



# IAIS

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INTERNATIONAL ASSOCIATION OF  
INSURANCE SUPERVISORS

# **IAIS Global Insurance Market Report (GIMAR) 2016**

**31 January 2017**

## **About the IAIS**

The International Association of Insurance Supervisors (IAIS) is a voluntary membership organization of insurance supervisors and regulators from more than 200 jurisdictions. The mission of the IAIS is to promote effective and globally consistent supervision of the insurance industry in order to develop and maintain fair, safe and stable insurance markets for the benefit and protection of policyholders and to contribute to global financial stability.

Established in 1994, the IAIS is the international standard setting body responsible for developing principles, standards and other supporting material for the supervision of the insurance sector and assisting in their implementation. The IAIS also provides a forum for Members to share their experiences and understanding of insurance supervision and insurance markets.

The IAIS coordinates its work with other international financial policymakers and associations of supervisors or regulators, and assists in shaping financial systems globally. In particular, the IAIS is a member of the Financial Stability Board (FSB), member of the Standards Advisory Council of the International Accounting Standards Board (IASB), and partner in the Access to Insurance Initiative (A2ii). In recognition of its collective expertise, the IAIS also is routinely called upon by the G20 leaders and other international standard setting bodies for input on insurance issues as well as on issues related to the regulation and supervision of the global financial sector.

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## Executive Summary

This 2016 edition of the Global Insurance Market Report (GIMAR) discusses the global (re)insurance sector from a supervisory perspective, focusing on the recent performance of the sector as well as key risks faced by it. During the current year, the (re)insurance sector has remained well-functioning and stable, as evidenced by high capital levels, positive profitability, and a persistent inflow of additional capital.

The (re)insurance sector operates in an increasingly difficult macroeconomic and financial environment, characterised by weak global demand, low inflation rates, very low and partially negative interest rates, and bursts of financial market volatility. This environment is challenging long-established business models of various insurance companies, mainly life insurers, as demonstrated by recent official stress test results and scenario analyses.

Non-life (re)insurance continues to be subject to soft market conditions. Premiums charged by non-life (re)insurers in the commercial lines, property and catastrophe markets remain under pressure, partly due to increasing competition, while investment yields are declining gradually. Competition is especially strong in the reinsurance market. Reinsurers are facing competitive pressures and changing demand from cedants while investment yields remain low and the possibilities of reserve releases diminish.

The prolonged low interest rate environment is a source of vulnerability for life insurers, especially in Europe. Low interest rates are gradually eroding life insurers' capital positions, particularly for those companies offering products with long-term guaranteed rates and large duration mismatches between assets and liabilities. The longer that rates are low, the more investment of premium income and reinvestment of maturing investments – as far as assets and liabilities are mismatched - will have to be done at prevailing low interest rates; and the more insurers will need to respond, for example by repricing or redesigning products to reflect these lower rates. Moreover, life insurers are under pressure to improve their expense management and to reduce costs. For some life insurers, estimates of cost of equity exceed return on equity. This gap is not sustainable in the long run, since life insurers will not be able to deliver the return required by equity investors. Over time, this will make it difficult for life insurers to attract capital and finance growth.

From a macroprudential perspective, in order to safeguard the stability of the financial system and economies in the future, it is essential for insurers to respond to an accumulation of risks and structural changes that are a source of potential vulnerability. Insofar as insurance companies' profitability is declining, they need to formulate business plans to stabilise and improve their future profitability. Another important challenge is to strengthen insurers' ability to respond to risks in areas where they are increasing their risk-taking. An example is life insurers that may be tempted, or effectively even be required, to shift their investments to riskier assets in response to the low interest rate environment, or non-life (re)insurers that aim to preserve or even grow their activities in the current soft market environment, and to avoid the "Winner's Curse" of under-pricing in order to win business. Given the importance of large insurance companies to the financial system and the economies in which they operate, it is important they maintain a solid financial base and strengthen business management frameworks to manage the accumulation of risks, as well as being prepared to respond in an orderly manner in times of stress.

The issues highlighted above are developed and further discussed in the four chapters that make up the 2016 GIMAR. Chapter 1 analyses the overall macroeconomic and financial environment. Chapter 2 focuses specifically on global insurance market developments, while Chapter 3 contains a variety of special topics that focus on regulatory, financial and economic developments and risks. One such section looks at relations between climate change, insurance and regulation. Another discusses recent developments in insurance risk transfer to the capital markets. Additional special topics cover first experience with Solvency II, the results of the European Insurance and Occupational Pensions Authority (EIOPA) 2016 insurance stress test and financial markets and insurers' search for yield. Chapter 4 provides a summary of the IAIS survey of the global reinsurance market. It documents a unique global data set made possible by the participation of 44 reinsurers in nine jurisdictions in North America, Europe and Asia, and links the financial position of reinsurers to the broader financial economy by a discussion of the inter-linkages between the reinsurance sector and other financial sectors.

## Contents

Executive Summary .....	3
Background.....	7
Chapter 1 - Macroeconomic and financial environment .....	8
A.    International economic growth and inflation .....	8
B.    International monetary policy .....	9
C.    Financial markets.....	10
Chapter 2 - Global insurance market developments.....	13
A.    Non-life insurance .....	13
1.    Investment yields and underwriting profitability.....	14
2.    Market conduct in Australia .....	17
B.    Life insurance .....	18
1.    Impact of low interest rates .....	18
2.    Industry response to low interest rates.....	21
3.    Capital costs of life insurers .....	22
C.    Reinsurance.....	23
Chapter 3 - Special topics .....	26
A.    Reinsurance and climate change .....	26
1.    Introduction .....	26
2.    Insurers and climate change-related risks .....	27
3.    Supervisory response to climate-change related risks .....	31
4.    Distribution of insurer practices on climate risk.....	33
B.    Financial markets' snapshot and insurers searching for yield .....	36
1.    Market snapshot.....	36
2.    Search for yield .....	40
C.    Recent developments in insurance risk transfer to the capital markets.....	45
1.    Introduction .....	45
2.    Recent developments .....	45
D.    EIOPA stress test 2016.....	50
1.    Framework and scenarios .....	50
2.    Discussion of the results.....	51
3.    Main conclusions and EIOPA recommendations.....	53
E.    First experience with Solvency II framework .....	55

Chapter 4 - Global Reinsurance Market Survey .....	59
A. Reinsurance premiums .....	59
B. Risk transfer between regions .....	60
C. Assets .....	62
D. Additional movements .....	62
E. Profitability .....	63
F. Capital adequacy .....	64
G. Counterparty linkages and exposures .....	65

## Background

This is the fourth issue of the Global Insurance Market Report (GIMAR).

The GIMAR assesses developments relevant to the (re)insurance industry and identifies and documents some main risks and vulnerabilities for the industry. It does so to promote awareness of these developments and risks among IAIS members, stakeholders and interested parties more generally. By providing a financial system-wide assessment of developments and risks, the GIMAR also plays an important role in the IAIS' new macroprudential policy and surveillance framework. Such a global system-wide dimension is an important complement to microprudential insurance supervision, which is more focused on the soundness of individual financial institutions.

This report is data-driven and prepared, by the Macroprudential Policy and Surveillance Working Group (MPSWG) of the IAIS.). It is neither an official policy paper nor an application paper, and it is not intended to reflect the views of the Members of the IAIS. Part of the report draws from a data pool on reinsurers built over the years by the Reinsurance Transparency Group, which is now maintained and developed further by the MPSWG. The GIMAR report benefitted from contributions from several jurisdictions and industry experts.

## Chapter 1 - Macroeconomic and financial environment

Internationally, the insurance industry operates in an increasingly difficult macroeconomic and financial environment marked by weak global demand, low inflation rates, very low, and in many advanced economies negative, short- and long-term interest rates, and bursts of financial market volatility. This environment - in particular the low level of interest rates - challenges long established business models of insurance companies and other members of the financial sector. To date, insurance companies have been able to weather such developments, but the pressure is increasing, as suggested by recent official stress test results and scenario analyses, eg from EIOPA and Deutsche Bundesbank.<sup>1</sup>

### A. International economic growth and inflation

Eight years after the global financial crisis, the world economy remains heavily affected by its aftermath. Debt burdens of governments, households and nonfinancial firms are at an all-time high, having risen globally from 200% of GDP in 2002 to 225% in 2015.<sup>2</sup> Two thirds of these consist of liabilities of the private sector. Global trade growth is exceptionally weak, both relative to its historical performance and to overall economic growth.<sup>3</sup> Fixed investment remains weak in many countries. Productivity growth remains significantly below pre-crisis trends in most advanced economies.

Reflecting these and other headwinds, global economic growth remains modest. Following a soft patch in the first quarter, GDP growth in the United States has picked up in the latter half of 2016. In the euro area, the economy has maintained its course of moderate growth in the first three quarters of this year, with geopolitical and political uncertainty as well as weak global trade hindering a stronger performance.<sup>4</sup> In Japan, growth in the third quarter accelerated, driven by net exports and residential investment. Many emerging market economies have lost momentum, with sharp downturns in some, especially in commodity producing countries. In China, fiscal and monetary stimulus is continuing to support demand as policy seeks to rebalance the economy from investment and manufacturing led-demand towards consumption and services.

The world economy is in a low-growth trap, according to the OECD.<sup>5</sup> Poor growth expectations are depressing trade, investment, productivity, and wages. This in turn leads to a further downward revision in growth expectations and subdued demand. The long period of slow demand has damaged the longer-run supply-side potential of economies. For the OECD as a whole, potential GDP-per-capita growth is estimated at 1% in 2016, which is half the average in the two decades preceding the crisis. Potential per capita output growth in China and other emerging economies has also declined.

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<sup>1</sup> EIOPA (2014): EIOPA announces results of the EU-wide insurance stress test 2014, Press release, 14 November. Deutsche Bundesbank (2015): The Deutsche Bundesbank's Financial Stability Review 2015, Press release, 25 November.

<sup>2</sup> IMF (2016a): Fiscal monitor: Debt, use it wisely, October.

<sup>3</sup> IMF (2016b): Global trade: what's behind the slowdown? , Chapter 2 in IMF World Economic Outlook, October.

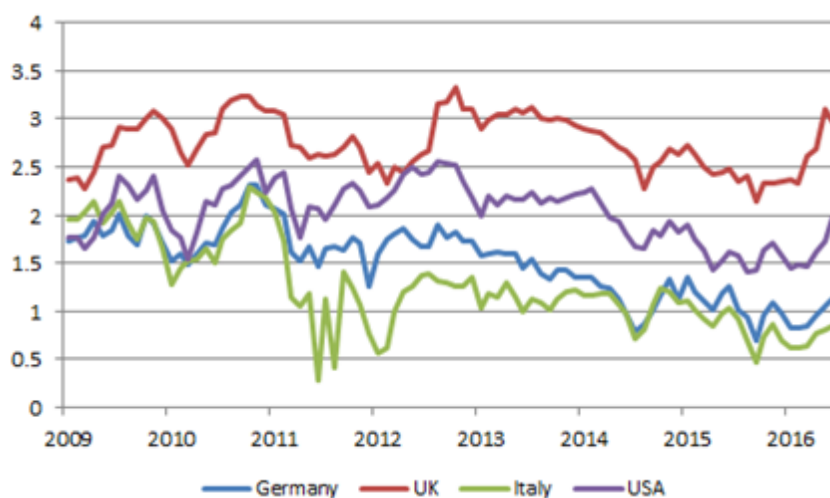
<sup>4</sup> European Commission (2016): European economic forecast: Autumn 2016, Institutional Paper 038, November.

<sup>5</sup> OECD (2016): OECD economic outlook, Volume 2016, Issue 2. In advance of the G20 summit that took place in Hangzhou, China in September, the IMF also warned against a 'low growth' trap. See Christine Lagarde (2016): We need forceful policies to avoid the low-growth trap, IMFdirect (blog), September 1.



In many countries and regions, inflation rates are at or close to historically low levels. According to the IMF, a large number of countries globally are currently facing low inflation or even deflation – that is, a fall in the aggregate price level for goods and services.<sup>6</sup> Economic slack and the sharp drop in oil and other commodity prices are the main drivers of lower inflation since the financial crisis, according to the IMF. Since February 2016, the IMF's Primary Commodities Price Index has, though, increased by 22 percent. The strongest price increases were for fuels, in particular for oil and coal. Partly in response to this recovery of commodity prices, market-based inflation expectations have risen in the last few months.

*Figure 1 Market-based inflation expectations, June 2009 - Nov. 2016 (break even rates of 10-year bonds, in %)*



Source: Bloomberg

## B. International monetary policy

Since the crisis, monetary policy in advanced economies has had to deal with weak demand and below-target inflation. In a context of continued growth disappointments and rising deflation risks, and with limited support from fiscal and structural policies, this has resulted in major central banks cutting policy rates to negative levels and to using unconventional monetary measures, such as forward guidance, asset purchase programs, and credit easing.<sup>7</sup> These responses, originally intended as short-term measures, have now been applied for several years. By May 2016, 18% of the global economy, weighted by GDP, operated in an environment of negative central bank policy rates. The proportion rises to 40% if one includes zero to 1% rates.<sup>8</sup>

Monetary accommodation continued in 2016, but the outlook in different countries has now started to diverge. The U.S. Federal Reserve ended its large-scale asset purchase programme, has raised the federal funds target rate at the end of 2016 for the second time in a year, and seems on track for gradual further tightening of monetary policy. By contrast, other major central banks further moved towards accommodative monetary policies. The European

<sup>6</sup> IMF (2016c): Global disinflation in an era of constrained monetary policy, Chapter 3 in World economic outlook, October.

<sup>7</sup> Carlos Arteta, M.A. Kose, M. Stocker and T. Taskin (2016): Negative interest rates: sources and implications, CEPR Discussion Paper 11433.

<sup>8</sup> Mario Draghi (2016): Addressing the causes of low interest rates, Speech at the Annual Meeting of the Asian Development Bank, Frankfurt am Main, 2 May.

Central Bank (ECB), the Bank of England (BoE) and the Bank of Japan (BoJ) expanded monthly purchases under their respective asset purchase programmes. From February, the BoJ introduced a negative rate policy. In March, the ECB decided to expand monthly purchases under the asset purchase programme to EUR 80 billion, from the previous amount of EUR 60 billion. In December, the ECB decided that these purchases are to run until March 2017, after which they would be reduced to EUR 60 billion per month until December 2017. In September, the BoJ decided on a new framework for strengthening its monetary easing policy, introducing, among others, an inflation-overshooting commitment. The BoJ presently expects to continue to buy government bonds broadly in line with the current pace of about JPY 80 trillion (16% of GDP).<sup>9</sup> In the euro area and Japan, central bank holdings of government bonds will increase significantly under current monetary policy plans. In Japan, the share of bonds held by the Bank of Japan in total outstanding government bonds is likely to rise to around 60% by March 2019, if the bank sustains purchases of 80 trillion yen per year.<sup>10</sup>

### **C. Financial markets**

Long-term interest rates have trended down globally for more than two decades.<sup>11</sup> Sovereign bond yields have risen recently from their historical lows reached mid-2015 last summer, with a particularly sharp increase after the US elections. However, they still remain low by historic standards. Even after the post U.S.-election step-up in bond yields in mid-November, bond valuations remain particularly high in Europe and Japan, where the share of sovereign bond yields trading at negative yields is estimated by the OECD to be above 50% in several countries.<sup>12</sup>

The decline in international long-term interest rates since 2008 has been driven almost entirely by a fall in term premiums (ie the excess yield that investors require to commit to holding a long-term bond instead of a series of shorter-term bonds).<sup>13</sup> An important factor behind the eroding term premiums were central banks' sizable bond purchases, part of their aforementioned asset purchase programmes (Figure 3).<sup>14</sup> Another factor was the increased demand by insurance companies and pension funds for long-duration assets. Hedging by institutions such as pension funds and insurance companies has also boosted demand for long-term government securities. Indeed, duration matching strategies of life insurance companies may amplify movements in long-term interest rates and itself generate a feedback-loop whereby prices of longer-dated bonds are driven higher, serving to further lower long-term interest rates and leading to yet additional purchases.<sup>15</sup>

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<sup>9</sup> Yutaka Harada (2016): Economic activity, prices and monetary policy in Japan, Speech at a meeting with business leaders, Nagano, 12 October.

