurance Company (Everest Re) returned to the catastrophe bond market with its third transaction under the Kilimanjaro Re Limited program. The Series 2015-1 Class D and E notes provide North America named storm (expanded to include the entire US, Canada, and Puerto Rico) and earthquake coverage on an industry index per occurrence basis. The USD625 million issuance brings total catastrophe bond capacity secured by Everest Re to USD1.575 billion and ranks the property and casualty (re)insurer second overall in total outstanding limit as at year-end 2015, all in just two years of issuance.

Swiss Reinsurance Company Ltd. (Swiss Re), historically the largest sponsor of catastrophe bonds as based on issuance volume since market inception, issued via Vita Capital IV Limited its first catastrophe bond transaction since 2013. The USD100 million extreme mortality transaction combines with two prior life and health transactions placed earlier in the 2015 calendar year to bring life and health annual issuance to USD610 million, representing the second highest level for the life and health catastrophe bond sector in a single year in market history and the most since the 2007 financial crisis.

Exhibit 7: Catastrophe bond issuance by half year



Source: Aon Securities Inc.

Aon Securities expects prevailing catastrophe bond market trends to persist into 2016, with the continuing privatization of public risks through residual market transactions, further utilization by non-insurance corporate sponsors, and an increasingly diverse and expanding covered area and exposure base. In addition, our firm anticipates an increase of issuance by reinsurers during 2016.

We expect US property peak peril risks, such as Florida hurricane and California earthquake, to continue to dominate the catastrophe bond market in 2016, in alignment with the global (re)insurance market. Although recent rate stabilization at historic market lows has motivated some investors to pull back, many still see significant and continued value in the asset class. As overall asset allocation remains relatively low in the global capital markets, the upward potential for the catastrophe bond market still remains high despite year-over-year contraction.

Aon Securities' preliminary view for 2016 primary catastrophe bond issuance is USD6 to 7 billion.

Rating Agency Criteria Continues to Evolve

Rating agencies continually fine-tune criteria to address industry trends and anticipate emerging issues, while improving their analytical approach and increasing rating transparency. Below, we summarize key criteria developments for 2016.

A.M. Best to issue request for comment on new stochastic BCAR model

A.M. Best has been developing a new stochastic factor-based BCAR model and is set to release draft criteria in March for the US P&C statutory model. They will also release criteria for the US Life & Health, Canadian, Title, and Universal BCAR models in the months following. While the overall structure of the model is not intended to change materially, risk factors will be determined using stochastic simulations from probability curves at various confidence intervals. At each successive confidence interval, risk factors for bond default, stock volatility, reinsurer default, pricing risk, and reserving risk are increasingly conservative. In addition, the catastrophe charge will vary based on higher return periods, and will be applied on an All Perils, occurrence VaR basis rather than by peril. The table below provides the confidence intervals and related catastrophe return periods.

Confidence Interval	95.0%	99.0%	99.5%	99.8%	99.9%
Catastrophe PML	20yr	100yr	200yr	500yr	1,000yr

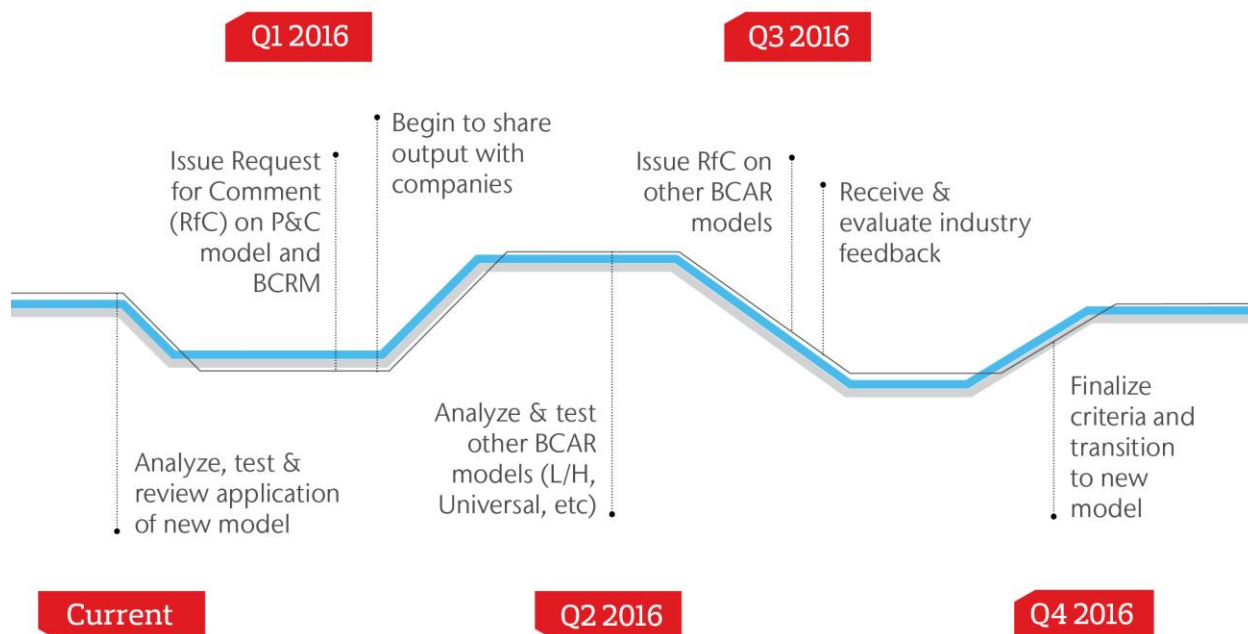
Companies most at risk to a change to the model are higher rated companies (A- or above) whose catastrophe reinsurance program exhausts near the 100-year return period as they will likely see a material drop in capital adequacy at higher confidence intervals. This will influence A.M. Best's overall view of their balance sheet strength. In addition, companies with relatively low BCAR scores under the current model are at risk given less inherent cushion to absorb the impact of more conservative factors.

It is important to keep in mind that adequate capital remains only one component of the overall rating assessment. Operating performance, business profile, and enterprise risk management (ERM) are still integral aspects of the rating process. A.M. Best has indicated that they plan to release a revised Best's Credit Rating Methodology (BCRM) in conjunction with the release of the stochastic BCAR model.

A.M. Best plans to publish five BCAR scores for rated entities across all confidence intervals, which could have implications for insurer capital management. The change in catastrophe charge may encourage insurers to buy more catastrophe cover to mitigate the impact on net required capital. The current charge is based on the greater of 100-year wind or 250-year earthquake. The new requirement will be on an all perils basis, varying by confidence interval as shown above. As an example, an A rated carrier driven by hurricane exposure faces a catastrophe charge based on the 100-year hurricane PML in the current model but will be evaluated at the 200, 500, and 100 year return periods in the new model.

In addition, asset risk charges will increase materially from the current model, specifically in the higher confidence intervals. The most meaningful increase will be the risk charge pertaining to equity holdings. Under the current framework, the default risk charge is 15 percent, while the risk charges under the new model reach nearly 50 percent at the upper confidence intervals. This could drive some reinsurance demand, as reinsurance can provide capital relief to companies who wish to maintain their equity portfolios.

The illustration below shows Aon Benfield's view of the estimated BCAR timeline, which is subject to model testing results and/or the level of industry feedback.



Increased scrutiny of catastrophe risk tolerances

Rating agencies and regulatory authorities have become increasingly mindful of company catastrophe risk tolerances. These entities continue to stress the importance of management identifying and evaluating risks throughout the organization, which could have a significant impact on company enterprise risk management practices and ultimately, reinsurance purchases.

Aon Benfield's annual Catastrophe Risk Tolerance Study evaluates catastrophe risk tolerances for 102 global (re)insurers and shows that 84 percent of these companies make some form of public disclosure. Of the companies that disclosed catastrophe risk tolerance information, many reported on a 100yr or 250yr basis. The table below summarizes the insurer median and maximum PMLs for both 100yr and 250yr results as a percentage of equity.

Return Period	Median	Maximum
100yr	4.8%	17.0%
250yr	8.0%	25.7%

New regulatory and rating agency developments may change the way companies think about catastrophe risk tolerances and disclosure expectations from the market. The table below provides a summary of catastrophe exposure thresholds for rating agencies and some regulatory regimes.

Rating Agency / Regulatory Regime	Catastrophe PML
A.M. Best – Current BCAR	Greater of 100yr Wind OEP or 250yr Earthquake OEP
A.M. Best – New stochastic based BCAR	20yr, 100yr, 200yr, 500yr and 1000yr All perils OEP
Fitch	100yr, 250yr, 500yr, 1000yr TVAR AEP
Moody's	250yr All perils AEP
Standard & Poor's	250yr All perils AEP
Solvency II	200yr All perils AEP
U.S. NAIC – proposed	100yr Hurricane and 100yr Earthquake (AEP or OEP)

Note: AEP = Aggregate exceedance probability; OEP = Occurrence exceedance probability

The likely result is that companies will be faced with having to evaluate catastrophe risk with much wider scope than they have previously. As companies begin to expand their view of catastrophe risk in light of these developments, we expect an increase in reinsurance demand.

Rating agency capital remains strong

The rating environment for US property casualty insurers continued its stable trend as all industry outlooks have remained unchanged during the past year. The reinsurance sector continues to be viewed with a negative outlook by the four rating agencies. Capital adequacy remains strong with median BCAR scores for US non-life companies 100+ points above published minimums.

FSR	Min.	2011	2012	2013	2014	2015E	Change
A++	175	284	298	295	280	278	<2>
A+	160	293	326	323	312	302	<10>
A	145	296	292	303	315	318	+3
A-	130	278	272	278	296	288	<8>
B++	115	232	219	216	228	234	+6
B+	100	172	175	198	198	197	<1>

Regulatory Developments on the Horizon

North America—ORSA requirements

First required filings of Own Risk Solvency Assessment (ORSA) summary reports were due before the end of 2015 for non-exempt companies domiciled in states that already have legislation passed. As of the publication release date, 34 states adopted the model act and 2 states have actions pending. The US National Association of Insurance Commissioners (NAIC) adopted ORSA into the NAIC's Accreditation Standards—Part A. The adoption of this new standard will require all member states to pass ORSA legislations on a substantially similar basis as prescribed in NAIC's ORSA Model Act by January 1, 2018. The NAIC's next task will be focusing on finalizing review and evaluation procedures for regulators that are receiving the reports.