<sup>10</sup> OECD (2016) op.cit.

<sup>11</sup> See eg Charles Bean, C.Broda, T.Ito, R.Kroszner (2013): Low for long? Causes and consequences of persistently low interest rates, Geneva Reports on the World Economy 17.

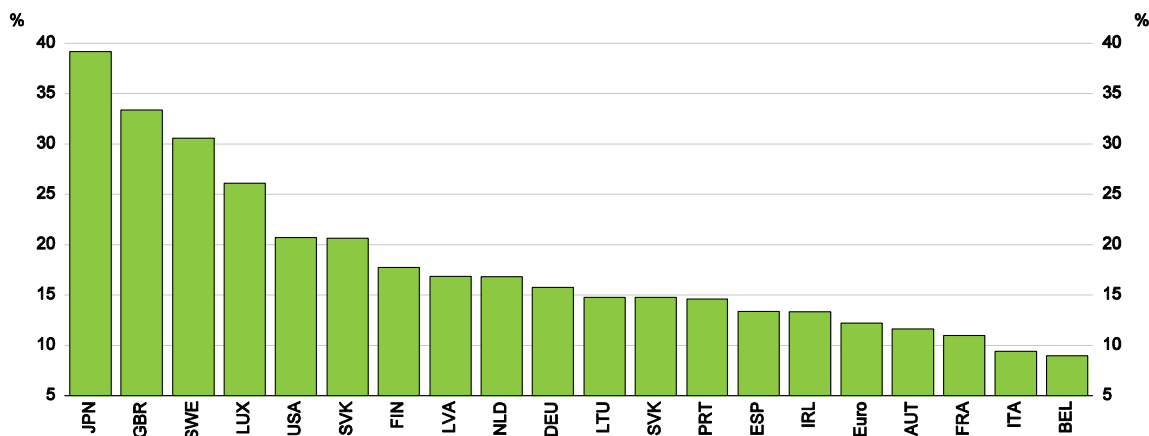
<sup>12</sup> OECD (2016) op.cit.

<sup>13</sup> Peter Hördahl, J.Sobrun, P.Turner (2016): Low long-term interest rates as a global phenomenon, BIS Working Paper No.574.

<sup>14</sup> IMF (2016d) op.cit.

<sup>15</sup> Dietrich Domanski, H.S. Shin, V. Sushko (2015): The hunt for duration: not waiving but drowning?, BIS Working Paper No. 519.

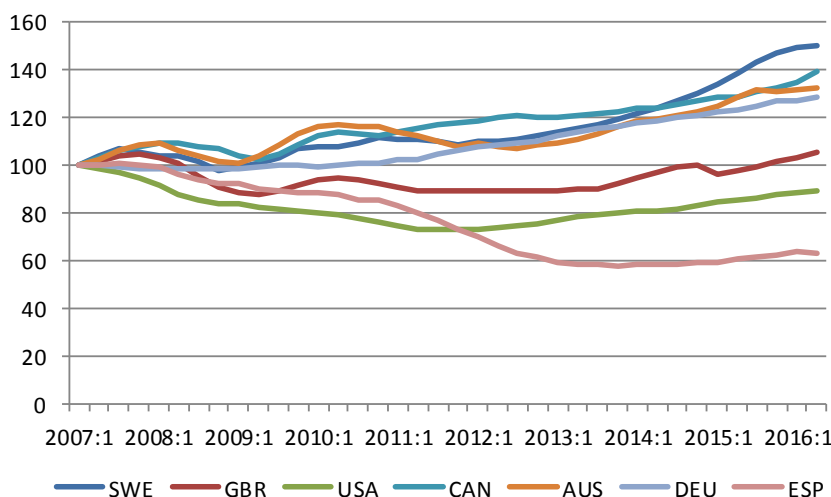
Figure 2 Government bonds held by central banks as a per cent of government debt securities, (as of September 2016)



Source: OECD

The low-rate environment drives valuations of riskier asset classes, like equities and real estate. Equity prices have risen significantly in recent years in advanced economies, notably in the United States. In 2016, equity prices in the U.S. rose to new record highs, even as the macroeconomic outlook remained relatively weak. As of end of November, the MSCI World equity market index is up 3.0% year-to-date. The MSCI emerging markets equity index is up 8.6% year-to-date. The prolonged period of low interest rates has also contributed in many countries to rapidly rising house prices, including in the United Kingdom, the United States, Canada and Sweden (see Figure 3).

Figure 3 Real house price indices in selected advanced economies, 2007Q1-2016:Q2, Index 2007:Q1=100



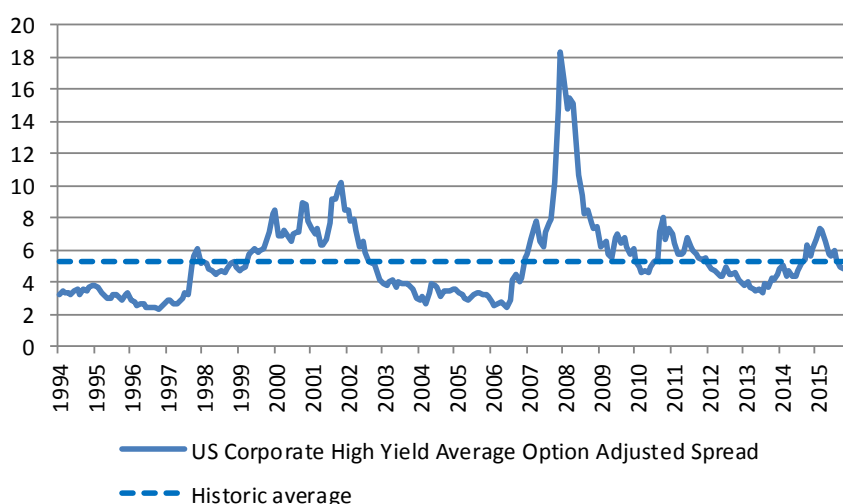
Source: OECD

Quantity-based indicators also point to stronger risk-taking by global investors. This is evident for example in corporate bond markets. In the first nine months of 2016, more than USD 5tn. of debt has been sold by companies, countries and agencies, eclipsing a previous record pace

of issuance set in 2007.<sup>16</sup> Since 2010, corporations in emerging markets have issued growing amounts of debt in international markets at longer maturities. Scheduled repayments have been modest so far, but will rise quite sharply from 2016. The Bank for International Settlements (BIS) estimates that these repayments will total USD 340 billion over the years 2016-18, which is 40% more than during the past three years and, on an annualised basis, amounts roughly to the net issuance of bonds by emerging economies' non-financial corporations in 2015. This may test the refinancing capacity of highly leveraged emerging market corporations.<sup>17</sup>

The search for yield is leading to a convergence between the returns of riskier assets and those of lower risk assets, as evidenced for example in the U.S. high-yield corporate bond markets. Before the crisis, high-yield corporate credit spreads in the U.S. were extremely compressed, as investors were chasing yields, and differences in corporate credit quality appeared to be of minor importance. During the global financial crisis, high-yield corporate credit spreads widened markedly, reflecting the weakness of the economy and rapidly rising corporate bond default rates. In the last couple of years, corporate credit spreads narrowed dramatically, even though corporate debt issuance has increased. Since 2007, corporate debt (including investment grade debt) in the U.S. has increased by 60%, according to the Securities Industry and Financial Markets Association.

*Figure 4 U.S. corporate high yield average option adjusted spreads, Dec 1994 – Nov 2016, in %*



*Source: Bloomberg*

Financial market prices remain vulnerable to a sharp increase in interest rates as the compensation demanded by investors for holding risky assets. Asset prices are also vulnerable to a sudden fall in the willingness of investors to hold risky assets. Some markets appear to have become more fragile, as evidenced by episodes of short-term volatility and illiquidity over the past couple of years. Large swings in some market segments seem to have increased in recent years; relatively small changes in positions seem to have the potential for outsized price

<sup>16</sup> Financial Times (2016): Global debt sales eclipse USD 5tn in '16, September 27.

<sup>17</sup> BIS (2016): International capital flows and financial vulnerabilities in emerging market economies: analysis and data gaps, Note submitted to the G20 International Financial Architecture Working Group, August.

shifts. Moreover, correlations of different assets, like equity market indices in different countries, or interest rates internationally, have risen.<sup>18</sup>

On 7 October 2016, an episode of intense volatility in the foreign exchange markets materialised against the broader backdrop of concerns among market participants about the road to Brexit. In the early trading hours that day, sterling depreciated by around 9% against the dollar in less than 40 seconds.<sup>19</sup> The abrupt fall of the pound joins a growing list of “flash crashes” in recent years that have been difficult to explain. These events have largely centred on markets with widespread use of electronic and high frequency trading. This led some observers to suggest that there have been changes in micro-market structures that impede market liquidity, possibly as a result of changes in regulation and/or advances in financial technology, like the rising use of electronic and automated trading in fixed income markets.<sup>20</sup> The pound recovered quickly that day from its shock move, but remained under pressure in the following days.

The United Kingdom vote to leave the EU on 23 June led to high volatility in financial markets and a marked rise in news-based measures of uncertainty. While markets have since stabilised, sterling has depreciated by more than 12% in trade-weighted terms since the referendum. Nonetheless, the result of the United Kingdom referendum has triggered an increase in macroeconomic uncertainty.

## **Chapter 2 - Global insurance market developments**

The global insurance industry is affected by the global macroeconomic and financial environment and thus exposed to weak economic growth, low inflation rates, volatile financial markets and the persistent low interest rate environment. Since the crisis, premium growth has generally remained below pre-crisis levels. Underwriting is under pressure, but remains profitable. The protracted low-yield environment is eroding life insurers’ capital positions, particularly for companies offering products with long-term guaranteed rates and big duration mismatches between assets and liabilities. Non-life (re)insurance is subject to soft market conditions, which partly can be regarded as an unintended consequence of the current low interest rate environment, reflecting the convergence of capital and insurance markets.

### **A. Non-life insurance**

Global non-life premium growth was slower in 2016 than in the year before.<sup>21</sup> Global non-life premiums have risen by 2.4% in real (inflation-adjusted) terms in 2016, after 3.0% in 2015. In advanced economies, premium growth decelerated to 1.7% from 2.5% due to weaker economic growth and a softer pricing environment in commercial insurance. In emerging markets, premium growth was 5.3% in 2016, up slightly from 2015, but slower than the 8% annual average growth between 2000 and 2014. Growth in emerging markets is mostly driven

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<sup>18</sup> Franklin Allen (2016): Market liquidity – An overview, Presentation at the SAFE Summer Academy, Brussels, 13 September.

<sup>19</sup> Bank of England (2016): Financial Stability Report, November, page 39 ff.

<sup>20</sup> See eg Morten Bech, A. Illes, U. Lewrick, A. Schimpf (2016): Hanging up the phone – electronic trading in fixed income markets and its implications, BIS Quarterly Review, March.

<sup>21</sup> Swiss Re (2016a): Global insurance review 2016 and outlook 2017/18, November.

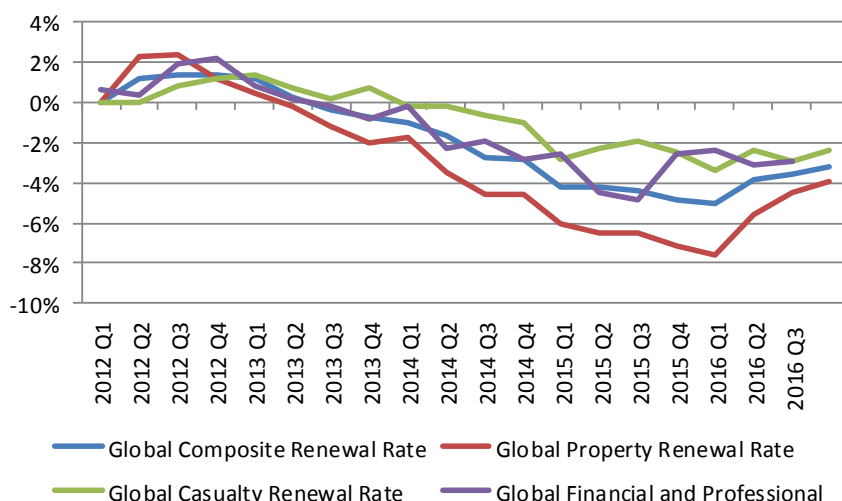
by motor insurance, which represents close to 60% of the total non-life market in these markets.<sup>22</sup>

Natural catastrophe losses remained below historic average levels in 2013, 2014 and 2015. Global insured losses from natural catastrophes for 2016 are estimated by Swiss Re to amount to USD 42 billion, compared to USD 37 billion in the year before.<sup>23</sup> This is slightly below the average loss of the previous ten years of insured losses from natural catastrophe events (USD 46 billion). Losses resulting from man-made disasters fell to USD 7 billion from USD 9 billion in 2015. The earthquake that struck the Kumamoto prefecture in Japan on 16 April 2016 and its aftershocks resulted in an estimated insured loss of USD 5 billion, the costliest disaster event globally in 2016. Hurricane Matthew – the first Category 5 Atlantic hurricane since Hurricane Felix in 2007 – is currently estimated to be in excess of USD 4 billion in insured losses for the U.S. and the Caribbean.

### 1. Investment yields and underwriting profitability

Non-life insurers' investment income is gradually declining, primarily due to falling interest rates. As non-life insurers' investments usually have a shorter maturity than those of life insurers, current investment yields of such insurers decline more rapidly when interest rates fall. The Insurance Information Institute expects U.S. non-life insurers' net investment yields to fall to 3.1% in 2016, from an estimated 3.6% in 2015, and relative to 4.5% in 2007.<sup>24</sup> Lower investment earnings place a greater onus on underwriting and pricing discipline.

*Figure 5 Global insurance market renewal rates (2012 Q1 – 2016 Q3)*



Source: Marsh Global insurance market index – Q3 2016

Broker reports indicate that prices continue to soften in various business lines. In some non-life markets and business lines, premium rates continue to fall and, at the same time, extended

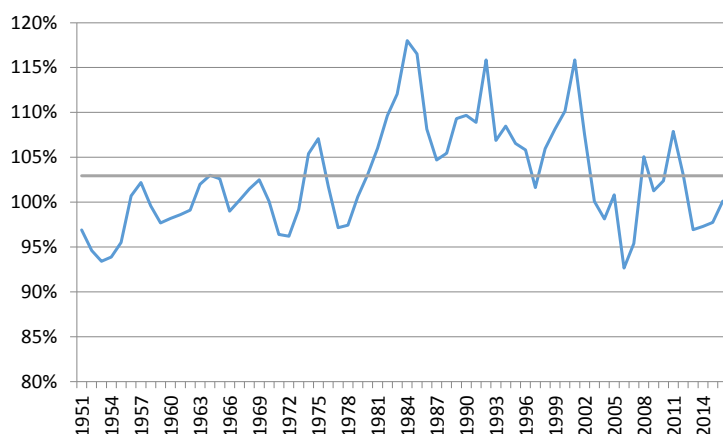
<sup>22</sup> Swiss Re (2016b): The future of motor insurance: How car connectivity and ADAS are impacting the market, March.

<sup>23</sup> Swiss Re (2016): Preliminary sigma estimates: Total losses from disaster events rise to USD 158 billion in 2016, Press release, 15 December.

<sup>24</sup> Robert P. Hartwig (2016): Overview & outlook for the commercial P/C insurance industry in 2016 & beyond, Insurance Information Institute, September 15, slide 26.

terms and conditions are being offered. The third quarter survey by the Council of Insurance Agents & Brokers indicates an overall softening of rates in U.S. commercial lines. Rates decreased across all sizes of accounts, by an average of -3.2% (-3.9% in Q2 2016). Marsh reports commercial rate declines across regions and lines of business. In the third quarter of 2016, global commercial insurance rates fell for the 14<sup>th</sup> consecutive quarter (-3.6%). Property renewal rates continued to show the biggest decrease (-3.9%).<sup>25</sup>

*Figure 6: U.S. property and casualty combined ratio (1951 - 2016)*



*Sources: Swiss Re. Data from A.M. Best 2015 (preliminary) and 2016 (estimate) from Conning*

Reported profitability remains positive. Between 2013 and 2015, the U.S. property and casualty insurance industry reported combined ratios (ie incurred losses and expenses as a proportion of premiums earned) comfortably below 100%, which was the first time since the beginning of the 1970s (1971-73) that underwriting was profitable for three consecutive years. In the first half of 2016, the combined ratio deteriorated to 99.8%, due to higher natural catastrophe losses in the U.S. and higher motor insurance claims.<sup>26</sup> Underwriting has often been unprofitable in the past; U.S. insurers used to rely on positive investment results. The long-run (1951-2014) average combined ratio of the U.S. property and casualty industry is 102.8%.

In Europe, the combined ratio remained broadly unchanged. In Q2 2016, the average combined ratio was close to 95%, after 95.0% in Q2 2015. Pressure is arising from motor insurance business, which is highly competitive.<sup>27</sup> In Japan, overall underwriting results deteriorated, reflecting mainly higher natural catastrophe losses due to the Kumamoto Earthquake and higher losses in auto insurance.<sup>28</sup> In Australia, profitability of property insurers improved in the first half of 2016, with claims costs from natural catastrophes significantly lower than for the same period in 2015.<sup>29</sup> However, the Australian industry does face significant reputational risk as there is an increasing public, and press, push for faster claims processing for catastrophe events.

<sup>25</sup> Marsh (2016) Global insurance market index Q3 2016.

<sup>26</sup> Swiss Re (2016a) op. cit.

<sup>27</sup> EIOPA (2016): Financial Stability Report, June, page 24.

<sup>28</sup> Swiss Re (2016a) op. cit.

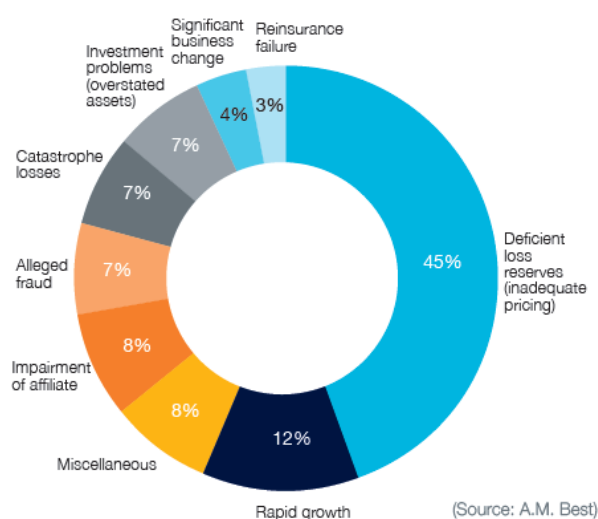
<sup>29</sup> Information from APRA (Australian Prudential Regulation Authority)



The softening market makes profitable underwriting increasingly difficult to achieve. In the last couple of years, reserve releases have contributed to higher profitability and allowed non-life companies to reduce prices in competitive markets. Reserve releases have been made possible by benign claims trends in both property and casualty. In the United Kingdom, financial reserves released by non-life insurers in 2015 as measured by the percentage of reserves brought-forward have been the highest for over 30 years.<sup>30</sup>

The two most important factors to cause financial impairments for both life and non-life insurers have been deficient loss provisioning and inadequate pricing. Between 1969 and 2014, 45% of impairments have been caused by deficient loss reserves whilst rapid growth, which is probably highly correlated with deficient loss reserves, has caused 12% of all impairments. Inadequate prices, either as result of poor actuarial work or in the wake of aggressive pricing in order to compete for market share, materialise often in deficient reserving. Consequently, supervisors are well advised to monitor closely the adequacy of non-life insurers' reserving activities, their underwriting practices and the economic impact of reinsurance transactions.

*Figure 7: Primary causes of property and casualty insurer impairments - 1969 – 2014*



*Source: JLT Re. Data from A.M. Best*

In part, the current soft market is a manifestation of the wider low return environment.<sup>31</sup> Asset managers, hedge funds, and other institutional investors have recently entered the (re)insurance space, in search of the relatively high returns (premiums) offered, and attracted also by the perceived low correlation of some insurance risks with other financial market risks. Such entrants can result in expected returns gradually falling into line with other investment opportunities, putting pressure on premium rates, and contributing to the soft market conditions non-life (re)insurers are currently exposed to. Another reason for the current soft market conditions is the absence of major natural catastrophe losses. Insured natural catastrophe losses remained below historic average levels between 2013 and 2015. The most recent truly

<sup>30</sup> Bank of England (2016): Analysis and observations from regulatory returns and monitoring-the-market questionnaire, 18 July.

<sup>31</sup> David Rule (2016): Managing risk in a soft market, Speech at the General Insurance Research Organisation conference, Dublin.



costly hurricane (ie the third costliest insurance loss between 1970 and 2015) in the United States was Hurricane Sandy in 2012, with USD 36 billion of insured losses.<sup>32</sup>

## 2. Market conduct in Australia

In Australia, there is increasing public and press focus on any areas where insurers (both life and nonlife) and, indeed, financial services more generally, could be considered to be acting in 'bad faith' across the entire value chain.<sup>33</sup> This ranges from products which are sold with poor (or perceived to be poor) value for money, to inappropriate (including slow or complicated) claims decisions. Insurers face a material, and increasing, reputational challenge in many areas and this is traditionally not an area where their risk management processes have had a significant focus.

### **Cyber insurance - Trends and risks**

Cybersecurity risks have become more significant as critical consumer financial and health information is increasingly stored in electronic form. As people become more reliant on electronic communication, and as businesses collect and maintain ever more granular pieces of information on their customers, the opportunity for bad actors to cause difficulties for business and the public is exploding.<sup>34</sup>

The demand for insurance has increased significantly in response to sharply heightened risk awareness. The insurance industry has reacted to cyber threats and to the corresponding demand for risk cover by launching specific cyber policies. These relatively new types of policies can be used to insure against IT and cyber risk exposures in private, commercial and industrial environments. The cyber insurance market is only small at present, but expected to grow dramatically over time. Marsh estimates the U.S. cyber insurance market was worth around USD 2 billion in gross written premiums in 2014 (0.3% of the U.S. non-life market). Currently, the U.S. market dominates the global volume of these type of products, with the majority of the business written being against U.S. risks. The European cyber insurance market is expected to get a boost from expected reform of EU data protection rules that force companies to disclose breaches of customer data.<sup>35</sup> A PwC study reported the global market could grow to USD 5 billion by 2018 and USD 7.5 billion by 2020.<sup>36</sup>

A major challenge facing insurers selling these insurance products is to set risk-adequate premiums.<sup>37</sup> This is in part due to the inherent complexity of the risk, given that the definition of cyber risk is evolving and rapidly expanding. Moreover, although many costly cyber events have occurred, there is still a lack of historical data for cyber risk, making it difficult for insurers to write and price policies appropriately. Finally, expected claims in the commercial and industrial area tend to be low frequency events with possibly highly severe impact, given that cyberattacks have the potential to be massive and wide-ranging. Risk accumulation – in which a single event spans multiple risks affecting companies, countries, industries and lines of business – is a growing concern and creates the potential for catastrophic risk.

Insurers are exposed to cyber underwriting risk directly through prudential risks that emanate from underwriting specific cyber policies (affirmative) and indirectly through insurance policies where cyber risk is not clearly excluded (silent). Affirmative policies include, for example, data breach covers. Silent policies might include casualty, marine, aviation, transport, motor and home contents policies that

<sup>32</sup> Swiss Re (2016d): Natural catastrophes and man-made disasters in 2015, sigma No. 1/2016.

<sup>33</sup> Information from APRA.

<sup>34</sup> NAIC (2016): Cybersecurity, July.

<sup>35</sup> The Reform of EU data protection rules will become effective in May 2018.

<sup>36</sup> PricewaterhouseCoopers (2015): Insurance 2020 & beyond: Reaping the dividends of cyber resilience, September.

<sup>37</sup> Robert P. Hartwig, C. Wilkinson (2015): Cyber risk: Threat and opportunity, Insurance Information Institute, October.

either cover all risks, or do not clearly exclude cyber risks. In a recent consultation paper, the Bank of England has expressed concern about the loss potential of silent cyber risk and has identified material shortcomings in its management.<sup>38</sup>

Cyber insurance products have to be embedded in adequate control structures to prevent potentially incorrect assessments from escalating into a threat to the insurance companies concerned. An IAIS working group has recently published an issues paper on cyber risk, which builds on a 2015 survey of members on their approaches to cyber risk.<sup>39</sup>

## **B. Life insurance**

In 2016, global life insurance premiums have risen 5.4% on an inflation-adjusted basis, up from 5% growth in 2015, and relative to an estimated 3.1% GDP growth rate of the global economy.<sup>40</sup> In advanced markets, premium growth has slowed to 2% in 2016 from 3.4% in 2015. According to Swiss Re, emerging markets, in particular emerging Asia, were the main drivers of growth for the global life sector. Emerging market premiums for the full-year 2016 are projected to have grown by 20.1%, up from a 13.2% increase in 2015.

In Australia, insurers net profit performance has been improving over the last few years following significant negative experience for group risk business in 2013-14. The industry still faces significant challenges in relation to disability income business for both direct writers and reinsurers. According to Australian Prudential Regulation Authority (APRA), this is a product where the industry needs to undertake systemic product and pricing redesign.

### **1. Impact of low interest rates**

The prolonged low interest rate environment has been a source of vulnerability for many life insurers. Life insurers typically derive their profits from the spread between their investment yields and (guaranteed) benefits to policyholders. Low interest rates can present challenges for life insurance companies if they had previously offered to pay guaranteed benefits to policyholders based on higher interest rates, and hence investment yields, prevailing at the time.

The promised benefits, which represent liabilities on life insurers' balance sheets, are typically expected to become payable long into the future, with maturities that are much longer than those of many financial assets. The resulting maturity gap has meant that the decline in interest rates following the financial crisis often increased the present value of these insurers' liabilities by more than the present value of their assets.

The impact of the low interest rate environment on life insurers differs across countries, and not all companies are affected equally. In some European countries, particularly in Germany and Austria, guaranteed-rate life insurance products have commonly been used by households for saving for general purposes and for retirement. In Germany, in 2015 84% of existing inforce life insurance premiums were written for plans of this type. In the United States, 45% of life insurance premiums are written on fixed rate plans.<sup>41</sup>

<sup>38</sup> Bank of England (2016): Cyber insurance underwriting risk, Consultation Paper 39/16, November.

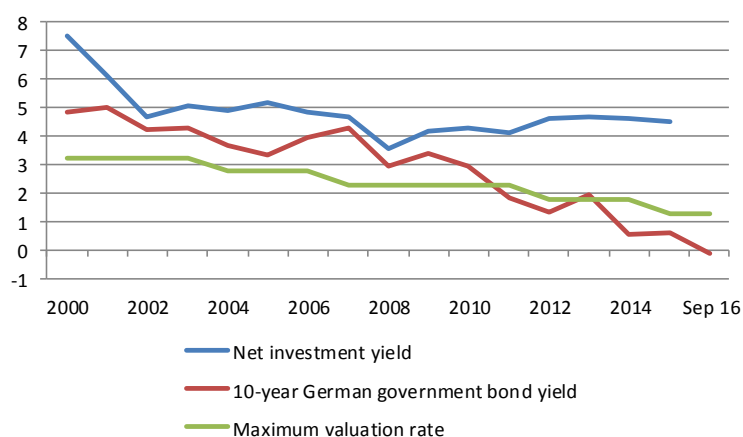
<sup>39</sup> IAIS (2016): Issues paper on cyber risk to the insurance sector, August.

<sup>40</sup> Swiss Re (2016a) op cit.

<sup>41</sup> McKinsey Global Institute (2013): QE and ultra-low interest rates: Distributional effects and risks, November.

Life insurers' net investment yields have been declining gradually in many countries. In Germany, for example, they have declined from 7.5% in 2000 to 4.5% in 2015. For about 5 years, the 10-year German government bond yield has been below the current guaranteed rate offered by German life insurers. This means that only investing in German government bonds while paying customers the minimum rate would lead to a loss. Life insurers do have a set of tools to mitigate this problem, for example by seeking alternative, higher-yielding investments or by redesigning products (see section below). Moreover, only current premium income, a fraction of total investments, and maturing investments are (re)invested at current market yields. According to Swiss Re, current premium income accounts for about 12% of life insurers' and 43% of non-life insurers' investments, meaning that the vast majority of life insurers' investments stem from previous years.<sup>42</sup>

*Figure 8 Government bond yields, net investment yield and maximum valuation rate in the German life insurance market, (2000 - Sept. 2016), in %<sup>43</sup>*



Sources: GDV, Bloomberg

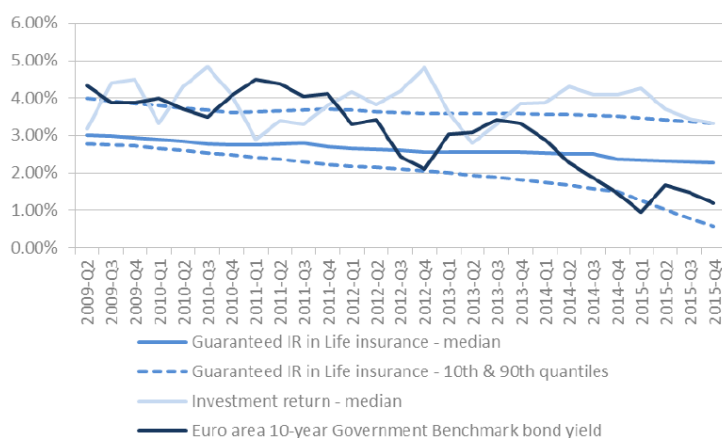
The low yield environment is affecting the guaranteed rates of many European life insurers, not only in Germany.<sup>44</sup> The median guaranteed interest rates decline gradually over time. Since the beginning of 2014, the guaranteed rates are well above the Euro area 10-year government bond yield. The gap between life insurers' investment yield and the guaranteed rate has declined, but stays positive.

<sup>42</sup> Swiss Re (2012): Facing the interest rate challenge, sigma No. 4/2012.

<sup>43</sup> The valuation rate is the maximum rate at which life insurers are allowed by the regulator to discount liabilities. In practice, it is the guaranteed rate that insurers offer on new business.

<sup>44</sup> EIOPA (2016): Financial Stability Report, June.

*Figure 9 Guaranteed interest rate in life insurance vs. investment yield and Euro area 10-year government bond yield, 2009 Q2 – 2015 Q4*

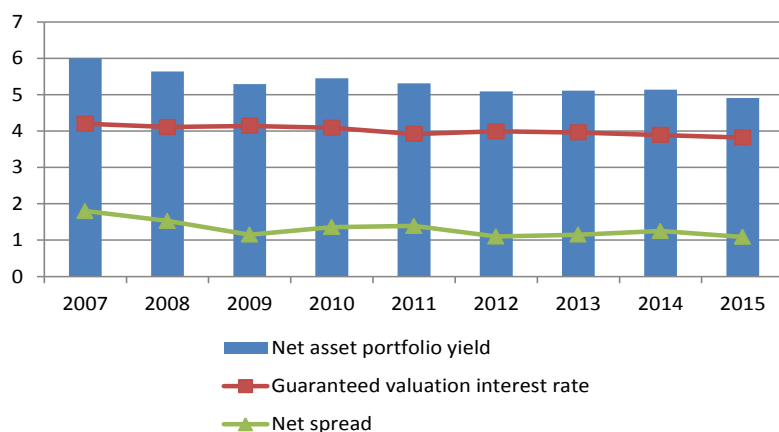


*Note: sample based on 32 large insurance groups in the EU and Switzerland*

*Source: EIOPA Financial Stability Report, June 2016*

According to a study conducted by the National Association of Insurance Commissioners (NAIC), the recent period of the low interest environment created spread compression on earnings, it did not materially impact life insurers' solvency.<sup>45</sup> For the period from 2007 to 2015, the U.S. life insurance industry-wide spread between net portfolio yield and guaranteed credited rate (ie the average discount rate on all life insurance policies) declined by 72 basis points, but remains positive. The decline in spread on an average reserve of USD 2.7 trillion results in USD 22.5 billion loss in revenue per year over this period. In 2015, the guaranteed credited rate to policyholders was 3.82%, which is above current U.S. market interest rates.