- **States Adopted ORSA Model:** AK, AR, CA, CT, DE, GA, IA, IL, IN, KS, KY, LA, ME, MN, MO, MT, ND, NE, NH, NJ, NY, NV, OH, OK, OR, PA, RI, TN, TX, VA, VT, WA, WI, WY
- **States with Actions Pending:** MA, MI

US risk based capital—Catastrophe risk charge

Discussions of key components for calculating the risk based capital (RBC) catastrophe risk charge have been ongoing but are nearing finalization. The NAIC still does not have a definitive timeline for including the catastrophe charge into the actual RBC calculation. It was made clear that the catastrophe component will again be filed on an informational basis only for the 2015 reporting year. Currently, the 2016 reporting year is the tentative target for implementation of the catastrophe charge. The following key decisions made in the past year may have a significant impact on a company's RBC results when the catastrophe charge is implemented:

- Contingent credit risk charge was reduced to 4.8 percent from 10.0 percent
- Allow companies to report both OEP and AEP modeled results as opposed to AEP only

China—C-ROSS

In February 2015, the China Insurance Regulatory Commission (CIRC) issued the final version of C-ROSS rules, and the transition period started right after. During the transition period, insurers report solvency under both the expiring scheme and C-ROSS, while supervision decisions are still based on the expiring scheme. The three-pillar C-ROSS aims to better align solvency capital requirement with the risks insurers face. At the same time, risk management is emphasized and the market discipline mechanism is implemented. For non-life insurers, the average solvency ratio under C-ROSS was 282.0 percent for Q1 2015 and 286.3 percent for Q2 2015. CIRC also revealed the composition of quantifiable risks' minimum capital requirement (for Q2 2015 non-life insurers)—insurance risk, market risk, and credit risk account for 56.8 percent, 40.8 percent, and 32.0 percent respectively, offset by the diversification benefit of 29.5 percent. CIRC commented that the solvency level for the industry was adequate, the risk indicators properly reflected the real risks the industry faced, and C-ROSS guided the insurers to improve their business model, marketing strategy, and risk management. It is widely expected that C-ROSS will be formally implemented in 2016.

Hong Kong and Singapore—Risk based capital

In September 2014, the Insurance Authority (IA) of Hong Kong published its first consultation paper on the development of a new RBC framework. The proposed RBC framework adopts a three pillar structure.

- Pillar 1 consists of the quantitative requirements, including assessment of capital adequacy and valuation.
- Pillar 2 sets out the qualitative requirements, including corporate governance, ERM, and ORSA.
- Pillar 3 focuses on disclosures and enhancing transparency of relevant information to the public.

In September 2015, IA issued the consultation conclusions. There is general support from the insurance industry for the move towards a risk-sensitive capital framework and the enhancement of risk management. There is general agreement on the high level principles of the conceptual framework, although there are mixed views on some of the technical aspects. IA decided to proceed to the next phase, which involves developing the detailed rules and carrying out the Quantitative Impact Study. After that, another consultation exercise will be conducted.

The Monetary Authority of Singapore (MAS) has embarked on a review of the framework (RBC 2 Review) in light of evolving market practices and global regulatory developments. The first industry consultation was conducted in June 2012 in which the MAS proposed a number of changes and an RBC 2 roadmap for implementation. In March 2014, the MAS issued a consultation paper on the RBC framework, updating the previous proposal. This second paper included the detailed technical specifications required for insurers to conduct Quantitative Impact Study 1. This will gather information and help evaluate the full impact of the RBC 2 proposals. MAS is finalizing the risk calibration and features of the RBC 2 framework, with implementation expected January 1, 2017.

Japan—Economic value-based solvency framework

In June 2015, the Japan Financial Service Agency (JFSA) disclosed the results of its second field tests with the aim of introducing an economic value-based solvency regime. The JFSA summarized the direction of future examinations.

- A variety of issues and challenges were recognized in the field tests, as in the previous tests. Based on the results, the JFSA needs to conduct further examination toward establishing a specific framework.
- There are ongoing movements in the economic value-based solvency regime and accounting system, such as the IAIS's ICS field tests, Solvency II in Europe, and examination of IFRS 4 "Insurance Contracts."
- Introducing the economic value-based solvency regime requires some revisions to the business management and risk management methods used by insurance companies.

The JFSA will make steady efforts to establish a new framework through dialogue with relevant parties in various situations, so as to ensure a smooth introduction.

Latin America

Historically, the majority of regulators in catastrophe exposed countries set regulatory limit requirements based on a percentage of Total Insured Value (TIV). There is growing support to transition to a catastrophe model based requirement. Mexico and Peru have already made this transition, basing their regulatory catastrophe limit on the ERN model. Further to this, Peru has recently approved AIR as a regulatory model. Chile is in the process of developing a proprietary catastrophe model with the hopes that it will replace the current TIV calculation. Finally, Colombia, which also has a TIV calculation based limit requirement, is considering a catastrophe model based approach. While it is early to determine the specific outcome of these changes, the potential for some market disruption exists.

In June 2015, Brazil was granted Solvency II equivalency from the European Insurance and Occupation Pension Authority (EIOPA) for a 10 year period. This allows the country to maintain its own solvency capital model with a similar Solvency II scale. In addition, Brazil introduced Regulation CNSP 322, which is intended to reduce the percentage of the mandatory offer of reinsurance to the local market. Currently the regulation requires that 40 percent of all reinsurance must be placed with local reinsurers. Over the next five years, this requirement will be reduced to 15 percent. Approximately 80 percent reinsurance is currently ceded to local markets. This regulation also adjusts the intra-group transfer limitations. Currently, local companies may only transfer 20 percent from a local company to their parent company. Over the next five years, this limitation will be increased to 75 percent.

In April 2015, the Mexican regulators officially adopted the new Insurance and Surety Institutions Law (LISF). Under the new law, regulatory authority will be shifted from the Ministry of Finance and Public Credit (SHCP) to the National Insurance and Surety Commission (CNSF), replacing the statutory examiner with an audit committee. The LISF regulation paved the way for the Unified Insurance and Surety Regulations (CUSF), which was adopted in April 2015 as well. The main objective of this law is to incorporate the Solvency II framework throughout the country. Both the LISF and CUSF set forth regulation similar to Pillar 2 of Solvency II and ORSA requirements with increased Board responsibilities and implementation of risk management and internal control committees.

The Chilean Securities and Insurance Supervisory Authority is expected to discuss requirements for earthquake catastrophe reserves. The current regulation stipulates that insurers must establish a reserve based on CRESTA zone exposure, applying a PML of 10 percent for material damage and of 15 percent for engineering risks and BI covers, less reinsurance and plus a 10 percent safety margin. Although these requirements may be sufficient, Chilean regulators plan to review the adequacy of the current standards.

Europe—Solvency II

The Solvency II Directive (S2), originally published in 2009, comes into effect across the European Union (EU) on January 1, 2016. The new regime represents a comprehensive program of regulatory requirements for insurers, covering authorization, corporate governance, supervisory reporting, public disclosure, risk assessment and management, as well as solvency and reserving. All EU (re)insurers are expected to be compliant from inception, assisted in some cases by certain 'transitional measures' that have been introduced to smooth conversion from the old regime.

S2 introduces economic risk-based solvency requirements in many European countries for the first time. The industry is effectively shifting from a static, mechanical calculation of capital requirements, to a dynamic approach where all assets and liabilities are valued according to market consistent principles. This means that insurers will be required to hold capital against market risk, credit risk, and operational risk, as well as insurance risk.

S2 is expected to introduce some volatility to required capital, but rating agency capital requirements generally still represent the higher hurdle. Larger, more sophisticated (re)insurers already conform to S2 principles, through the way they assess capital, conduct risk management and in their reporting standards. They also typically hold capital buffers in excess of an economic capital requirement that is normally calibrated to at least the same confidence level as S2.

Smaller, less-diversified insurers with limited access to new funds have found converting to the new regime more difficult. In addition, certain risks will prove more capital-intensive than in the past. These factors are expected to create additional reinsurance demand in certain lines and markets.

S2 will recognize securitization and derivatives as effective risk mitigation techniques, which could help to stimulate further interest from sponsors in Europe.

The Middle East and Africa

In the Middle East, as the insurance industry continues its rapid growth, new regulations continue to be introduced with existing regulations strengthening to improve market stability, transparency and policyholder security. While some regulators are adapting Solvency II regulations to fit their markets, others are looking to the IAIS and its Insurance Core Principles. In South Africa, the Solvency Assessment and Management regime comes into effect from January 1, 2017.

M&A Activity Update—Continued Pressure

Merger and acquisition (M&A) activity in the global insurance and reinsurance market increased dramatically in 2015. According to Capital IQ, the global insurance sector M&A deal volume in 2015 totaled USD89.0 billion with 770 deals, compared to USD31.0 billion and 701 deals for the same period of 2014¹, a deal value increase of 187 percent.

The recent increase in M&A activity has been driven by the challenging organic environment and strategic acquirers' desire to expand (i) geographically (e.g. Tokio Marine Holdings/HCC Insurance Holdings), (ii) into new products or distribution channels (e.g. ACE Ltd/Chubb Corporation), (iii) to achieve scale and stronger client relationships (e.g. XL Group/Catlin Group), and (iv) to more effectively utilize existing capital through diversification (e.g. RenaissanceRe/Platinum Underwriters). In addition, asset managers and hedge funds continue to assess opportunities to expand into the insurance sector through acquisitions (e.g. Exor/PartnerRe) or reinsurance start-ups (e.g. ACE Ltd/BlackRock = ABR Re). While a few potential start-up ventures have been postponed, we continue to believe that the unique investment expertise of high quality investment managers can help mitigate the current challenging operating environment. Aon Securities believes that these acquisition motivations will continue into the near future.