*Figure 10 Net spread over guaranteed rate of U.S. life insurers, 2007-2015, in %*



*Source: L. Bruning (NAIC), Monitoring interest rate risk: Low interest rate study update, 2016*

The longer that rates are low, the more investment of premium income and reinvestment of maturing investments (where assets and liabilities are mismatched) will have to be done at prevailing low interest rates; and the more firms will need to respond, for example by repricing

<sup>45</sup> NAIC (2016): Low interest rates, April. [http://www.naic.org/cipr\\_topics/topic\\_low\\_interest\\_rates.htm](http://www.naic.org/cipr_topics/topic_low_interest_rates.htm).

or redesigning products to reflect these lower rates. For companies with mature books of long term business, it is the evolution of rates over a period of many years that will determine whether they can meet their promises to policyholders. This requires them to make assumptions about long run future rates. How such assumptions are made needs to be a key focus of both company risk management and supervisory oversight.<sup>46</sup>

## 2. Industry response to low interest rates

Insurers adapt to lower than expected interest rates by resorting to diverse adjustment mechanisms. In some countries, for example, the United States, and in Europe, the industry continues to consolidate. In the U.S., many firms are exiting the market, and a few firms are failing.<sup>47</sup> In Europe, the number of active insurance companies has declined continuously since the crisis. According to Insurance Europe data, the number of domestic active European companies operating in the domestic market declined by 6.9% from 2010 to 2014.

In many countries, life insurers are selling fewer products with sensitivity to interest rates and equities, and switching to lower risk products, including retirement-related business, with limited or no guarantees. They often shift the focus of new business towards unit-linked policies where the amount policyholders receive at the end of the term or in retirement is linked to the change in the underlying value of the investments they chose. Policyholders thus bear the investment risk.

In Europe, life insurers are gradually withdrawing from the provision of longer-term return guarantees.<sup>48</sup> In France, in 2015 net inflows to unit-linked products almost doubled compared with the previous year, while inflows into euro-denominated products declined by 25%.<sup>49</sup> At the euro area aggregate level, unit-linked insurance constitutes about 20% of life insurance policies.<sup>50</sup> As life insurers shift investment risk back to policyholders, they face greater competition from other financial institutions, including banks and asset managers. It is also questionable whether, from a societal perspective, individual policyholders are more suited to take long-term investment risks than life insurers.

Life insurers have increased efforts at pushing policyholders to switch to new conditions on inforce products or to other types of insurance products, like pure risk protection products (eg term life or disability). In the U.S., for example, the share of pure risk protection products in total inforce premiums increased from 18% in 2008 to 21% in 2015, as life insurers stopped offering certain types of savings products, according to Swiss Re. Life insurers have also adjusted their hedging strategy. Hedging exposures tend though to be often costly and imperfect where the business is long term and where there are extensive policyholder options. Moreover, it introduces counterparty risk.

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<sup>46</sup> IMF (2014): The impact on the insurance sector of a low interest rate environment – Technical Note, IMF Country Report No. 14/68.

<sup>47</sup> IMF (2015) op. cit.

<sup>48</sup> ESRB (2016): Macropprudential policy issues arising from low interest rates and structural changes in the financial system, November.

<sup>49</sup> Francois Villeroy de Galhau (2016): Towards the insurance of tomorrow, Speech at the 8th International Insurance Conference, Paris, 14 October.

<sup>50</sup> ECB (2015): Financial Stability Review, November, page 89.

Life insurers have responded to the low interest rate environment by lengthening the duration of assets, including non-fixed income investments, to match liabilities. The average asset duration of U.S. life insurers for example has increased from 7.2 years in 2009 to 7.6 years in 2014. In an attempt to contain duration mismatches, German life insurers have been increasing the asset duration in recent years.

Despite the very low level of interest rates, there is relatively limited evidence of an industry-wide shift of assets to “riskier” categories.<sup>51</sup> There are indications that some insurers have redirected their investment strategies towards some riskier asset classes and activities, but aggregate numbers do not indicate a widespread and materially significant practice.<sup>52</sup> This may, however, be reflecting the challenge of identifying empirical evidence of a search for yield/ increased risk taking, given that changes in aggregate asset allocations tend to be limited over time and can result from a range of different factors. For some European countries, it may also be related to the advent of Solvency II, which introduces risk-sensitive capital requirements and market-based valuation (see Chapter 3 of this report).

### 3. Capital costs of life insurers

The low level of interest rates and investment yields puts tremendous pressure on life insurers to improve their expense management and to reduce costs. According to McKinsey, the average costs of equity for a cohort of life insurers in the years from 2000 to 2013 was 9.6%, exceeding the average return on equity of 8.8%.<sup>53</sup> Thus, tackling cost issues is likely to be a top priority.

A negative gap (ie cost of equity exceeding return on equity) is not sustainable in the long run since life insurers will not be able to deliver the return required by equity investors. Over time, this will make it difficult for life insurers to attract capital and finance their growth. According to data for a cohort of 30 global life and composite insurers, the gap did close and the return on equity exceeded the costs of capital in 2015, owing to an improvement in life insurers’ earnings and favourable equity market conditions, but widened again in the first half year of 2016.

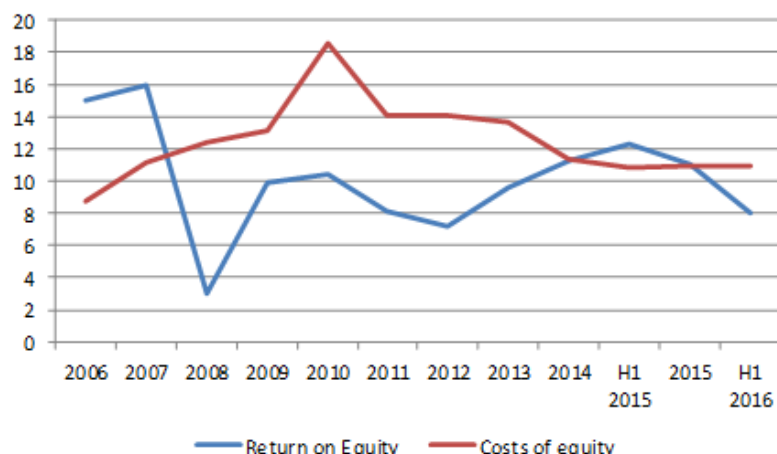
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<sup>51</sup> IMF (2016e): The insurance sector – Trends and systemic risk implications, Chapter 3 in Global Financial Stability Report, April, page 3.

<sup>52</sup> Daniel M. Hofmann (2016): The impact of low interest rates on the insurance sector and its economic role, Geneva Association Research Report.

<sup>53</sup> McKinsey (2015): Successfully Reducing Insurance Operating Costs: Insights from McKinsey’s Insurance 360 Benchmarking.

Figure 11 Global life insurers' return on equity and costs of equity 2006-H1 2016, in %\*



Source: Bloomberg

\*[Note: Market capitalisation weighted average of 30 global and composite life insurance companies. Based on IFRS/local GAAP data. Companies in the sample include: Aflac, Aegon, Ageas, ASR Nederland, Assurant, Aviva, Axa, Baloise, China Life, CNP Assurance, Generali, Genworth, Hartford, Legal & General, Manulife, Metlife, Old Mutual, Phoenix, Principal Financial, Protective Life, Prudential Financial, Prudential Plc, Standard Life, Storebrand, Sun Life, Swiss Life, Torchmark, Unum, Vienna Insurance.]

### C. Reinsurance<sup>54</sup>

Market conditions in the reinsurance industry remain tense, being marked by fierce competition, excess capacity, modest premium growth, softening rates, low investment yields and industry consolidation. Reinsurance premium growth has remained moderate since the crisis, at about half the pre-crisis average. In 2016, global non-life reinsurance premiums have grown by 1.0% on an inflation-adjusted basis, after 1.4% in 2015. Global premiums in traditional life reinsurance, consisting of mortality and morbidity, are estimated to have grown by 1.5% in real terms in 2016.<sup>55</sup>

Reinsurance capital stands at peak levels. Since 2008, according to estimates by Aon Benfield, reinsurance capital (traditional and alternative) has increased by more than 70%, driven mainly by alternative capital.<sup>56</sup> By contrast, the demand for reinsurance is affected by the weakness in the economy, the balance sheet strength of primary insurers, and changes in reinsurance buying habits of large global insurers. Improved risk management and larger balance sheets have enabled many large insurers to buy less reinsurance and also purchase reinsurance on a group-wide and centralised basis. On the other hand, the implementation of Solvency II in Europe arguably has created some added reinsurance demand to generate capital relief.

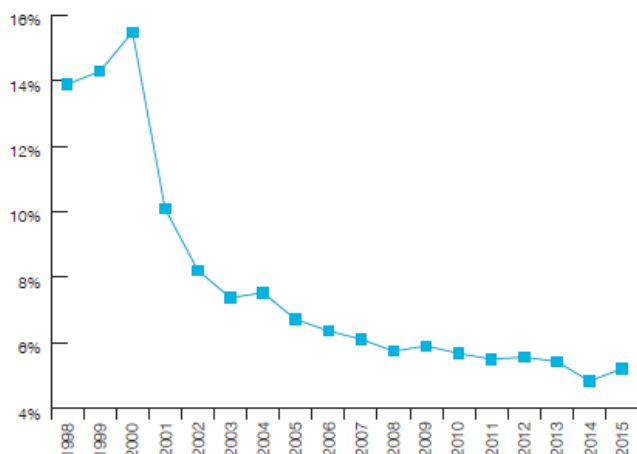
<sup>54</sup> The topic of reinsurance is also covered elsewhere in this GIMAR, chapter 3 discusses recent developments in risk transfer to the capital markets. Chapter 4 introduces findings from empirical research conducted by IAIS on a sample of global reinsurers.

<sup>55</sup> Swiss Re (2016a) op.cit.

<sup>56</sup> Aon Benfield (2016): Reinsurance market outlook, September.



Figure 12 Simple average cession rate of 20 global P&C carriers, 1998 - 2015



Source: JLT Re

As a consequence, reinsurance premium rates continue to soften, albeit, as various broker reports suggest, at a slower pace than in 2014 and 2015, but with no signs of a rebound. Premium rates have been falling for around a decade. For example, Guy Carpenter's Global Property Catastrophe Rate-On-Line index has declined by more than a third since its post-Hurricane Katrina peak in 2006.

Standard & Poor's observes a continued shift to proportional and primary lines of business from non-proportional reinsurance business, as price reductions in the former lines of business are less severe than in the latter.<sup>57</sup> Reinsurers withdraw capacity where they deem pricing to be inadequate. A number of reinsurers considered U.S. casualty reinsurance a relatively attractive line of business following severe price declines in property business. Other business lines, such as accident & health, United Kingdom motor, and agriculture or crop, have also been profitable alternatives to property business, but these lines are becoming increasingly competitive and returns are diminishing.

Reinsurers continue with active capital management strategies, as opportunities for profitable capital deployment opportunities diminish. In the first half of 2016, publicly listed reinsurance companies have returned more than 70% of their earnings to shareholders via share buybacks and ordinary and special dividends.<sup>58</sup> The wave of mergers and acquisitions in the reinsurance industry in 2015 has receded this year, but the industry still looks to consolidate to compete against new entrants into the industry from the alternative market. A major deal was announced in October, when Sompo Japan, a Japanese insurance company, acquired Endurance Specialty Holdings Ltd., a Bermuda-based property and casualty insurance and reinsurance company, for USD 6.3 bn.<sup>59</sup>

Reinsurers' profitability is under pressure. Combined ratios in the first half-year of 2016 increased to 94.1% due to slightly higher natural catastrophe losses (H1 2015: 91.5%). Investment yields, excluding realised and unrealised capital gains, remained modest at 3.1% (H1 2015: 3.3%). On average, reinsurers in the first half-year of 2016 reported an annualised

<sup>57</sup> Standard & Poor's (2016): Softer for longer: Are global reinsurers ready for a long soft cycle and an evolving business landscape, in Global Reinsurance Highlights, September.

<sup>58</sup> Willis Re (2016): Reinsurance market report: Results for half-year 2016, September, page 9.

<sup>59</sup> Artemis (2016): Sompo Japan acquires Endurance for USD 6.304 billion, October 5.



return on equity of 8.3%, down from 10.4% in the same period last year. Results continue to be bolstered by releases of prior year reserves which represent around a third of net income, according to estimates by Willis Re.

Conditions in the global reinsurance market are expected to remain competitive and challenging. Reinsurers' earnings have been heavily supported in recent years by benign catastrophe experience and significant prior-year reserve releases. These trends are, at least in part, due to luck. Although this has allowed reinsurers to consistently maintain relatively comfortable profitability measures in recent years, the returns may not be sustainable.

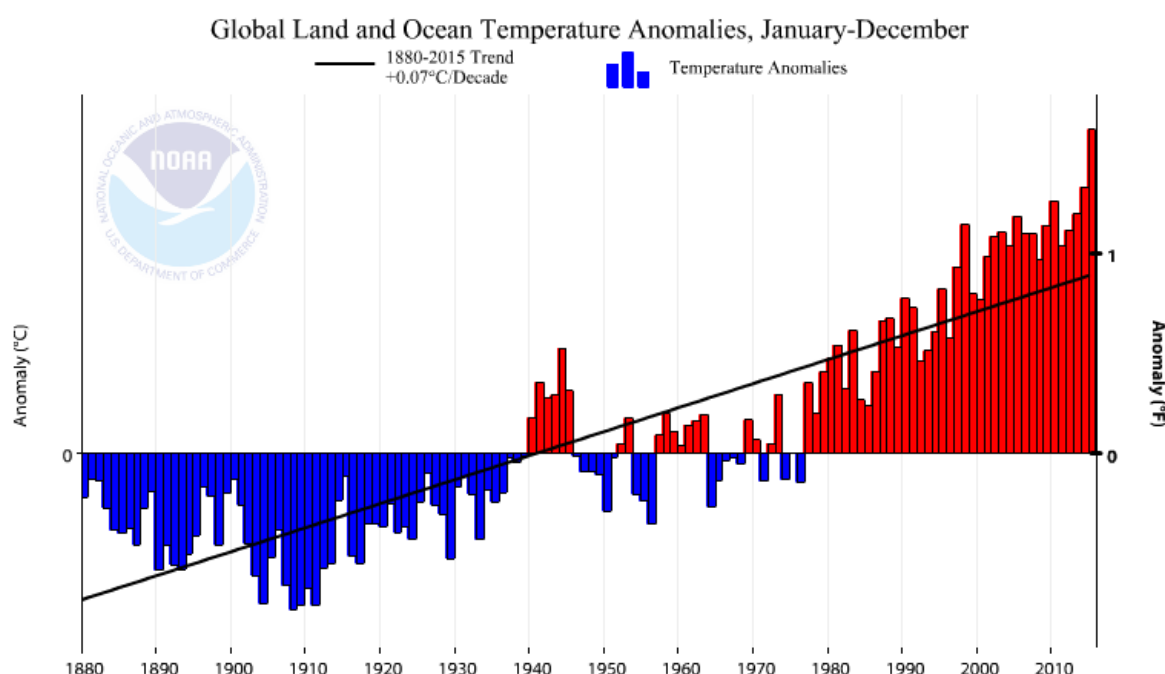
## Chapter 3 - Special topics

### A. Reinsurance and climate change

#### 1. Introduction

Climate change refers to any identifiable change in measures of climate lasting for a long period of time. Examples of climate change include major changes in temperature (see graph below<sup>60</sup>), rainfall, snow, or wind patterns, lasting for decades or longer. A variety of often related factors can give rise to climate change; some are natural ones (eg changes in the sun's energy or changes in ocean circulation) while other factors relate to human activities that change the atmosphere's make-up (eg burning fossil fuels) and the land surface (eg cutting down forests, planting trees, building developments in cities and suburbs).