A summary of the current market trends affecting insurance M&A activity follows:

- **Reinsurer and insurer stock price performance and valuation multiples continue to be positive.** As summarized in the Aon Securities Weekly Public Market Recap, most global reinsurers' and insurers' stock prices and valuation multiples have maintained or exceeded their pre-crises levels (e.g. P/TBV multiples² for the Large Cap Specialty index = 1.70x and for the London Specialty index = 1.98x). One reason for this positive performance is the continued strength in earnings from a benign catastrophe environment and stable loss reserve releases. Another potential driver is investors' increased M&A expectations.
- **Continued pressure on underlying organic results will drive additional M&A.** Whether the pressure on earnings and returns is from new alternative capital market capacity or from traditional challenges, like low interest rates, reduced favorable reserve development, excess capital, the need for improved capital utilization and operational efficiencies will increasingly stimulate buyers' interest.
- **Investors are accepting tangible book value (TBV) dilution for transactions with compelling strategic rationale.** Despite meaningful tangible book value dilution, investors have been very supportive of M&A transactions with compelling strategic value. Examples include ACE's relative stock price appreciation of 16.3 percent through December 25 despite an estimated 29.0 percent tangible book value dilution from its acquisition of Chubb and XL Group's relative stock price appreciation of 12.5 percent despite an estimated 10.0 percent tangible book value dilution from its acquisition of Catlin Group.³
- **Increasing foreign (especially Asian) interest in the (re)insurance market stemming from the desire to achieve diversification and augmented assets under management.** Increased competition and low global interest rates have led foreign buyers to search for geographic and investment diversification, as well as growth in AUM. This desire has led to acquisitions of (re)insurance companies in mature markets, such as Tokio Marine's acquisition of HCC, China Minsheng's acquisition of Sirius, Fosun's acquisition of Ironshore, and Exor's acquisition of Partner Re.

Over the near term, Aon Securities expects M&A activity to continue at historically high levels as companies seek to satisfy their strategic, diversifying, and asset gathering objectives through acquisition.

¹ Based on YTD announced transactions with publicly disclosed deal values in the global insurance brokerage, P&C, multiline and reinsurance subsectors through December 25, 2015 and December 26, 2014, respectively.

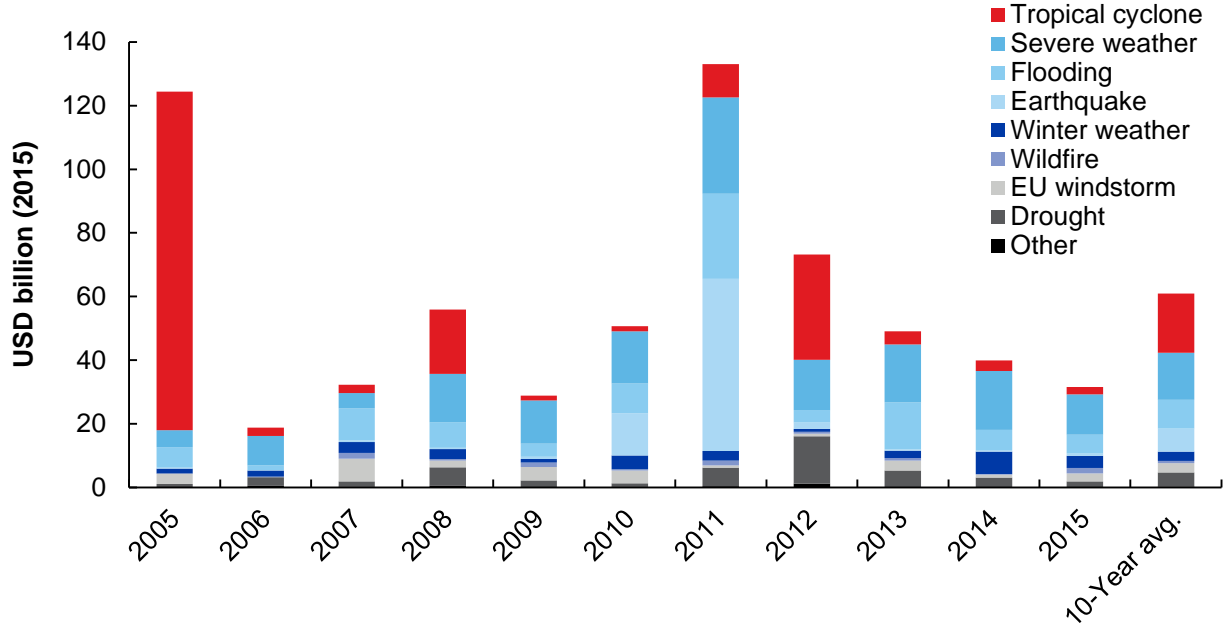
² Mean multiples as of December 25, 2015 for the respective indices.

³ Stock price appreciation is relative to the performance of the S&P 500 and is measured from the day before the transaction announcement to December 25, 2015.

2015 Global Catastrophe Losses Decrease for Fourth Consecutive Year

Insured global catastrophe losses in 2015 were at their lowest levels since 2009. With the exception of winter weather and wildfire, the rest of the natural disaster perils were either at or below their recent 10-year averages (2005-2014). For the fourth consecutive year, catastrophe-related losses continue to decline following a record year in 2011 where the insurance industry and government-sponsored programs paid out more than USD133 billion (2015 USD).

Exhibit 8: Insured losses by year by type



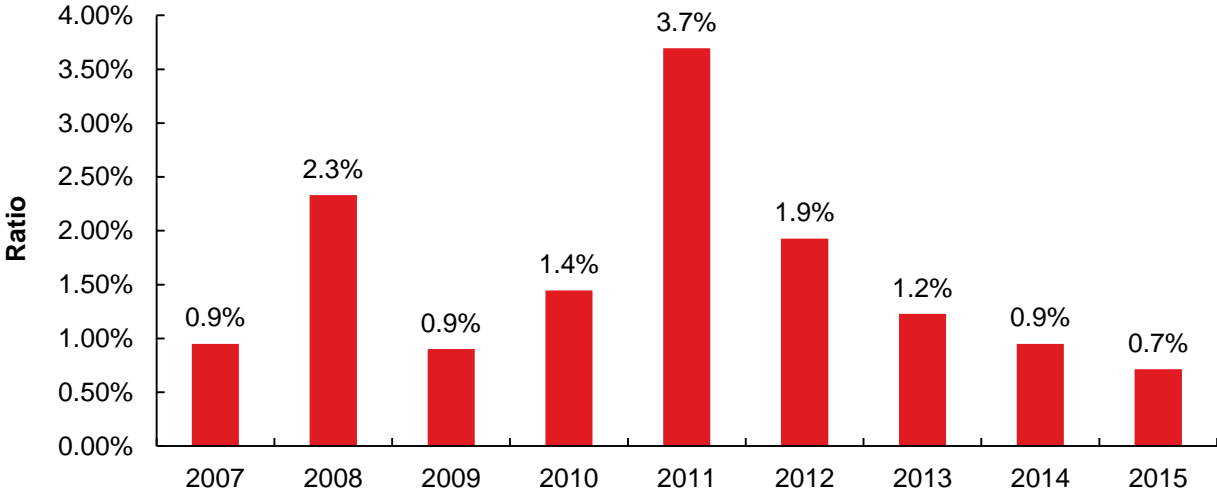
Source: Aon Benfield Analytics

Global insured losses in 2015 were tentatively listed at USD32 billion (subject to change), which is down 48 percent from the 10-year average of USD61 billion. The losses are down 21 percent from those sustained in 2014 (USD40 billion) and down 36 percent from 2013 (USD49 billion). Severe weather (convective storm) events comprised 40 percent of the losses in 2015, primarily driven by separate billion-dollar events in the United States. A multi-billion-dollar February winter weather insured loss event in US due to considerable snowfall, ice, and frigid temperatures in the Northeast, Mid-Atlantic, and the Midwest led to extensive impacts across nearly two dozen states was the costliest insured event of the year on a global basis. The costliest non-US insured events were Windstorms Mike and Niklas in Europe and Typhoon Goni in Japan. Each cost insurers roughly USD1.0 billion. More than USD25 billion—or 81 percent—of overall global insured losses were sustained in the United States and Asia Pacific.

To find the most current global catastrophe loss data for 2015, and other historical loss information, please visit Aon Benfield’s Catastrophe Insight website: www.aonbenfield.com/catastropheinsight

The 2015 Annual Global Climate and Catastrophe Report will also have a complete overview of the year’s events.

Exhibit 9: Insured losses as a percentage of global insurer capital

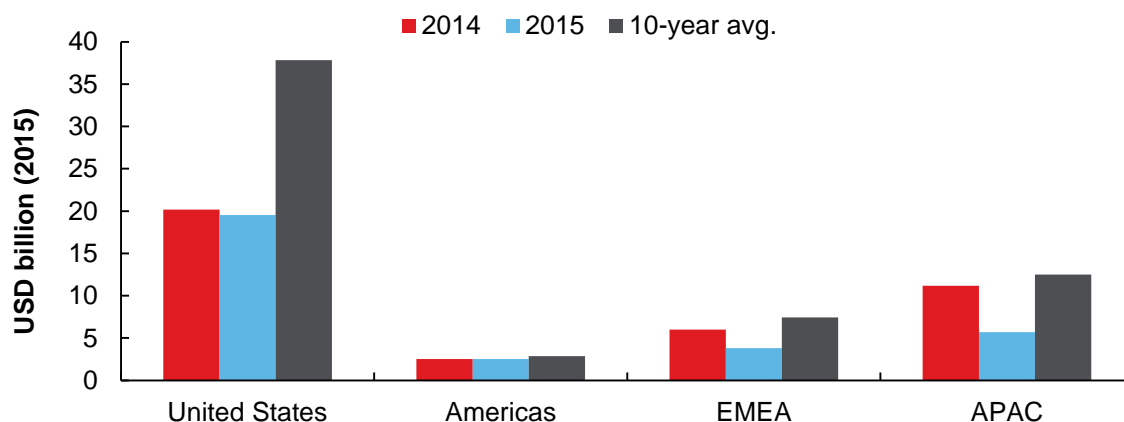


Source: Aon Benfield Analytics

Perhaps a better indication of how subdued insured losses from natural disasters were in 2015 is an analysis of the losses as a percentage of global insurance capital. As noted elsewhere in this report, outside of a notable decrease in global capital during the financial crisis in 2008, capital levels have slowly grown each year. The USD4.2 trillion in global capital through the second quarter of 2015 marks the most on record.

When recognizing the percent of insured losses versus these annual global insurer capital levels, we find that 2015 represented the lowest ratio on record since 2007. The 0.7 percent marks a nearly 87 percent reduction from the recent high of 3.7 percent in 2011. Given a steady decline in these ratios since 2011, this signifies that the industry remains in strong position to handle the next year of substantial catastrophe events. Recent years with below average insured loss values have only further enhanced available insurance capital across the industry.

Exhibit 10: 2015 insured losses by region



Source: Aon Benfield Analytics

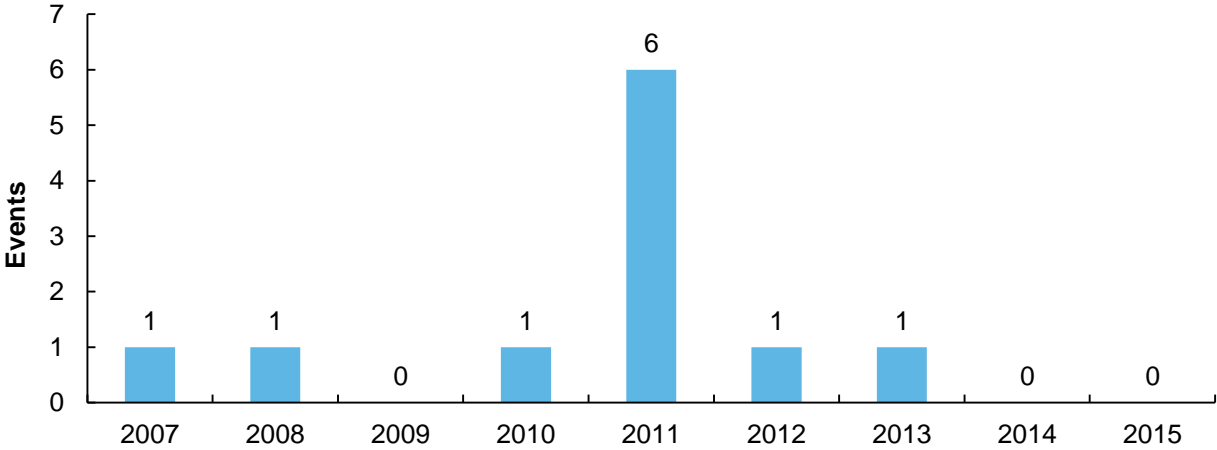
Every major region of the world sustained below average annual insured losses in 2015. The Americas (including North America (non-US) and South America) were the closest to their 10-year average. The combination of the magnitude-8.3 earthquake in Chile, an extended drought in Canada and flooding in Chile all led to higher insured losses in the region. Severe weather events in Canada also caused notable losses. It is worth noting that despite becoming just the second Category 5 hurricane on record in the Pacific Ocean to ever make landfall in Mexico, Hurricane Patricia's most severe impacts missed the major metropolitan areas of Manzanillo and Puerto Vallarta. This led to substantially lower insured losses than what may have happened if the storm meandered either to the north or south.

The highest insured losses, unsurprisingly, were recorded in the United States. An active winter season led to elevated insured losses resulting from heavy snowfall, frigid temperatures, and ice. Massachusetts was particularly impacted throughout the season, including the greater Boston metro region. Despite tornadic activity resulting in a slight uptick with more than 1,100 touchdowns in 2015, most of the severe thunderstorm damage resulted from large hail and damaging straight-line winds. The most notable above-average insured losses in the United States were attributed to the wildfire peril. California experienced its costliest year for wildfires since 2007—primarily due to September's Valley and Butte fires. Combined insured losses from the two blazes alone topped USD1.3 billion.

Elsewhere, Europe withstood several windstorms during the first and fourth quarters of 2015. The costliest was a one-two punch of windstorms Mike and Niklas at the end of March. The storms caused roughly USD1.0 billion in claims payouts. Windstorms Elon and Felix also prompted payouts into the hundreds of millions (USD). In Asia Pacific, the two costliest events were Typhoon Goni in Japan (USD980 million) and severe hail in Australia's New South Wales (USD670 million).

Despite equaling 63 percent of the global total, the United States endured well-below normal losses: 51 percent less than the 2005-2014 norm. The total was even less than in 2014 (USD20 billion). The year was again marked by limited land-falling hurricane activity in the United States. The country remains in a record-setting stretch—0 consecutive hurricane seasons—without a major hurricane landfall (Category 3+) since October 2005's Hurricane Wilma.

Exhibit 11: Global insured loss events >USD5 billion since 2007



Source: Aon Benfield Analytics

In addition to a downward trend of aggregated insured losses in the last several years, there has been a noticeable lack of “major” catastrophes. It has now been two consecutive calendar years in which no singular natural disaster event has caused more than USD5.0 billion in nominal insured losses for the public and private insurance sector. Following a record year in 2011 where six separate events each caused more than USD5.0 billion in insured losses, there have only been two since (Hurricane Sandy in 2012 and the Central Europe Floods in 2013).

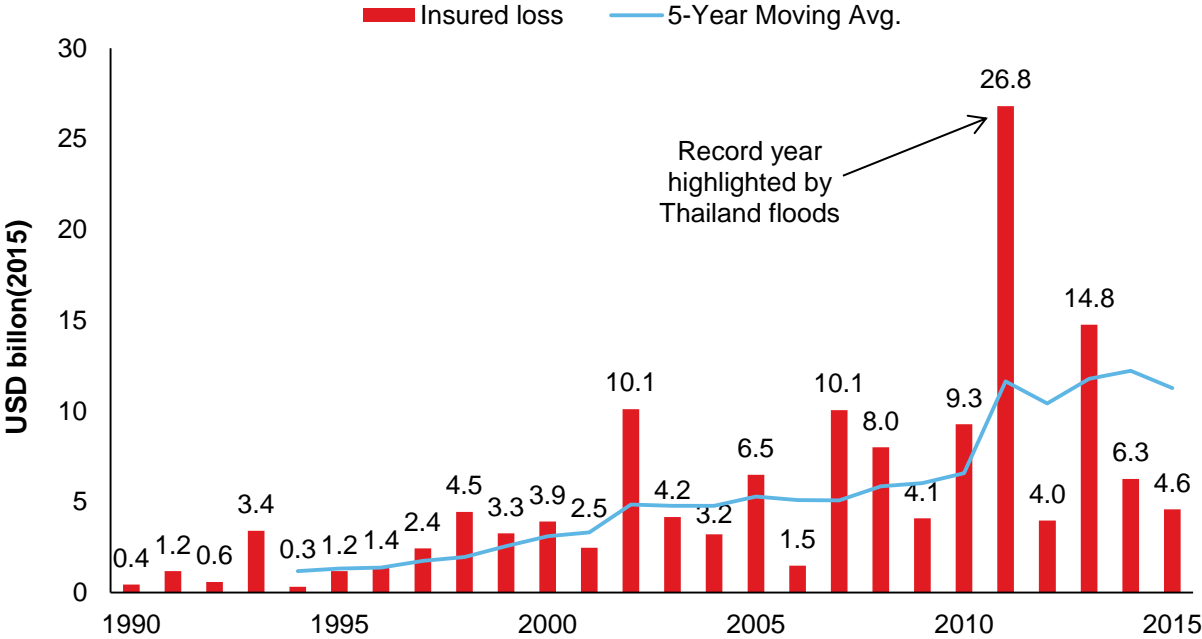
To provide even more perspective, the costliest insured event of 2015—a February winter storm in the United States that left an insured loss of USD2.1 billion—is the lowest “most expensive” annual individual insured loss event since 2000.

Flood Remains a Major Global Growth Opportunity

Global flood continues to experience a lower ratio of insured to economic losses when contrasted against other major catastrophe perils and remains a substantial global growth opportunity for the insurance industry. Despite the high annual economic cost of the flood peril, the insured portion of the USD40 billion in global annual economic loss is relatively modest at USD5.3 billion per year since 1990. This 13 percent coverage ratio highlights the historical lack of flood insurance penetration around the world. For sake of comparison, other insured-to-economic loss ratios include 35 percent for tropical cyclones and 55 percent for severe convective storms.

Economic flood losses have averaged roughly 26 percent for all global catastrophic perils over the last 25 years on an inflation-adjusted basis, and represent the costliest global peril. During that time, tropical cyclones averaged USD36 billion (23 percent) and earthquakes averaged USD34 billion (22 percent) per year on an inflation-adjusted basis.