*Figure 13 Global land and ocean temperature anomalies*



The insurance industry is not immune to climate change, and insurance regulation and supervision need to respond to industry changes. The relation between climate change, insurance, and insurance regulation as well as supervision is the central issue addressed in this section. As insurers respond to the impact of climate change there is a need for insurance regulation and supervision to do likewise. Insurers' possible responses with climate change have multiple dimensions. Examples of responses might include insurers deciding to provide coverage for climate change related risks, making their own operations "greener", taking part in society's efforts to prevent, mitigate or adapt to climate change and making 'greener'

<sup>60</sup> Temperature anomalies refer to departures from a reference value or long-term average. Positive anomalies indicate that the observed temperature was warmer than the reference value, while negative anomalies indicate that the observed temperature was cooler than the reference value (US National Oceanic and Atmospheric Administration NOAA, available at <http://www.ncdc.noaa.gov>).

investment portfolio decisions – often in the context of long or very long term horizon expectations.

While insurers' responses to climate change may have the potential to contribute to addressing challenges that climate change poses, they also generate risks. Insurance regulators and supervisors in turn, face the challenge of understanding, assessing and dealing with the risks that result from insurer responses.

This chapter first discusses initiatives by insurance regulators and supervisors to understand risks emerging from insurers' interaction with climate change. Second, it examines current approaches by regulators and supervisors to generate regulatory and supervisory responses to those risks.

## 2. Insurers and climate change-related risks

Climate change related risks, from the perspective of insurance supervisors, arise at three distinct though interconnected levels.<sup>61</sup> First, risks faced by insurers in their capacity of underwriters of insurance risks. Second, risks faced by insurers in their capacity as institutional investors. And last but by no means least, risks faced by insurers in their capacity as corporations (ie legal entities or groups).

***Risks affecting insurers in their capacity of insurance risk underwriters*** – Insurers' core business is to sell insurance protection in exchange for a premium. Thus, insurers have a liability risk for the compensation of policyholders that have suffered damages as an effect of climate change. Climate change affects non-life, life and all sub-categories of these risks - albeit in different ways.

As underwriters of property risks, insurers are affected both directly and indirectly. Direct effects can relate to immediate consequences of weather events such as, for example, damage to property. Indirect effects cover a broad range of consequences derived from the physical risk, such as financial loss produced by a breakdown of the supply chain or by business interruption. With respect to indirect risks, a study carried out by the United Kingdom's Prudential Regulation Authority notes that indirect physical risks are less likely to have been fully incorporated into insurers' models and other risk management tools than direct physical risks.<sup>62</sup>

As underwriters of casualty risks, insurers may be affected by climate change via at least three channels:<sup>63</sup>

- An insured's ***failure to mitigate*** a climate-change related risk, which if it materialises, causes a loss to a third party which is covered by insurance (eg a general liability policy). An example of this may be the failure of an electricity producer to reduce carbon emissions which causes damage to a third party.

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<sup>61</sup> For an early supervisory effort at understating climate change related risks please refer to NAIC (2008), *The potential Impact of Climate Change on Insurance Regulation – White Paper* (available at [www.naic.org](http://www.naic.org)).

<sup>62</sup> Prudential Regulatory Authority (2015) *The impact of climate change on the UK insurance sector - A Climate Change Adaptation Report by the Prudential Regulation Authority* - September 2015 (available at <http://www.bankofengland.co.uk/pru/Documents/supervision/activities/pradefra0915.pdf>).

<sup>63</sup> Prudential Regulatory Authority (2015).

- An insured's **failure to adapt** to climate change related risks. For example, the value of a firm protected by insurance (eg a directors and officers (D&O) policy) may drop due to the firm's directors' inability to foresee or adequately manage a climate risk, generating a claim on the D&O policy. Further, an engineering firm protected by insurance (eg a professional indemnity policy) may be found liable for not designing a bridge strong enough to withstand extreme floods resulting from climate change.
- An insured's **failure to disclose** a climate related risk. This category appears particularly relevant as better understanding is gained of climate change risks and this translates into regulations requiring disclosure. Importantly, as climate change related risks are better understood, the likelihood of their materialisation being considered a chance event diminishes – this makes it more likely that these risks will be linked to the failures discussed above.

As underwriters of life and health risks, insurers are affected by climate change related risks via, for example, increased morbidity and increased mortality. Events like peak -and/or protracted- heat waves are likely to negatively impact on population health. However, life insurers often have a partial hedge between mortality and longevity related risks and the IAIS has previously discussed this point.<sup>64</sup>

Last but not least, there are two additional climate change related risks faced by insurers, both life and non-life, in their capacity of underwriters of insurance risks. First, there are risks emerging from “**inadvertent coverage**”, ie the limitations and terms and conditions in policies may not be sufficient to avoid “inadvertent” coverage of new risks that arise. And second, there are risks emerging from the **development and marketing of new insurance products** developed to provide coverage of such new risks. An example of this would be insurance products developed to provide protection to specific risks emerging from so-called “green” buildings. As is often the case with new insurance products, actuarial data may be lacking in robustness, completeness and/ or accuracy, causing among other things, uncertainties in respect to pricing and or claims development.

**Risks affecting insurers in the capacity as institutional investors** – insurers, and in particular life insurers, are key institutional investors. Insurers invest their assets with the objectives of obtaining a return from their investments and of matching their investments with their liabilities, in particular, insurance risks. Climate change affects insurers in their capacity as institutional investors in at least three ways. First, insurers may invest in assets such as real estate that lose value due to, for example, the materialisation of climate change related events causing damage. Moreover, that real estate may lose value even if the climate change related does not directly damage it. For example, there is the risk of property losing value due to being in a geographical location potentially affected by climate change related phenomena, like coastal areas that become more susceptible to flooding or rising sea levels.

A second way in which insurers as institutional investors may be affected by climate change related risks is as holders of assets (eg shares, debt) of firms or countries contributing to, or

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<sup>64</sup> IAIS (2010). *Macroprudential Surveillance and (Re)-Insurance - Global Reinsurance Market Report Mid-year Edition* (available at [www.iaisweb.org](http://www.iaisweb.org)). With respect to the partial hedge between mortality and longevity-related risks, please refer to point 1.3.1 of the report.

exposed to the effects of, climate change, like fossil fuel producers or consumers (eg electricity companies or oil producing countries).<sup>65</sup> Assets of these firms may be subject to transition risks and undergo sudden and or sharp loss in value as a result of the adjustment process towards a lower-carbon economy. This would affect investment portfolios of insurers. And third, insurers as institutional investors may be affected by climate change related risks as holders of assets of firms, including other insurers, that fail to adequately manage climate change related risks, eg firms that did not buy suitable insurance to protect themselves from climate change, or firms that did not adequately disclose climate change related risks.

***Risks affecting insurers in their capacity as corporations*** – insurers are also affected by climate change in ways that differ substantively from how climate change might affect other corporations. There are a wide range of aspects, many of which are highly dynamic. This section describes some of the key risks faced by insurers as corporations.

First, insurers like other corporations may be affected by their failure to disclose climate change related risks. Failure to disclose was discussed above from the perspective of risk assuming casualty insurers. Here it is discussed from the perspective of the insurer as a corporation with the duty to disclose risks to stakeholders, especially shareholders. An important point is that a failure to disclose is not limited to a failure to carry out disclosures required or encouraged by public authorities. Failure to disclose also covers a corporation's fiduciary duty to report any risks materially affecting it, including climate change related risks.

Insurers, like other corporations, face the risk of not appropriately handling climate change related matters, from risk identification and understanding to risk assessment and management. This includes setting appropriate management and governance arrangements to enable insurers to adequately equip themselves to address climate change.

Further, insurers, like other corporations, may own property, eg real estate, that can be subjected to physical risk and suffer loss in value as a consequence of climate change. Last but not least, as players in competitive markets, insurers are affected by the changing landscapes that climate change triggers, like the development of new products or services, the transition of the corporation into a 'greener' corporations one, or the engagement with policyholders and governments in the pursuit of collective approaches to addressing climate change (eg influencing building codes, zoning, building materials).

To conclude, a wide range of risks that relate to climate change are likely to impact on insurers. Be it as insurance underwriters, institutional investors or mere corporations, insurers are affected by climate change related risks. This can damage their balance sheet assets as much as their liabilities,<sup>66</sup> potentially hindering their ability to meet obligations to policyholders. Further, widespread materialisation of climate change related risks may also have financial stability implications. Bearing in mind the centrality of policyholder protection objectives as well as the financial stability one, insurance supervisors face the critical task of requiring that

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<sup>65</sup> With specific relation to U.S., insurers please refer to Ceres (2016): *Assets or Liabilities? Fossil Fuel Investments of Leading U.S. Insurers* - June 2016 (at [www.ceres.org](http://www.ceres.org)).

<sup>66</sup> For reviews of court cases related to climate change please refer to Wilensky, M. (2015) *Climate Change in the Courts: an Assessment of non-U.S. Climate Litigation* (Columbia Law School – Sabine Center for Climate Change Law) and to Markell, D and Ruhl, J. (2012) *An Empirical Assessment of Climate Change In the Courts: A New Jurisprudence Or Business As Usual?*, Florida Law Review, Vol 64, Issue 1.

insurers effectively identify, assess and handle climate change related risks they face. The next section looks at supervisory responses aimed at this issue.

*Table 1 Climate change risks faced by insurers*

Climate change risks faced by insurers		
As underwriters of insurance risk	As institutional investors	As corporations
<ul style="list-style-type: none"> <li>Property insurance risks <ul style="list-style-type: none"> <li>Direct risks, eg property damaged by climate change</li> <li>Indirect risks, eg business interruption caused by climate change</li> </ul> </li> <li>Casualty insurance risks <ul style="list-style-type: none"> <li>Failure to mitigate, eg an electricity producer, covered by general liability policy, fails to mitigate climate change risks like carbon emissions</li> <li>Failure to adapt, eg a firm, covered by a D&amp;O policy, fails to adapt to climate change and loses value, triggering a D&amp;O claim</li> <li>Failure to disclose, eg a firm, covered by a D&amp;O policy, fails to disclose a climate change and loses value, triggering a D&amp;O claim</li> </ul> </li> <li>Life and Health insurance risks <ul style="list-style-type: none"> <li>Increased mortality or increased morbidity related to climate change</li> </ul> </li> <li>Risk of providing <u>inadvertent coverage</u> to climate change risks</li> <li>Risk of <u>inadequately developing new insurance products</u> providing coverage to climate change risks</li> </ul>	<ul style="list-style-type: none"> <li>Insurers as investors in <u>real estate assets</u> which risk to lost value due to climate change</li> <li>Insurers as investors in <u>assets that risk to directly lost value due to climate change</u>, eg an investment by an insurer in an energy company like an oil producer or a coal producer</li> <li>Insurers as investors in <u>assets that risk to indirectly lost value due to climate change</u>, eg an investment by an insurer in a company that loses value due to its inability to adequately manage its own climate change risks</li> </ul>	<ul style="list-style-type: none"> <li>Risk that insurers <u>fail to adequately disclose</u> their own climate change risks, triggering a loss in value of the insurer</li> <li>Risk that insurers <u>fail to adequately manage</u> their own climate change risks</li> <li>Other risks: <ul style="list-style-type: none"> <li>Risks to <u>insurers' own real estate</u> assets being affected by climate change</li> <li>Risks to insurers posed by their own <u>transition to becoming a 'greener' corporation</u></li> <li>Risks to insurers posed by developing <u>new products</u> related to climate change (see "Insurers as underwriters" column)</li> </ul> </li> </ul>

### 3. Supervisory response to climate-change related risks

Although current regulatory and supervisory practice indirectly captures some of the risks discussed above, specific supervisory policy and practice in respect to the impact on insurers of climate change is an emerging area. To date, the majority of work has concentrated around disclosures. Efforts pursued by regulatory and supervisory authorities focused on enhancing disclosure of climate change related risks have not been limited to insurance. The paragraphs below review some of these efforts, commencing with those that are not insurance specific.

#### ***G20 Green Finance Study Group (GFSG) and Climate Finance Study Group (CFSG) –***

The GFSG was launched in early 2016 during China's presidency of the G20. Its mandate is to identify institutional and market barriers to green finance, and based on country experiences, develop options on how to enhance the ability of the financial system to mobilise private capital for green investment. The GFSG presented findings of its work at the G20 meeting that took place in Hangzhou, China on 4 and 5 September.<sup>67</sup> The CFSG was established by the G20 with a view to consider ways to effectively mobilise resources taking into account the objectives, provisions and principles of the United Nations Framework Convention on Climate Change, a framework for international cooperation to combat climate change by limiting average global temperature increases. Like the GFSG, the CFSG also reported on its work to G20 Hangzhou meeting on September 2016.<sup>68</sup>

#### ***Financial Stability Board Task Force on Climate-related Financial Disclosures (TCFD) -***

In December 2015 the FSB launched the industry-led TCFD. The Task Force was asked to develop a set of recommendations for consistent, comparable, reliable, clear and efficient climate-related disclosures by companies. These disclosures should contribute to the goals of (1) supporting informed investment, credit, and insurance underwriting decisions about reporting companies, and (2) enabling a variety of stakeholders to understand the concentrations of carbon-related assets in the financial sector and the financial system's exposures to climate-related risk. In April, the TCFD issued its Phase 1 report, setting out fundamental principles of effective, relevant disclosure in this area and defining the scope and objectives of the next phase of the task force's work. By end-2016, the TCFD will publish for public consultation specific recommendations and leading practices for climate-related financial risk disclosures.<sup>69</sup>

***France Energy transition and Green Growth*** – In July 2015, the French National Assembly adopted the Energy Transition Law, broad legislation aimed at reducing French greenhouse gas (GHG) emissions, capping fossil fuel and nuclear production, and increasing renewable energy usage. In addition to these broad goals, the law contains an article, Article 17, aimed at increasing disclosure of climate change-related risks by listed companies and financial institutions (including institutional investors) as well as the alignment of institutional investors'

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<sup>67</sup> G20 Green Finance Study Group (2016) *G20 Green Finance Synthesis Report* (at [http://unepinquiry.org/wp-content/uploads/2016/09/Synthesis\\_Report\\_Full\\_EN.pdf](http://unepinquiry.org/wp-content/uploads/2016/09/Synthesis_Report_Full_EN.pdf)).

<sup>68</sup> Climate Finance Study Group (2016) *G20 Outlook on Mainstreaming Climate Change Considerations into Development Assistance and Climate Finance Programs* June, 2016 (at <http://www.g20.utoronto.ca/2016/P020160815355719634016.pdf>).



portfolios with French and international climate policy. Insurers fall within the scope of this reform, as institutional investors.

**U.S. Securities and Exchange Commission (SEC)** – In 2010, the SEC published guidance aimed to assist entities required to file disclosures with SEC in respect to disclosing matters related to climate change.<sup>70</sup> The SEC guidance specifies four subjects triggering climate change related disclosures. These four topics are “examples of climate change-related issues that a registrant may need to consider,” and are intended as a starting point, rather than a comprehensive list of subjects to be considered. The guidance advises entities required to file disclosures with SEC to consider positive consequences and potential opportunities, not merely the negative consequences of a particular law, regulation, or business trend. The four subjects identified in the guidance are:

- Impact of legislation and regulation.
- Impact of international accords.
- Indirect consequences of regulation or business trends.
- Physical impacts of climate change.

In relation to insurance-specific disclosure requirements, since 2009, state insurance supervisors in the United States have been engaged in a comprehensive study looking at climate change related practices by life, non-life and health carriers. Details of the tool used by supervisory authorities to gather data from insurers are provided in Box 1 at the end of this section.