Exhibit 12: Global flood losses



Source: Aon Benfield Analytics

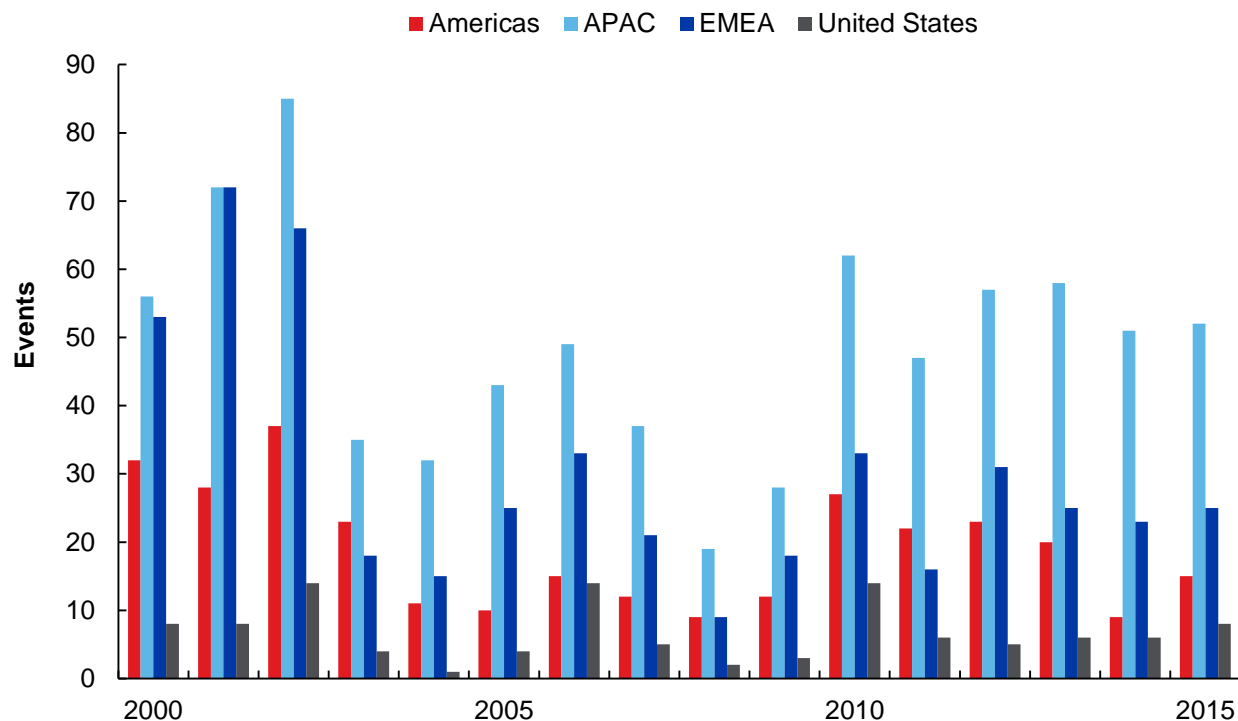
In recent years, and most notably in 2011, insured flood losses have grown as flood insurance market penetration has slowly but steadily increased around the world. The nearly USD27 billion incurred by public and private insurance entities in 2011 were headlined by the historic floods in Thailand that caused payouts of more than USD16 billion alone (2015 USD). The significant impacts to commercial manufacturing interests helped propel the Thai event to become by far the costliest insured flood event on record. It was this same increased insurance penetration in the commercial sector that resulted in a much higher insured-to-economic loss ratio of 34 percent for the Thai floods compared to only a 13 percent 25 year historical average. The event prompted the government to substantially alter its flood insurance policy structure and include a catastrophe fund.

Since 1990, insured losses derived from non-tropical flood events have shown a positive annual growth trend of 11 percent per year. Every major region of the globe has shown annual growth in insured flood loss in the last 25 years: United States, Americas, Asia Pacific, and EMEA. Of the flood events since 1990 that have exceeded 2 billion-dollar in insured loss, nine have occurred since 2010. Three events have occurred to each APAC and EMEA, two in the United States and one in rest of the Americas. Given differing flood insurance policy programs in place all around the world there are varying economic-to-insured loss ratios. However, most major flood events have less than one-third of economic losses covered by insurance. In fact since 1990, only 7.6 percent of economic flood losses have been covered by private insurance. The very low percent coverage can be attributed to highly flood-prone countries in Asia—such as China, India, and the Philippines—where most homeowners do not have insurance policies in place.

It is important to note that the market approaches for handling the peril of flood vary by country. Many developed countries, such as Canada, have yet to fully implement any flood insurance market. Listed below are the four primary types of flood insurance markets available:

- **Bundled Flood Insurance (Backed by private markets)**
Flood insurance is included with each residential insurance policy to maximize the risk pool, diversify risks across perils, and ensure widespread penetration in the marketplace. This type of approach is found in the United Kingdom, China, and Hungary.
- **Bundled Flood Insurance (Backed by government)**
Flood insurance is administered by the government and is mandated along with other perils for all property insurance policies. The policies are underwritten, marketed, and issued by private insurance companies, while the government maintains a portion of the capital by collecting part of the premium to address potential claims. This type of approach is found in France and Spain.
- **Optional Flood Insurance (Backed by private markets)**
Flood insurance is optional for policyholders. Specifically, a policyholder elects whether or not to insure against a flood event. More often than not, the majority of the policyholders with flood coverage are located in high-risk areas. The market is maintained by private insurance companies. This type of approach is found in Germany, Austria, and South Africa.
- **Optional Hybrid Flood Insurance (Backed by government)**
Flood insurance is optional for *most* policyholders. However, residents who have a mortgage from a federally regulated lender and, in accordance with government provided flood maps, reside in a high risk zone are required to purchase flood insurance to satisfy the regulators. The majority of policies with flood coverage are situated in the highest-risk areas despite the fact that a large portion of flood losses occur in areas designated outside of flood risk areas. The market is largely maintained by the government. This type of approach is found in the United States.

Exhibit 13: Major flood events by region



Source: Aon Benfield Analytics

As seen in the graph above, the overall frequency of flood events has maintained relative stability since 2000. Individual regions of the world have shown consistency on a trended basis, although experience fluctuates for a variety of reasons, including differing phases of ENSO. Despite the stability of event frequency, the size of flood events in the future will be influenced by the tendency for more extreme rainfall to be recorded, which when combined with increased residential and commercial exposure will contribute to catastrophe loss increases on an economic and insured loss basis.

Advancements in flood modeling

With the recent advancement in computational science and wider data availability, flood modeling is undergoing a renaissance. Today, flood models are used not only for portfolio modeling but also for the purpose of primary underwriting, where such a critical tool has perhaps even better potential on a per location basis.

Every flood model is based on flood mapping; or, put differently, on the process for creating flood maps. Flood maps are created using two main data sources: a Digital Terrain Model (DTM) to calculate elevation and hydrological (river and rain gauge) data. To elaborate, flood modeling design ranges from the simplest approach called the “bath tub” method, which was widely used in the past, the 1-dimensional (1D) approach, and finally the most advanced 2-dimensional (2D) flood modeling, which is now becoming embraced as the standard.

In terms of data availability, the most important development has occurred within the scope of gaining access to detailed digital terrain model (DTM) output. Using LiDAR (Light Detection and Ranging of Laser Imaging Detection and Ranging) and other remote sensing techniques, the horizontal resolution can now be increased to a level where the outputs of a flood model can be utilized on a per location level.

Widespread use of 2D modeling has been in the past limited by insufficient capacity of computational power. In other words, 2D tools were used only for smaller areas by hydrological consultants and it was not possible from a practical perspective to run 2D modeling tools for larger spaces (i.e., country wide areas that would be most valuable to the insurance industry). The computational advances include the use of GPU (Graphical Processor Units), plus the power harnessed by supercomputers, which allow for generally faster computational times and more storage available.

These advancements have sharply improved the ability for insurers to evaluate individual risks and price accordingly; elevating the industry into a better position to understand flood risk and to pursue such a significant growth opportunity.

New market initiatives / available capital

As seen in many of the events in the United States, a substantial amount of the flood losses occur outside of the previously identified Special Flood hazard Areas. Two issues arise when evaluating these losses:

- The lack of any requirement to purchase flood insurance often leaves these properties uninsured, and
- The cost of federal flood insurance for these risks often makes the purchase of this non-mandatory coverage a pricing decision, one which most property owners choose not to take.

The reinsurance market is showing that there is confidence in the analytics to price these risks and to reinsure portfolios of flood risk. This is primarily based on the flood models that are becoming readily available and the confidence in the science underlying these models. There is now an opportunity for insurers to evaluate the flood risk and look to provide coverage for these properties.

For the risks in flood prone areas, the amount of limit available and the relatively limited coverage (as compared to the standard fire policies) creates an additional opportunity to provide excess flood coverage or supplemental flood coverage. While the subsidization of risk within the Special Flood Hazard Areas may prevent insurers from taking on all risks in these areas, there are definitely opportunities to insure a portion of these risks at rates that insurers would deem to be adequate.

The aforementioned flood models will provide more insight and precision into the pricing needed to support insuring the risk, allowing for a more robust differentiation than is seen in the current federal flood program pricing.

The opportunity for US insurers to provide this coverage is here, and many are starting to analyze the scope of the opportunity.

With the development and maturation of flood models in Europe and Asia, more quantification can now be placed around the aggregation of risk, allowing insurers to better manage the risk. These same models, as mentioned previously, can also be used in the pricing of risk, similar to how earthquake and wind risks are priced. This is an exciting time in the flood risk analysis space and the opportunity for insurers is substantial.

Economic and Financial Market Update

Economic commentators trimmed their forecasts of global economic growth as the year progressed as GDP in 2015 came in below initial expectations. Modest improvement is expected in 2016 and 2017, although there are residual fears of a hard landing for the Chinese economy. Mid-year concerns about Greece and the Eurozone have subsided and consequent weakness in financial markets was short-lived, before the onset of further equity market weakness in December. The Fed has increased its target Federal Funds rate to 0.5 percent.

The global economy

Economic growth once again fell below expectations in 2015. The International Monetary Fund (IMF) has twice this year lowered its projection for global GDP growth for 2015 which it currently expects to be 3.1 percent⁴, compared with 3.3 percent in its July 2015 projection and 3.5 percent in April 2015. Contributory factors were a slowdown in the first quarter (which was largely attributable to adverse weather-related contraction in the United States, with attendant spillovers to Canada and Mexico) and uncertainties in Europe during the second quarter relating to Greece and the Eurozone. The second half of the year was overshadowed by difficulties in emerging market economies, with declining commodity prices and downward pressure on many emerging market currencies. The slowdown in the Chinese economy has had broader implications, particularly as a result of reduced demand for raw materials, as has weakness in Latin America and particularly Brazil. The slump in oil prices also had a depressing effect on oil-exporting economies that has been only partially offset by the resulting boost to net importers.