The study has gathered data from over 300 insurers accounting for nearly 80% of the US insurance market and examined insurers’ actions in respect to the following:<sup>71</sup>

- Climate Risk Governance
- Enterprise-Wide Climate Risk Management
- Climate Change Modelling and Analytics
- Stakeholder Engagement
- Internal Greenhouse Gas Management
- Quality of Climate Risk Disclosure

The study found that, in general, insurers were lacked in preparedness on addressing climate related risks. In this respect, according to the responses provided, insurers were graded under four categories which corresponded to the degree of development and sophistication of their approach to climate change, ie: “leading”, “developing”, “beginning” or “minimal”. The study found that the larger the insurer the more likely that it would be more developed and

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<sup>70</sup> G20 Green Finance Study Group (2016) *G20 Green Finance Synthesis Report* (at [http://unepinquiry.org/wp-content/uploads/2016/09/Synthesis\\_Report\\_Full\\_EN.pdf](http://unepinquiry.org/wp-content/uploads/2016/09/Synthesis_Report_Full_EN.pdf)).

<sup>70</sup> Climate Finance Study Group (2016) *G20 Outlook on Mainstreaming Climate Change Considerations into Development Assistance and Climate Finance Programs* June, 2016 (at <http://www.g20.utoronto.ca/2016/P020160815355719634016.pdf>).

<sup>70</sup> For details on the Task Force on Climate-related Financial Disclosures, please visit <https://www.fsb-tcfd.org>.

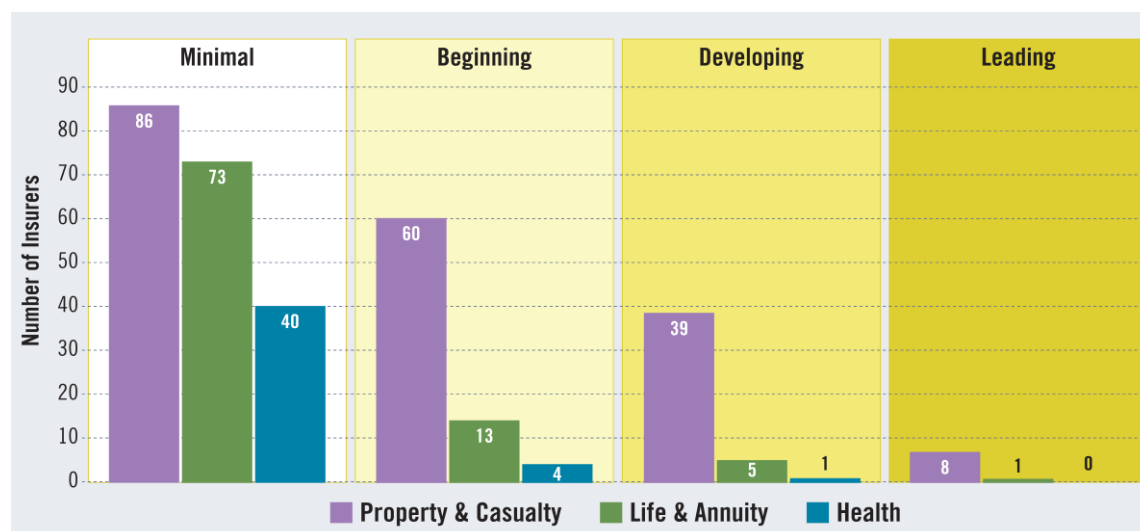
<sup>71</sup> Ceres (2014) *Insurer Climate Risk Disclosure Survey Report & Scorecard: 2014 Findings & Recommendations* (at [www.ceres.org](http://www.ceres.org)). Prior, smaller-scale, versions of the study were conducted in 2009 and 2012, and are also available from Ceres website.



sophisticated in their climate change risk approach. The graph below provides a breakdown of the distribution of insurers into categories.<sup>72</sup>

#### 4. Distribution of insurer practices on climate risk

*Figure 14 Distribution of insurer practices on climate risk*



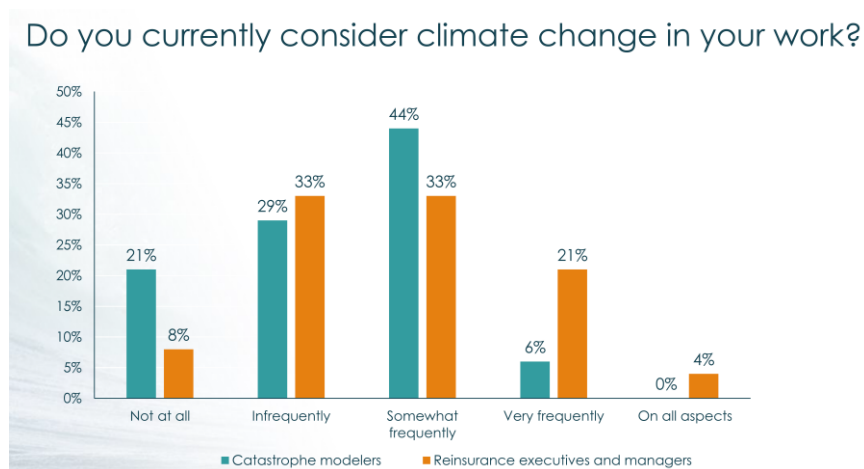
*Source: Ceres (2014)*

The study also identified some pockets of good practice among insurers, generally large ones. Other key findings of this research include: non-life insurers demonstrated more advanced understanding of the risks that climate change poses to their business, and more developed tools to manage climate change risks than life and health insurers. Life insurers and health insurers appeared generally indifferent to climate risk, both in regard to their core business lines and their investment strategies. Only a minority of insurers (approximately 10%) have issued public climate risk management statements articulating the company's understanding of climate change and its implications for core underwriting and investment portfolios.

A study conducted in 2015 by ICF International among reinsurance and catastrophe modelling executives also found a lack of attention by the industry in relation to climate change risk. The graph below summarises ICF's findings

<sup>72</sup> ICF International (2015) Survey of 186 reinsurance executives/managers and catastrophe modelers conducted at the Reinsurance Association of America Conference 2015.

Figure 15 Summary of ICF International's study on climate change risks



Source: Ceres (2014)

In addition to disclosures, in 2013 the U.S. NAIC amended its *Financial Condition Examiners Handbook* by incorporating guidance for insurance supervision staff on questions to ask insurers regarding the potential impact of climate change on solvency. The questions were specifically designed to help supervisors identify unmitigated risks and to provide a framework for them when examining such risks and their impact on how an insurer invests its assets and prices its products.

**Box 1****An easy-to-use tool for assessing insurers' engagement with climate change risks:  
The NAIC Insurer Climate Risk Disclosure Survey**

As part of the developments triggered by the 2008 paper 'The potential Impact of climate change on Insurance Regulation', the NAIC adopted the Insurer Climate Risk Disclosure Survey.<sup>73</sup> The survey is comprised of questions that assess insurers' strategy and preparedness in the areas of investment, mitigation, financial solvency (risk management), emissions/carbon footprint and engaging consumers. The survey results provide trends, vulnerabilities and best practices related to insurers' response to climate change. Findings of the most recently conducted survey are publicly available.<sup>1</sup>

This box looks at the research instrument used to gather survey data, focusing on the questions asked to insurers and reinsurers. These questions may be adopted or adapted by other insurance supervisors as part of their efforts to better understanding, assessing, monitoring and handling (ie preventing, mitigating and managing) risks emerging from climate change.

The Survey is made up of the eight question listed below, which are of both a quantitative and qualitative nature.<sup>2</sup> They enable supervisors to aggregate and compare responses provided by insurers as well as to segment them by type (ie life, non-life) and size of insurer. In addition, the questions enable supervisors to gain knowledge of sound practice developed and implemented by insurers in respect to addressing climate related risks:

- *Does the company have a plan to assess, reduce or mitigate its emissions in its operations or organisations?*
- *Does the company have a climate change policy with respect to risk management and investment management? If yes, please summarise. If no, how do you account for climate change in your risk management?*
- *Describe your company's process for identifying climate change-related risks and assessing the degree that they could affect your business, including financial implications.*
- *Summarise the current or anticipated risks that climate change poses to your company. Explain the ways that these risks could affect your business. Include identification of the geographical areas affected by these risks.*
- *Has the company considered the impact of climate change on its investment portfolio? Has it altered its investment strategy in response to these considerations? If so, please summarise steps you have taken.*
- *Summarise steps the company has taken to encourage policyholders to reduce the losses caused by climate change-influenced events.*
- *Discuss steps, if any, the company has taken to engage key constituencies on the topic of climate change.*
- *Describe actions the company is taking to manage the risks climate change poses to your business including, in general terms, the use of computer modelling.*

<sup>1</sup> Ceres (2014) Insurer Climate Risk Disclosure Survey Report & Scorecard: 2014 Findings & Recommendations (at [www.ceres.org](http://www.ceres.org))

<sup>2</sup> NAIC (2016) Climate Risk Disclosure Survey Guidance Reporting Year 2015 (at [www.naic.org](http://www.naic.org))

<sup>73</sup> NAIC (2008). The potential impact of climate change on insurance regulation (available at [http://www.naic.org/documents/cipr\\_potential\\_impact\\_climate\\_change.pdf](http://www.naic.org/documents/cipr_potential_impact_climate_change.pdf)).

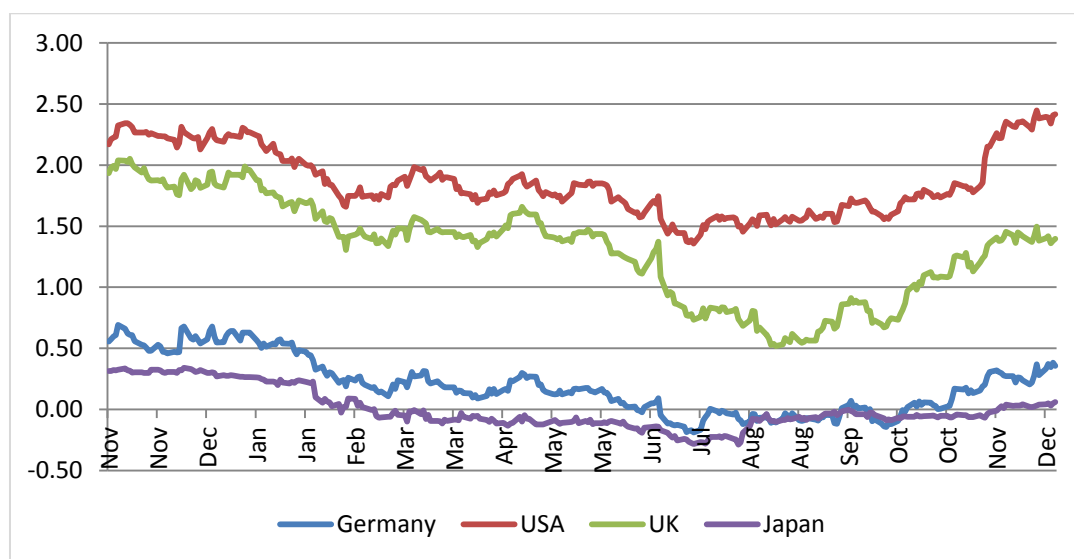
## B. Financial markets' snapshot and insurers searching for yield

A recurring theme over recent years in the financial markets has been the relative low level of interest rates in developed economies. The challenges presented by low interest rates and declining investment yields are accentuated by market movements across almost every asset type.

### 1. Market snapshot

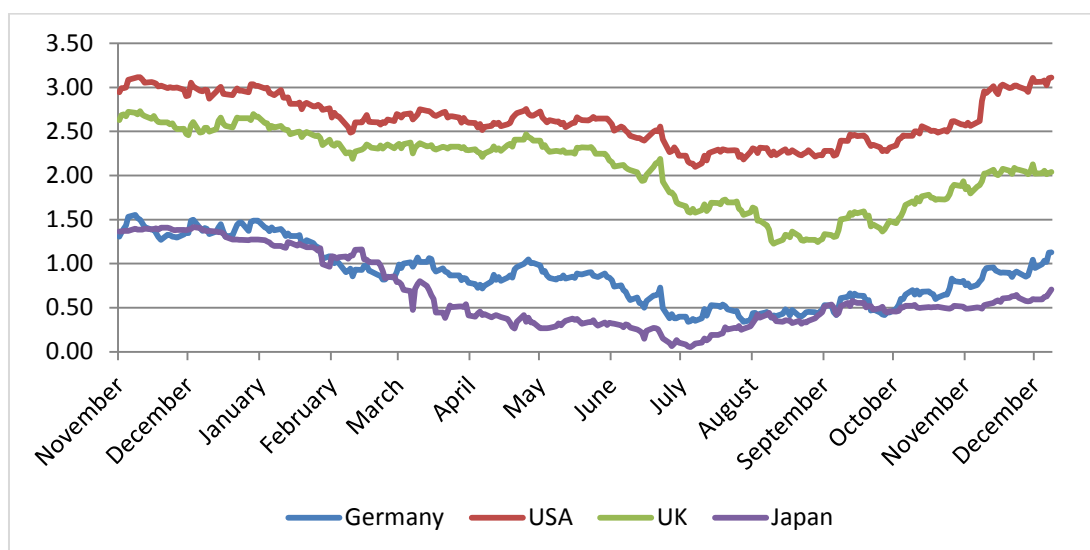
For the thirteen months from November 2015 through December 2016, the U.S. 30 year Treasury yield ranged from a low of 2.1% on July 8, 2016 to its current level of approximately 3.2%. The spread between the 30-year and 12-month Treasury (that is, the slope of the yield curve) during that period ranged from a high of roughly 300 basis points (July 2015) to as low as 160 basis points (August 2016). The long duration of a 30-year bond means that a 100 basis points increase in yield results in a 20% decrease in the price of the bond. The size of the price move would vary depending on the coupon on the bond. There has been similar movements in yields on the 10 year Treasury.

*Figure 16 Ten-year government bond yields, November 2015 – December 2016*



Source: Bloomberg

*Figure 17 30-year government bond yields, November 2015 – December 2016*



Source: Bloomberg

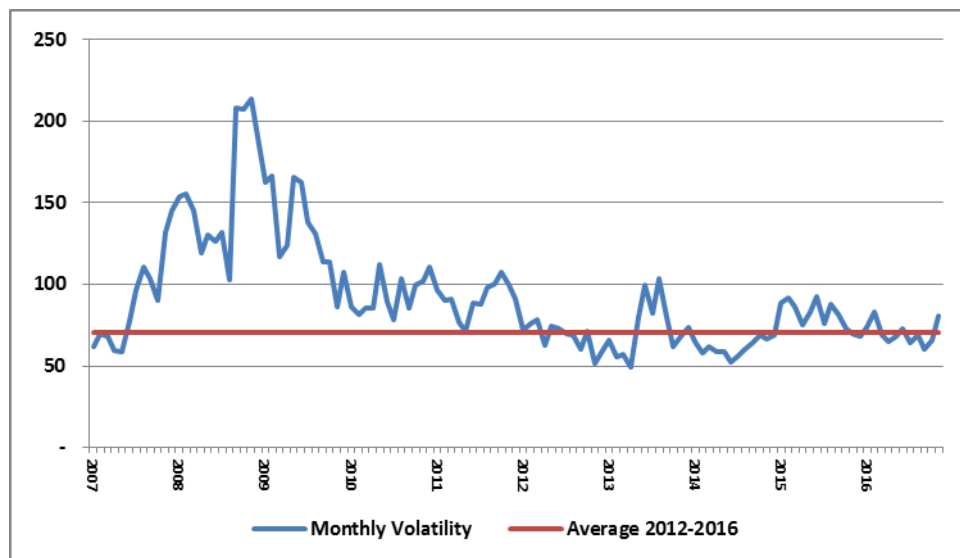
During the same twelve month period, Japanese government bond yields ranged, for the 30-year bond from a high of 1.4% in November 2015, to a low of 0.04% on July 6, 2016. The differential in yield between the 30-year bond and the one year bond ranged from 155 basis points in June 2015 to 38 basis points in July 2016.

Similarly, German Bund yields ranged from a high of 1.7% on June 26, 2015, to a low 0.3% on July 5, 2016. The differential between the long and short bond went from 70 basis points in April 2015 to 195 basis points in July 2015 and back down to 95 basis points in August 2016.

Sovereign debt yields of the United Kingdom are generally higher. They yielded a high 2.8% for the 30-year bond on July 14, 2015, but only 1.2% on August 11, 2016. The differential was 210 basis points in June 2015 versus 105 basis points in August 2016.