Exhibit 14: GDP growth projections

Percent (percentage point change vs July 2015 f/c)	2013	2014	2015p	2016p
World	3.3	3.4	3.1 (-0.2)	3.6 (-0.2)
Advanced economies	1.4	1.8	2.0 (-0.1)	2.2 (-0.2)
Euro area	2.2	2.4	2.6 (+0.1)	2.8 (-0.2)
France	-0.5	0.9	1.5 (0.0)	1.6 (-0.1)
Germany	0.2	1.6	1.5 (-0.1)	1.6 (-0.1)
United Kingdom	0.3	0.4	1.2 (0.0)	1.5 (0.0)
United States	1.6	-0.1	0.6 (-0.2)	1.0 (-0.2)
Japan	1.7	3.0	2.5 (+0.1)	2.2 (0.0)
Emerging market and developing economies	5.0	4.6	4.0 (-0.2)	4.5 (-0.2)
Emerging and Developing Europe	7.8	7.4	6.8 (0.0)	6.3 (0.0)
China	3.3	3.4	3.1 (-0.2)	3.6 (-0.2)
Latin America and the Caribbean	1.4	1.8	2.0 (-0.1)	2.2 (-0.2)

Source: IMF World Economic Outlook

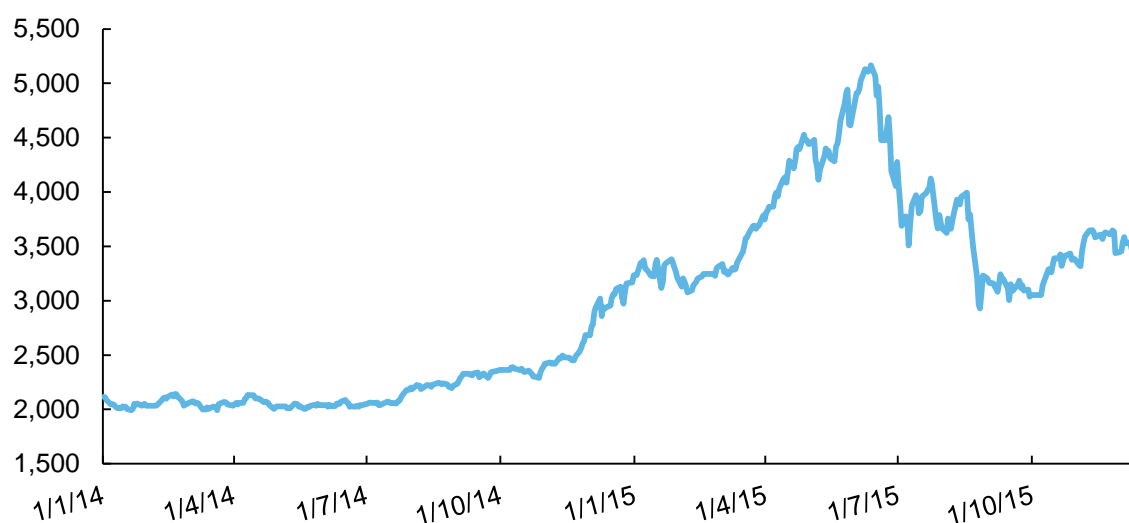
Economists expect modest improvements in the global economy in 2016 and 2017 as financial conditions remain accommodative, despite an anticipated further gradual rise in US interest rates. According to the IMF, stronger performance in both emerging market and advanced economies will boost growth in 2016. The IMF notes weak, but improving, conditions in Russia and some Latin American economies. The slowdown in China is expected to persist but the IMF anticipates stronger growth from advanced economies including the United States, the Euro area and Japan. Further recovery is projected through 2017 driven by a gradual return to trend growth in countries and regions such as parts of Latin America and the Middle East and Russia, which are currently under stress or growing well below potential in 2015–2016.

China

China is the world’s second largest economy and during the middle of 2015, evidence emerged that the slow-down was likely to be deeper and more protracted than expected. Concerns about the spill-over into the global economy rapidly spread with consequent volatility in global financial markets throughout September.

China’s real GDP growth slowed to 6.9 percent year-on-year during the third quarter of 2015, down from 7.0 percent in each of the two preceding quarters and dropping slightly below the official target of 7.0 percent. This reinforced fears of a slowdown that had prompted an earlier collapse in the Chinese stock market, which reached a high in June before falling 43 percent in a little over two months.

Exhibit 15: Shanghai composite index



Source: Bloomberg

In an attempt to stimulate growth, the People’s Bank of China has responded with a series of cuts in interest rates and reserve requirements. Nevertheless, economists consider the risks to China’s economic growth remain on the downside. The country’s indebtedness, measured in relation to GDP, is the highest among developing markets, largely reflecting rapid growth in corporate sector debt. Weakening corporate profits and relatively high real interest rates have caused credit spreads to widen, leading to an increased risk of a hard landing for the economy.

Brazil

Brazil, until recently seen as an engine of emerging market growth, has also been the focus of attention as recession there and in neighboring Venezuela pushed the Latin American region into negative growth in 2015. In the third quarter of 2015, Brazil's GDP contracted by 4.5 percent year-on-year, driven principally by a slump in investment and construction. An escalating crisis of confidence has accompanied the downturn, exemplified by the downgrade by Standard & Poor's in September of the country's sovereign rating to sub-investment grade.⁴ The government responded by affirming its commitment to fiscal discipline but has struggled to retain credibility in the face of political infighting, rising social discontent, and a continuing corruption scandal, all of which have contributed to policy paralysis. The continuing concerns have caused economic forecasters to cut growth projections for Brazil and trim those for the wider Latin American region.

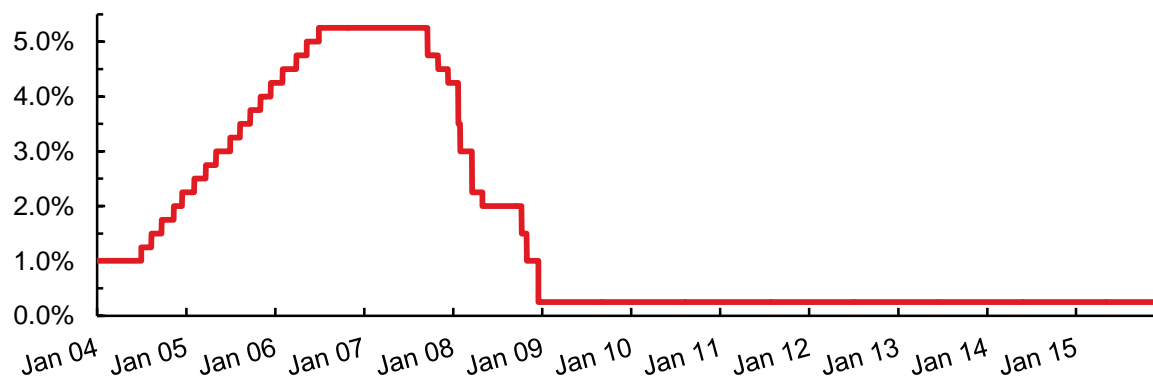
Brazil has been an important target market for international insurers and reinsurers in recent years, but the anticipated growth appears unlikely to materialize in the short term in the face of the country's economic difficulties.

Monetary policy

Monetary policies in the major economies are expected to diverge in the medium term. In a widely-anticipated move, the US Federal Reserve announced a 0.25 percentage point increase in the target range for the federal funds rate to 0.25 to 0.5 percent, signaling the start of a gradual but sustained tightening cycle.⁵ In announcing the first rate increase in nearly ten years, the Fed cited improving economic conditions in the US, including higher household spending and fixed investment and declining unemployment, but said inflation is still below the 2 percent target. This is likely to be a constraining factor in the timing and amount of future rate rises. The Fed said its policy stance would remain "accommodative" with gradual adjustments to monetary policy in line with economic activity.

Initial investor reaction to the Fed's move was favorable, with equity markets rising in Asia and Europe, even in emerging markets which are likely to face capital outflows. The Fed now faces the challenge of ensuring recovery in the US economy is sustained and sufficiently robust that it will boost world trade and global growth without exporting deflationary pressure and dampening recovery elsewhere.

Exhibit 16: U.S. Federal funds rate



Source: Bloomberg

⁴ September 9, 2015. S&P: Brazil Foreign Currency Ratings Lowered To 'BB+/B'; Outlook Is Negative

⁵ Federal Reserve press release, December 16, 2015

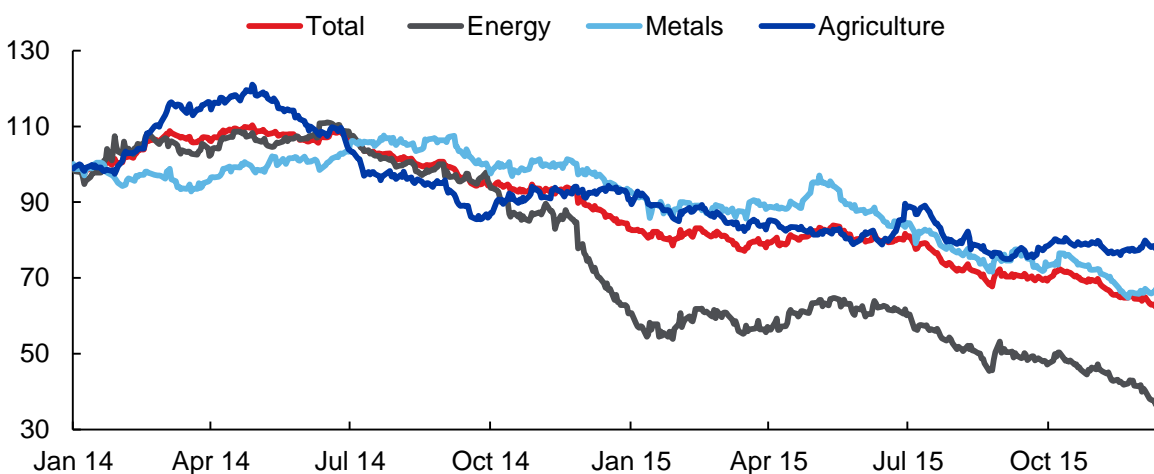
Relatively strong economic conditions, including declining unemployment rates, are likely to prompt others, including the Bank of England, to raise interest rates in the coming months. However, the Euro area remains fragile with deflation still a risk and the European Central Bank (ECB) is likely to continue its policy of quantitative easing. Japan's quantitative easing has provided a stimulus through a lower exchange rate and the policy is expected to be maintained through 2016. These divergent policies will likely cause further appreciation of the US dollar and sterling against other currencies.

Higher US interest rates are seen as a particular risk for emerging markets, as investment is diverted away, with the potential for further volatility in these regions.

Commodities

Commodity prices have been under sustained pressure since the second half of 2014. Rising demand from China in earlier years drive prices up, and heavy investment boosted supply. China's rapid slowdown has resulted in over-supply and a dramatic fall in prices, notably for energy and metals.

Exhibit 17: Commodity price indices

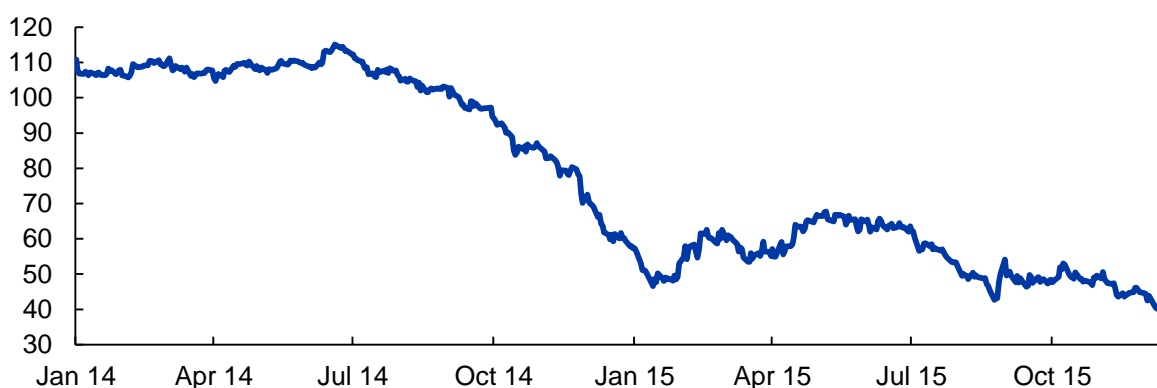


Source: Bloomberg

Oil prices staged a partial recovery during early 2015, but have since fallen away, exacerbated by the resurgence of concerns about weakening prospects for the global economy, with Brent Crude falling below USD40 per barrel in mid-December—the lowest level since March 2009 and down 67 percent from a peak of USD115 in June 2014. Production remains high in Saudi Arabia and fracking capacity in the USA has not been cut back. Although capital expenditure in the sector has been drastically curtailed, supply is unlikely to be materially reduced and prices are expected to remain low for several years, in the face of subdued demand. Oil importing countries have benefited from the lower price, but evidence suggests consumers in developed markets are taking advantage of higher real incomes to increase savings or repay debt rather than raising spending and consumption. Oil exporting economies naturally face more difficult prospects.

Exhibit 18: Brent crude price

USD/barrel



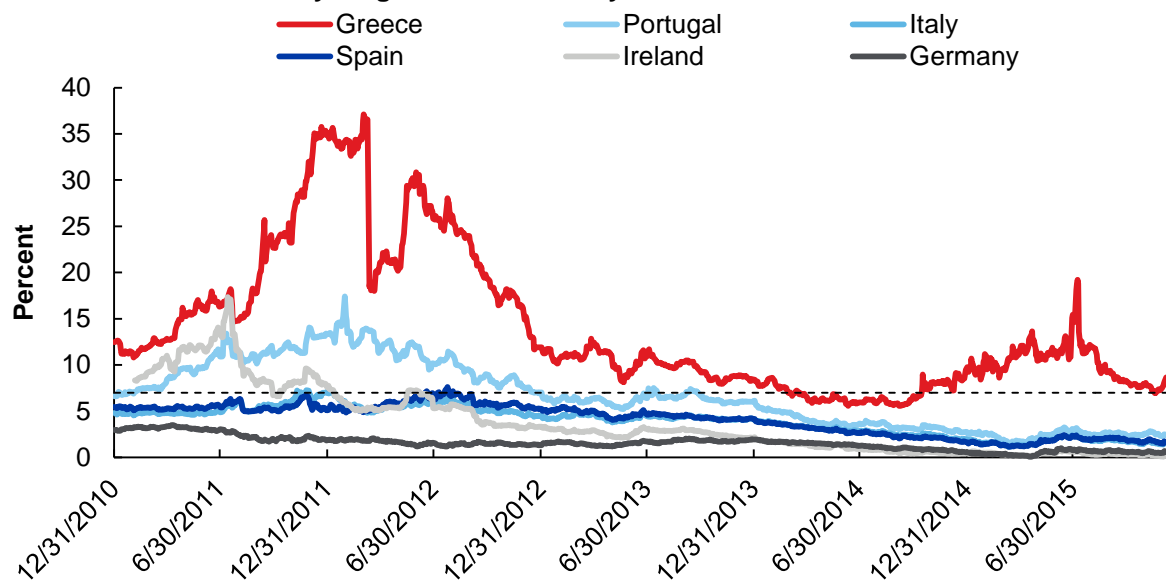
Source: Bloomberg

On balance, the consequences for insurers of low oil prices are likely negative. According to data from the American Automobile Association (AAA), the average retail price of gasoline had fallen below USD2.00 per gallon nationwide at the end of 2015, down 41 cents from a year previously and the lowest since March 2009. This bonus has encouraged people to drive more, with a consequent increase in accident and claims frequency, but lower levels of general inflation may have tempered increases in claims costs. The low price of crude oil has virtually halted exploratory offshore drilling activity and cancelled or put on hold most of the oil industry's capital development. This has led to intense competition among insurers for what little business remains.

The EU debt crisis

Greece was again the focus of attention in the middle of 2015 as the government entered an increasingly acrimonious negotiation with its creditors ahead of a major debt repayment in June. Nevertheless, the deadlock was broken, Greece did not leave the euro and a further bailout package was released. Yields on the government debt of other economies drifted slightly higher through the second quarter, but have since fallen back. With the exception of Greece, bond yields have remained well below 7 percent, which was a trigger for earlier intervention by the ECB. The yield on German 10-year government bonds was negative through the first four months of the year, falling to a low of -0.15 percent in April, and staying close to zero since then.

Exhibit 19: Eurozone 10-year government bond yields

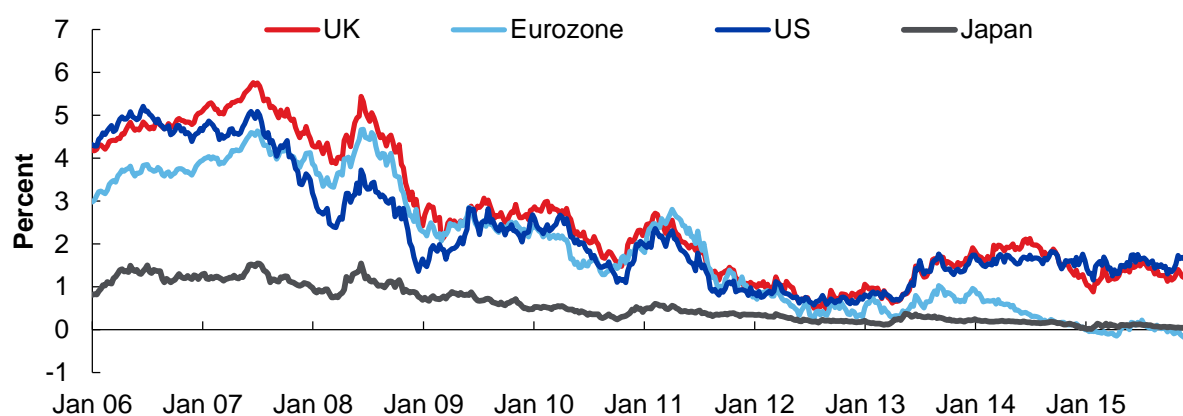


Source: Bloomberg
 * Ireland is 5-year

Financial markets

Governments around the world continue to target low interest rates and expansive monetary policy as key measures to stimulate economic recovery. With low inflation in most developed markets, interest rates are expected to remain low through 2016. The key US Federal Funds Rate was kept at a record low of 0.25 percent for seven years from December 2008 until the rise to 0.5 percent in December 2015, and the UK Bank Rate has been at 0.5 percent since March 2009. In response to concerns over disinflation and to promote sustainable growth, the ECB has kept its benchmark Main Financing Rate at 0.05 percent since September 4, 2014, but the rate on its overnight deposit facility was further cut to -0.3 percent on December 9, 2015.