As an indicator of bond market volatility, Merrill Lynch publishes a yield curve weighted index of the normalised implied volatility of U.S. Treasury options. This index averaged 70.8 over the five years from 2012 through 2016. It averaged 81.0 in 2015 and settled down for most of 2016, averaging 70.2, before spiking up in November to 82.1. Uncertainty about future market conditions tends to cause option volatility to rise.

Figure 18 Monthly volatility index of U.S. Treasury options, Jan 2007 – Nov 2016

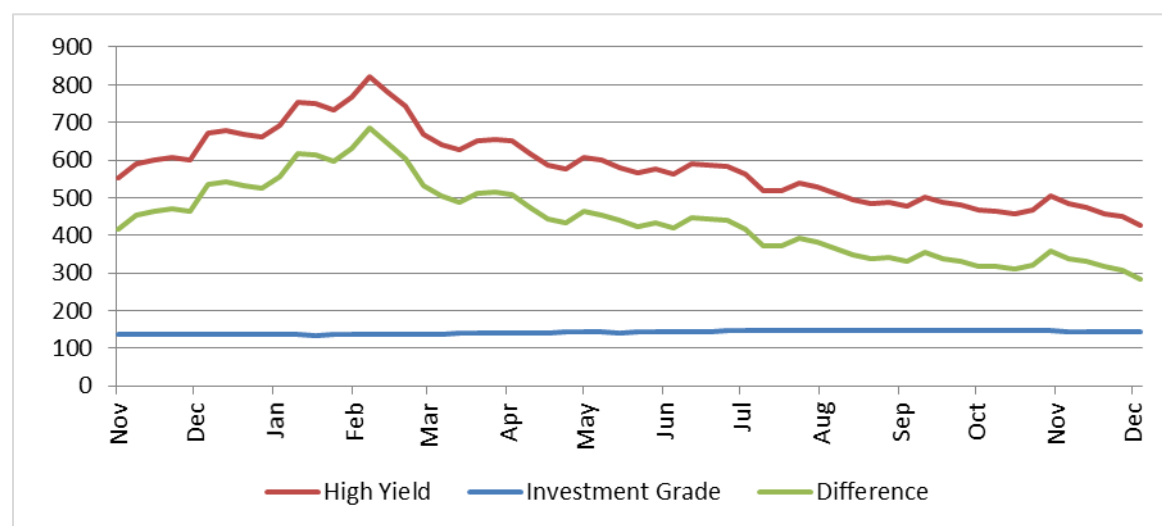


Bloomberg. Merrill Lynch Option Volatility Estimate (MOVE) Index

#### a. Credit spreads

Corporate credit spreads are low relative to historic norms. While corporate bond yields have recently recovered somewhat, ten year corporate bonds in Europe were issued in 2016 with yields as low as 1.0%. In some circumstances, for shorter dated bonds, corporate issuers have been able to issue bonds with negative yields to maturity.

Figure 19 U.S. corporate credit spreads, Nov 2015 – Dec 2016

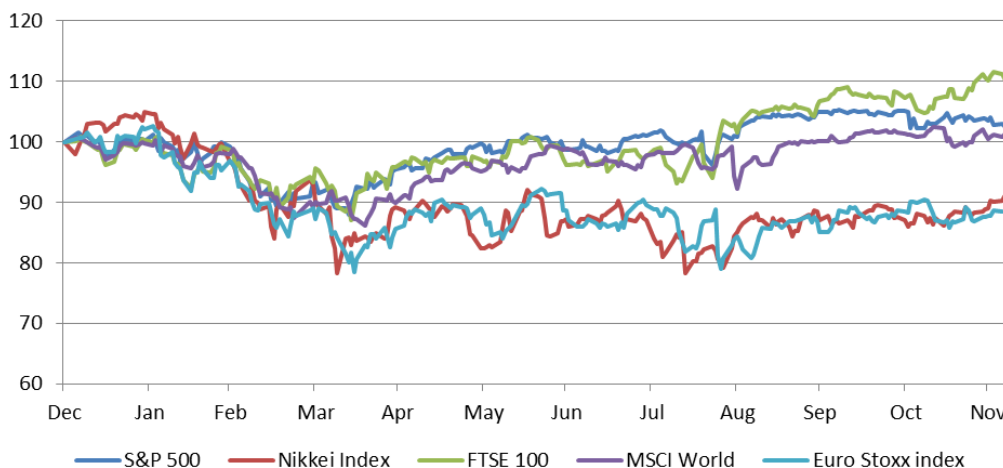


Source: Bloomberg

#### b. Equity markets

As of end of November, the S&P 500 Index this year is up 7.6%. The FTSE 100 Index in the United Kingdom gained 8.7%, whereas the Euro Stoxx 50, an index that tracks European blue-chips, is down 6.6%, and the Nikkei index 3.8%.

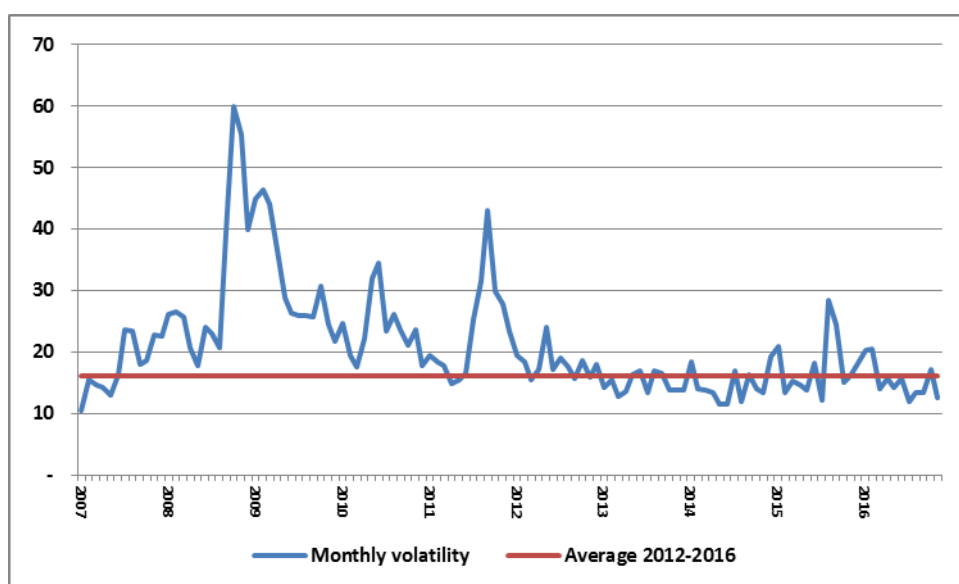
Figure 20 International equity market performance indices, Nov 2015 – Dec 2016



Source: Bloomberg

The Chicago Board Options Exchange Volatility Index (commonly referred to as the VIX) reflects a market estimate of future volatility based on implied volatilities for a wide range of equity options contracts. Over the five years from 2012 to 2016, the VIX's average is 16.1. During 2015, the index averaged a high of 17.6 before settling down in 2016 with an average through the month of November of 15.3.

Figure 21 Monthly volatility index of S&P equity options, 2007 – 2016



Source: Bloomberg. Chicago Board Options Exchange SPX Volatility Index ("VIX")

### c. Real estate

Following the financial crisis, overall commercial real estate values in the U.S. bottomed out in 2010. Since then overall values have completely recovered and have been reaching new highs. There are some concerns that the improvement in values is largely the result of low interest rates, and as interest rates begin to rise, commercial real estate values in the U.S. will decline significantly. Commercial real estate values in Europe have followed similar trends to the U.S. Values in the United Kingdom suffered somewhat immediately after Brexit. Notable was the announcement in July by several United Kingdom real estate funds to restrict redemptions.<sup>74</sup>

The low level of investment rates and market movements are also reflected in the market's perception of financial institutions. Expectations of both current and future earnings strength translate into equity prices realized in the market. In the last few months, stocks of the U.S. financial sector in general and U.S. insurers specifically have outperformed the broader market.

### 2. Search for yield

The NAIC monitors the invested assets of U.S. insurers based on the detailed investment schedules submitted annually. Changes to U.S. insurers' asset allocation have been incremental and there has been no significant shift in the overall breakdown between asset classes. Life insurance companies have increased their investments in commercial real estate, either directly as ownership in real estate properties or through mortgage loans secured by commercial real estate.

*Table 2 Asset allocation U.S. life insurers, 2013-2015*

Insurers	Invested Assets	2013	2014	2015
U.S Life Insurance	Corporate	50.8%	51.0%	51.1%
	Non-Agency Structured	12.7%	12.8%	12.4%
	Government (incl Agency)	20.7%	20.1%	20.3%
	Hybrid	8.0%	0.7%	0.6%
	Preferred Stock	2.0%	0.3%	0.3%
	Common Stock	1.0%	1.1%	0.9%
	Commercial Mortgage	10.4%	10.5%	11.0%
	Mezzanine Loans	0.2%	0.2%	0.2%
	Real Estate	0.5%	0.5%	0.6%
	Other	2.7%	2.8%	2.6%

Source: NAIC

<sup>74</sup> Financial Times (2016): Property funds in 'vicious circle of redemptions', July 8.



*Table 3 Asset allocation U.S. non-life insurers, 2013-2015*

Insurers	Invested Assets	2013	2014	2015
U.S Non-life Insurance	Corporate	24.7%	24.6%	25.7%
	Non-Agency Structured	6.4%	7.0%	7.1%
	Government (incl Agency)	45.4%	43.7%	43.0%
	Hybrid	0.1%	0.2%	0.2%
	Preferred Stock	0.8%	1.0%	1.0%
	Common Stock	18.9%	19.5%	18.7%
	Commercial Mortgage	0.6%	0.7%	0.9%
	Mezzanine Loans	0.0%	0.0%	0.0%
	Real Estate	0.1%	0.1%	0.2%
	Other	3.0%	3.2%	3.2%

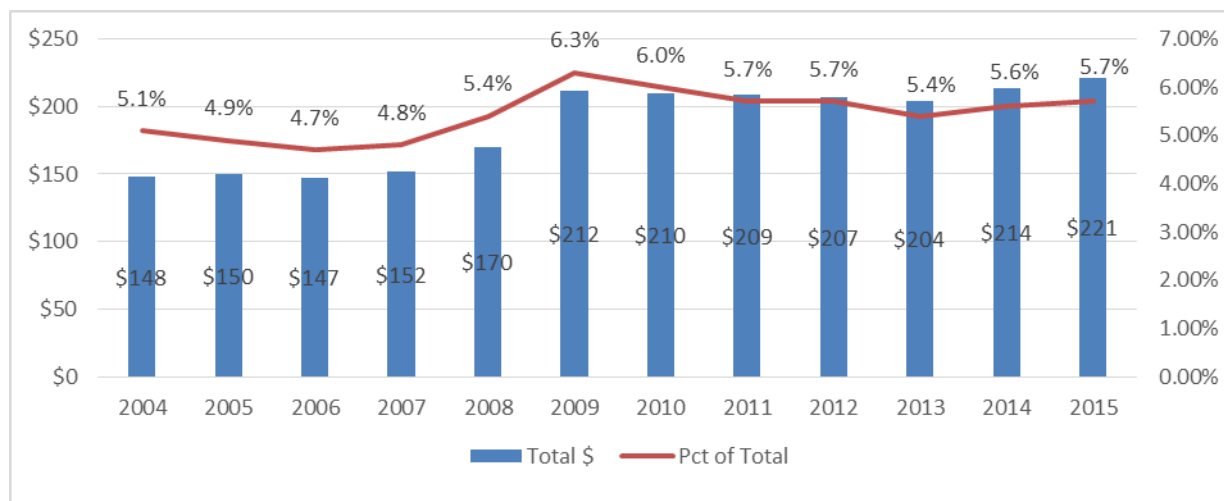
Source: NAIC

In the U.S., in 2015 71% of life insurers' total investments were invested in bonds (see corporate and government bond percentages in Table 2). Although low yields on corporate bonds have increased U.S. insurers' investments into alternative assets, like private equity, hedge funds or real estate, the aggregate asset allocation of insurance industry investments does not show a significant change in asset types year over year.<sup>75</sup> Fifty-one percent of life insurers' bond holdings consisted of corporate bonds, most of which (94%) were investment grade.

U.S. insurers have shifted their bond portfolios slightly based on credit quality. From 2009 to 2013, the exposure to below investment grade bonds declined from 6.3% of bonds to 5.4%. This has since increased modestly in 2014 and 2015. The U.S. insurance industry's exposure to BBB-quality bonds have also shifted over that time period, increasing from a low of 19.7% of bonds in 2007 to 27.4% of bonds in 2015.

<sup>75</sup> NAIC Center for Insurance Policy and Research (2015): Are U.S. insurers reaching for yield in the low interest rate environment?

Figure 22 U.S. insurance industry exposure to below investment grade bonds, 2004-2015



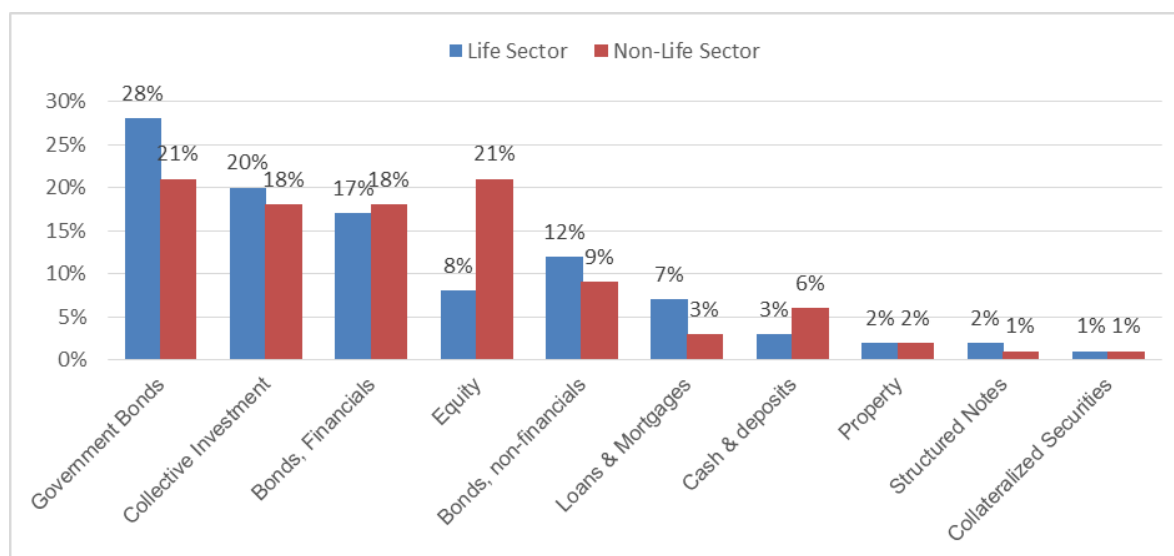
Source: NAIC

In Europe, insurers must balance the capital charge considerations of the new Solvency II framework and the search for yield through investments in alternative and other riskier asset classes. Large Euro area life insurers remain predominantly invested in fixed income securities, mainly government and corporate bonds. Large Euro area insurers' investment portfolios continue to shift towards corporate bonds, which are generally considered to be riskier than other fixed income instruments such as government bonds.<sup>76</sup> Furthermore, insurers are reportedly increasing their exposures to illiquid assets such as property and infrastructure investments. According to EIOPA, which tracks data of 2'600 solo life insurers in Europe, in the first half of 2016, some life insurance companies have adopted a form of "de-risking" investment policy, in order to reduce Solvency II requirements, by increasing exposures to AAA-rated counterparties (ie sovereigns) and/or by decreasing equity exposures.<sup>77</sup>

<sup>76</sup> ECB (2016): Financial Stability Review, November, page 87 ff.

<sup>77</sup> EIOPA (2016): Financial Stability Report, December.

Figure 23 Asset allocation of European insurance companies



Based on a sample of 32 large insurers  
Source: EIOPA

In Japan, the insurance industry has been subject to low interest rates since the late 1990's. The Japanese life insurance industry has assets of more than USD 3.2 trillion. Japanese life insurers traditionally focus their investments heavily in domestic fixed income assets, mainly Japanese government bonds (JGBs).