Exhibit 20: Five-year government bond yields

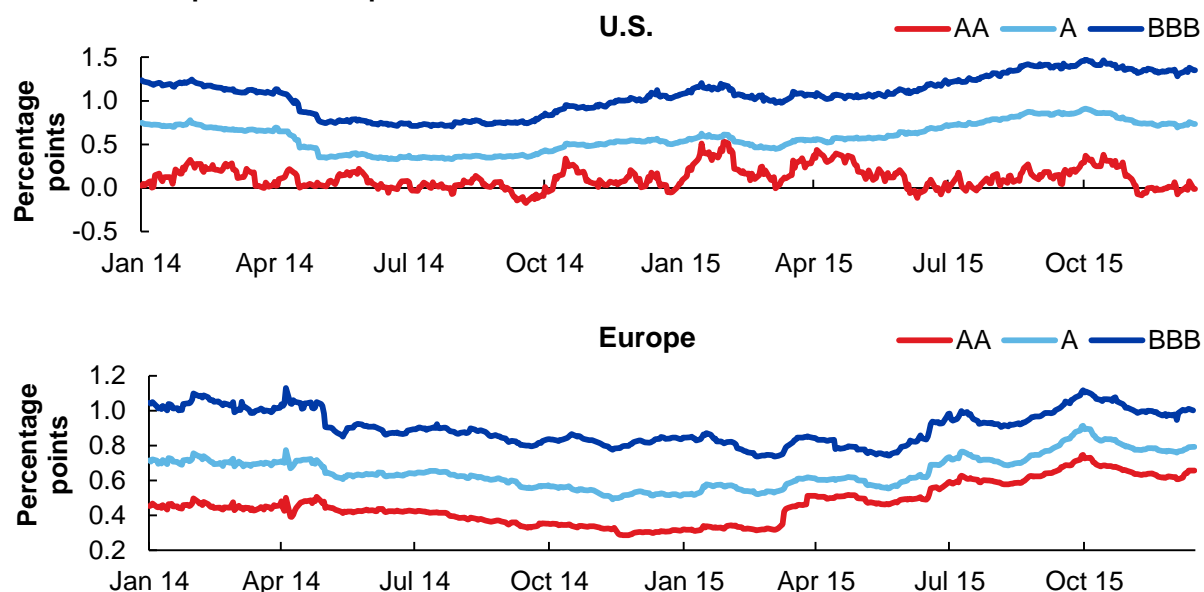


Source: Bloomberg

During the first part of 2015, the yield on five-year Eurozone government debt continued its declining trend, turning negative from mid-January to the end of April, coinciding with the start of the ECB's program of quantitative easing. After a brief rise, yields fell again, dropping back into negative territory in the fourth quarter. The yield on UK government bonds has oscillated within a range of 0.88 percent and 1.65 percent, falling back from the peak in late June to 1.28 percent at mid-December. US Treasuries have similarly moved within a tighter band of 1.15 percent to 1.75 percent. The yield on Japanese bonds has traded in a range of 0.01 percent to 0.14 percent, trading at 0.05 percent in mid-December.

In the middle of the year, there was a widening of spreads on corporate bonds—a class to which many insurers have increased their allocation in the face of low yields on government bonds.

Exhibit 21: Corporate bond spreads



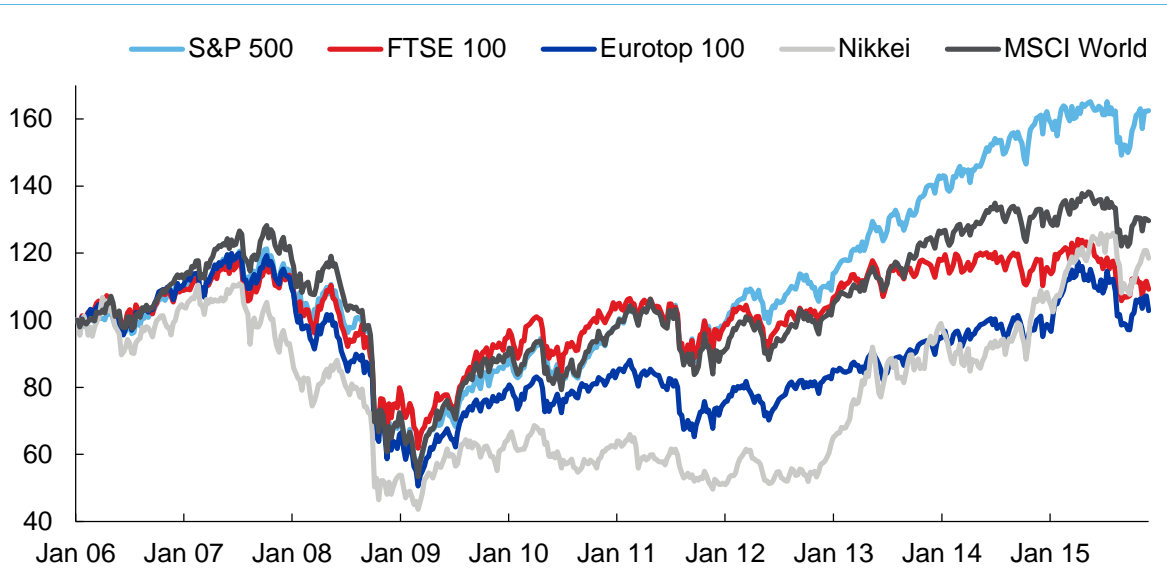
Source: Aon Benfield Analytics, Bloomberg

The spread over Treasuries on US 'BBB' rated corporate bonds was steady at around 1.0 percentage points and widened through the second quarter of 2015 to around 1.5 points at the end of September, before recovering somewhat towards the year-end. Similarly in Europe, the spread over government bonds on 'BBB' rated corporates rose from around 0.8 points to 1.1 points at the end of September, before falling back a little in the fourth quarter.

Persistent low interest rates have placed all classes of insurers and reinsurers under considerable strain in recent years as investment returns have been compressed as portfolio yields have fallen and reinvestment opportunities are limited. The Fed's action has been welcomed as directionally helpful, but it is recognized that a return to the rate levels seen before the financial market crisis of 2008 are a long way off. The rise in yields during the middle of 2015 negatively impacted the financial results of major insurers because of the consequent fall in the market value of fixed income securities and this was exacerbated by widening credit spreads on corporate debt. Unrealized losses on investments were a contributory factor to the reduction in global reinsurer capital during the year, although a higher discount rate for those with long-tail liabilities provided some offset.

A gradual steady increase in rates is beneficial to insurers as investment returns improve over time, and the effects can be priced in. Conversely, the unlikely scenario of a sudden spike in interest rates would be damaging as the resulting fall in bond prices could constrain capital and liquidity.

Exhibit 22: Equity markets indices (January 2006 = 100)



Source: Aon Benfield Analytics, Bloomberg

Volatility returned to equity markets during August in response to evolving worries about the slowdown in China and its spill-over into the global economy, but these concerns rapidly abated before the onset of further market turbulence during December. The major indices have traded in a relatively narrow range over the year, bouncing back from the dip in the third quarter. However, after recent weakness, most major indices ended the year-to-date to mid-December lower than at the start of the year. The MSCI World index was down 5.3 percent over the period, with the UK FTSE off 9.9 percent and the US S&P 500 down 3.7 percent. Only the Japan Nikkei ended the period up by 7.9 percent.

Bank Leverage Continues a Slow Decline

Analysis of the 20 largest banks globally shows that average leverage, measured by total assets to shareholders' equity, continues to decline. Leverage ratios have declined at Q3 2015, down from 18.7 at the close of 2014 and less than half the levels of mid-year 2009. While the general trend declines, the three largest banks based on total assets did see slight increases since lower positions at the end of Q2.

Implementation of the leverage ratio requirement began in January 2013 and banks began to publicly disclose leverage ratio and its components from January 1, 2015. The authorities are testing minimum levels and monitoring actual ratios until year-end 2017, at which any final adjustments to the definition and calibration must be made; with a view to migrating the leverage ratio into a Pillar 1 requirement on January 1, 2018.

As of October 2015, Basel II has been adopted by 27 of the 28 Basel Committee member jurisdictions with Russia expected to adopt and implement them from January 1, 2016. Basel 2.5 has been adopted by 25 member jurisdictions and Basel III is in various stages of adoption, with 12 having fulfilled all three requirements: the risk based capital, the liquidity, and the Leverage Ratio, while all other jurisdictions have varying degrees of progress in rulemaking.

Exhibit 23: Top 20 largest banks total leverage

Name	6/30/09	9/30/09	12/31/09	12/31/10	12/31/11	12/31/12	12/31/13	12/31/14	6/30/15	9/30/15
Industrial & Commercial Bank of China Ltd	17.2	18.6	18.1	17.8	16.8	16.2	15.2	14.1	13.6	14.0
China Construction Bank Corp	17.6	18.0	17.5	17.0	15.2	14.6	14.4	14.0	13.4	14.0
Agricultural Bank of China Ltd	24.6	25.1	25.5	19.2	18.7	18.0	17.6	16.7	15.0	16.8
Bank of China Ltd	16.3	17.4	16.8	17.8	16.6	16.1	15.3	15.3	14.2	13.4
HSBC Holdings PLC	23.4	20.5	19.4	17.2	17.1	15.9	15.2	14.1	14.3	13.4
JPMorgan Chase & Co	15.0	13.8	13.2	12.9	13.1	12.2	12.6	12.0	12.0	11.3
BNP Paribas SA	43.8	40.2	36.7	32.2	28.6	23.5	21.4	23.6	25.5	25.0
Mitsubishi UFJ Financial Group Inc	32.2	28.7	28.0	23.6	23.4	22.3	20.0	19.8	18.7	18.8
Bank of America Corp	14.0	11.5	11.3	11.0	10.5	9.9	9.7	9.6	9.4	9.4
Deutsche Bank AG	62.5	50.5	48.0	50.8	44.0	38.5	41.8	32.3	26.8	23.9
Barclays PLC	48.0	41.0	34.5	30.6	28.5	29.5	28.4	22.9	25.1	21.8
Citigroup Inc	26.2	23.7	13.4	12.2	10.9	10.4	9.7	9.3	9.0	8.9
Wells Fargo & Co	18.7	15.4	13.6	10.6	10.3	9.7	9.8	10.0	10.4	10.2
Japan Post Bank Co Ltd	23.9	23.8	22.8	21.2	21.1	19.7	18.3	19.3	17.9	18.1
Credit Agricole SA	40.4	36.7	39.6	36.5	37.5	44.5	43.3	32.1	31.2	30.0
Mizuho Financial Group Inc	128.7	95.3	58.6	40.8	38.9	36.2	30.6	27.5	23.9	24.0
Sumitomo Mitsui Financial Group Inc	55.4	33.4	32.2	26.5	26.8	26.0	21.3	21.6	20.3	20.3
Royal Bank of Scotland Group PLC	40.0	32.7	32.8	21.6	20.8	18.9	16.7	16.8	19.4	17.2
Societe Generale SA	32.2	27.9	26.0	25.2	25.9	26.1	24.6	23.5	25.0	24.2
Banco Santander SA	18.8	18.1	16.4	17.4	17.2	17.9	16.6	16.0	14.9	14.6
Average	35.7	30.4	26.6	23.1	22.1	21.3	20.4	18.7	18.0	17.5

Source: IMF World Economic Outlook

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