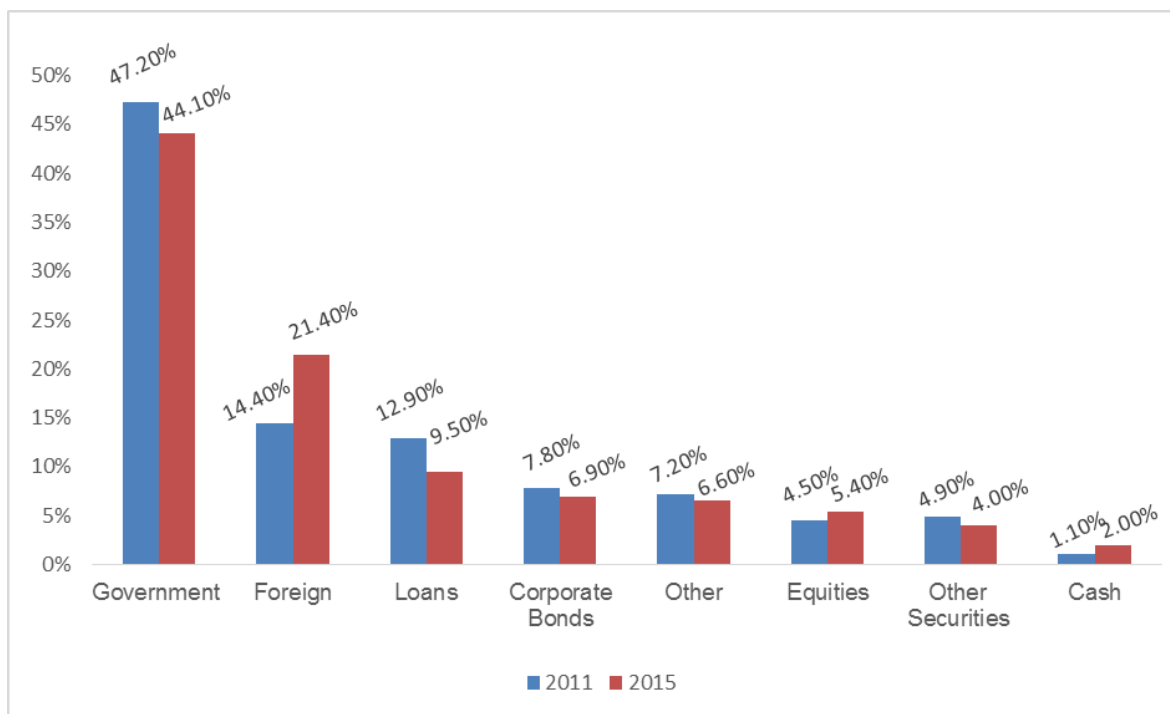
In the last couple of years, in response to further declines in interest rates, insurance companies have tended to diversify their investments including reallocation from JGBs towards assets, such as foreign bonds and other riskier asset classes. Japanese life insurers have also been increasing the number of acquisitions and investments in foreign insurance companies, to seize growth opportunities in international markets. The share of assets invested in domestic bonds (government, local government, corporate) fell from 68.4% in 2010 to 62.3% in 2015.<sup>78</sup> By contrast, share investments in foreign securities increased from 18.5% to 26.2% in 2015.

The tendency to invest more in foreign assets has intensified over the course of 2016, partly in response to the Bank of Japan's introduction of a negative rate policy from February 2016. As domestic interest rates have declined further, life insurance companies have focused on securing investment income by, for instance, accumulating overseas assets such as currency-hedged foreign bonds, and investing in areas in which relatively higher growth is expected (including mutual fund investment).<sup>79</sup>

<sup>78</sup> The Life Insurance Association of Japan (2016): Life insurance fact book (2016).

<sup>79</sup> Bank of Japan (2016): Financial system report, November, page 32.

Figure 24 Japanese Life Insurance Industry Assets, 2011 versus 2015



Source: Japan Life Insurance Association

## C. Recent developments in insurance risk transfer to the capital markets

### 1. Introduction

For over 20 years, insurers and reinsurers working together with investment banks, asset managers and other capital markets players, have been developing alternative ways to transfer insurance risks to capital market investors. From the first transaction by German reinsurer Hannover Re in 1994 to the approximately USD 75bn of risk capital contributed by the capital markets by the middle of 2016 (ie circa 15% of global reinsurance capacity), developments in this area have been significant. With the exception of the six months following the September 2008 bankruptcy of Lehman Brothers, during which there was a drop in activity,<sup>80</sup> the alternative risk transfer market has shown steady growth.

Insurers take on risks in exchange for a premium and, upon occurrence of a certain event (eg a death, a car crash or an earthquake), they pay claims. Importantly, insurers generally cede some of the risks they take to reinsurers. As noted above, in the last two decades capital markets have been taking on insurance risks as an alternative to mainstream reinsurers. Capital markets take on these risks via securitisation arrangements which, in the simplest form, transform an insurance risk into debt or equity, which is placed in the capital markets. The monies raised are used to fund the insurance risk taken on and are invested in other securities. Bondholders or shareholders receive an interest or divided payment that roughly equals the amount of the yield of the invested funds plus the (re)insurance premium paid by the ceding insurer. In many circumstances they also receive the principal back once the insurance risk expires. However, a critical element of such arrangements is that should the insurance risk materialise, capital market investors may lose all the interest and principal.

The IAIS has been monitoring matters related to insurance risk transfer to the capital markets for nearly 15 years.<sup>81</sup> The IAIS's interest stems from its' objectives of promoting sound supervision worldwide for the benefit and protection of policyholders, as well as contributing to global financial stability. This chapter examines recent trends in insurance risk transfer to the capital markets.

### 2. Recent developments

According to industry analysts AON/Benfield, by the middle of 2016 there was approximately USD 75 billion of risk capital deployed by the capital markets in support of insurance risks ceded by insurers and reinsurers worldwide. This represents circa 15% of global reinsurance capacity. The graph below provides nearly 15 years of data on this segment of the insurance market.<sup>82</sup> Risk transfer transactions are broken down into four main groups: collateralised reinsurance, Industry Loss Warranties (ILWs), Sidecars and Bonds (mostly, catastrophe bonds).

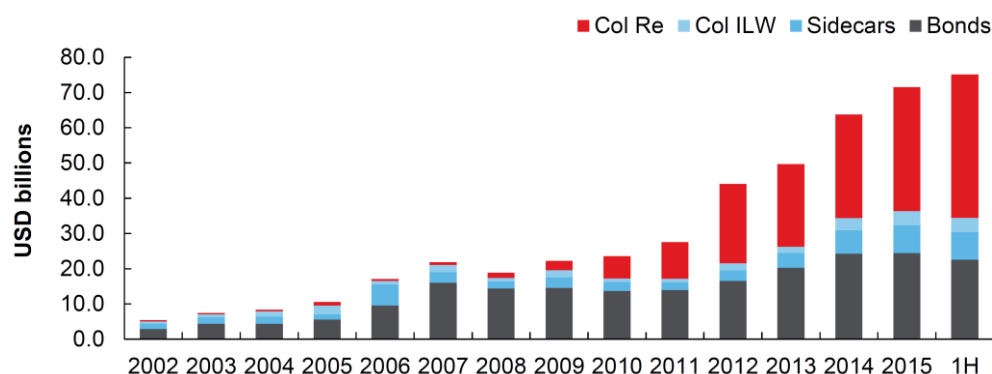
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<sup>80</sup> IAIS (2009) *Developments in (Re)insurance Securitisation*. Basel, Switzerland: International Association of Insurance Supervisors (available on [www.iaisweb.org](http://www.iaisweb.org)).

<sup>81</sup> See, for example, the two issues papers published in on life and non-life insurance securitisations published in 2003 (ie IAIS (2003a) *Issues Paper on Non-Life Insurance Securitisation*, and IAIS (2003b) *Issues Paper on Life Insurance Securitisation*), the various sectoral analyses published since 2004 in the Global Reinsurance Market reports and Global Insurance Market Reports, or Standard 13.6 of the 2011 Edition of the Insurance Core Principles (all available on [www.iaisweb.org](http://www.iaisweb.org)).

<sup>82</sup> Aon Benfield (2016) *Reinsurance Market Outlook: Capacity gap Narrows as Demand Picks Up*. September 2016 (available on <http://thoughtleadership.aonbenfield.com>).

Figure 25 Insurance risks transfer to the capital markets 2002 – 2016 (Q1 & Q2)



Source: Aon Benfield (2016)

Two key considerations warrant highlighting. First, with the exception of 2008, the sector has experienced a steady increase, with some years showing extraordinary levels of growth, like 2006, 2012 and 2014. Second, since 2012 the growth in collateralised reinsurance has been comparatively steeper than that of catastrophe bonds, sidecars or ILWs. Box 1 describes the main characteristics of these four types of arrangements.

### Box 1 Catastrophe bonds, collateralised reinsurance, industry loss warranties (ILWs) and sidecars

In the trade literature, arrangements in the non-life sector are often broken down into four loosely defined groups known –in alphabetical order– as “catastrophe bonds” (cat bonds), “collateralised reinsurance”, “industry loss warranties” (ILWs) and “sidecars”. These four groups, which are not mutually exclusive, focus on different elements of the risk transfer arrangements “Cat bonds” take the name from the financial instrument (ie a debt security) issued to fund an insurance exposure, usually a catastrophe one. The name “collateralised reinsurance” is generally used to highlight the credit risk mitigation feature of certain insurance transactions (ie the collateralisation of the insurance exposure). “ILWs” refer to a range of financial instruments used by counterparties, which may or may not be insurers, to buy or sell protection related to insurance risks. Finally, the label “sidecar” is used for a legal entity created ‘on the side’ of an insurer and used to transfer insurance risk, usually to the capital markets<sup>(\*)</sup>.

So hypothetically, there could be a “sidecar” that underwrites insurance risk via an “ILW” and funds the exposure through an issuance of “cat bonds”, the proceeds of which are used to “collateralise” the reinsurance risk assumed.

<sup>(\*)</sup>Ramella, M. and Madeiros, L. (2007). Bermuda Sidecars: Supervising Reinsurance Companies in Innovative Global Markets. *The Geneva Papers on Risk and Insurance – Issues and Practice*, Vol. 32(3)

Up to 2005, insurance risk transfer to the capital markets contributed less than USD10 billion of risk capacity. The occurrence of an extraordinarily active and virulent hurricane season affecting the Gulf of Mexico (ie hurricanes Katrina, Rita and Wilma) significantly depleted

available reinsurance capacity, creating a gap which was in part covered by the capital markets. The steep increase in 2006 (ie significant growth in Sidecars) and 2007 (ie growth in 'Cat' Bonds) reflects this. Moreover, with the exception of 2008, the sector has experienced a steady growth which has continued to date. Importantly, from 2010 onwards there has been a change in the relative contribution between different risk transfer channels.

A variety of factors have contributed to this trend, including developments in risk transfer arrangements (eg simpler structures and more flexible transactions that attract a wider pool of investors, like pension funds or private equity funds), improvements in data availability (eg increases in data available on region perils like Southeast Asia wind or Latin American earthquake), and capital market factors (eg prolonged period of low interest rates, so a search for higher yields)<sup>83</sup>. Factors such as these have contributed to the steep increase in collateralised reinsurance, which is characterised, among other things, by smaller size transactions compared to, for example, cat bonds. Also, a more diverse mix of insurance risk is transferred to collateralised reinsurance arrangements as opposed to cat bonds which tend to focus on property catastrophe risks. Most importantly, the insurance underwriting principles supporting catastrophe bonds, sidecars and collateralised reinsurance do not differ significantly from those for traditional reinsurance.

Two additional trends in the insurance risk transfer to the capital markets are of relevance to insurance supervisors: the increase in the kind of perils transferred, and the increase in the use of indemnity triggers.

In respect to the mix of perils, risk transfer to the capital market continues to be driven by U.S., Europe and Japan risks, which account for approximately 75% of all risks transferred. Importantly though, other risks have grown over the past years, accounting now for over 20% of risks transferred. Such other risks span from China or Turkey earthquake to operational risk. Importantly, the market is starting to see transactions covering risks like operational risks of banks or credit risk. The graph below provides data on transactions by peril for the period 2011 to 2016.<sup>84</sup>

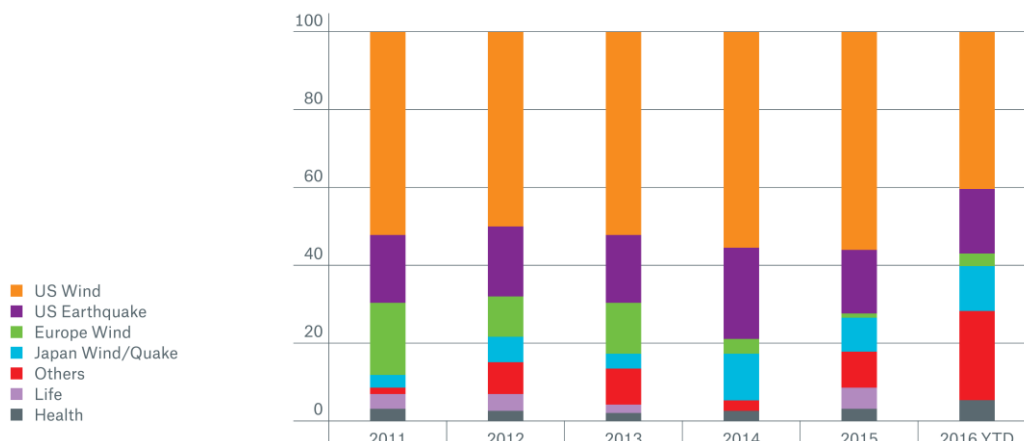
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<sup>83</sup> Hartwig, R. and Lynch, J. (2015) *Alternative capital and its impact on insurance and reinsurance markets* (available at [www.iii.org](http://www.iii.org)).

<sup>84</sup> Munich Re (2016) *Insurance-linked Securities Market Update Q2 2016* (available at [www.munichre.com](http://www.munichre.com)).



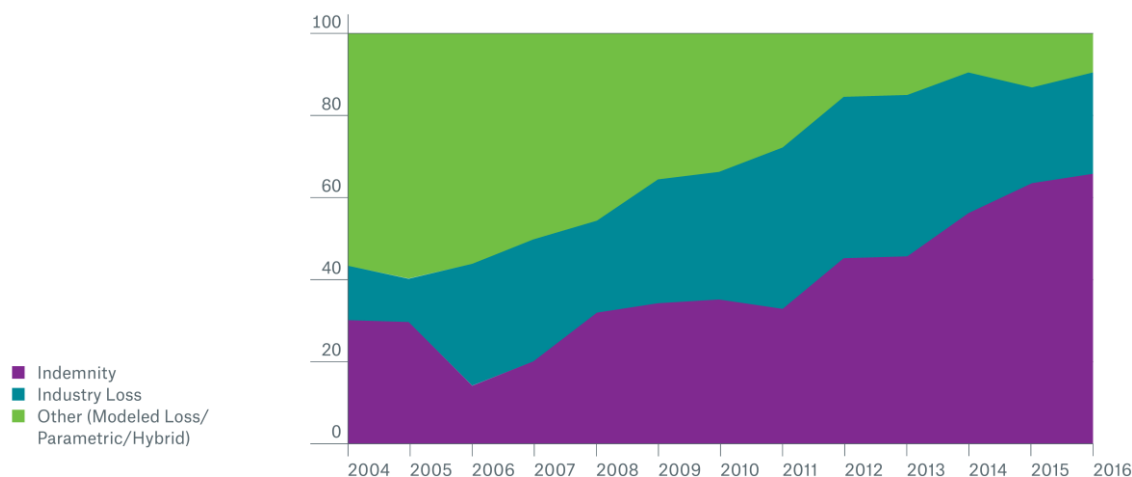
Figure 26: Alternative risk transfer: transactions by peril 2011 - 2016 (Q1 & Q2)



Source: Munich Re (2016)

In respect to the types of triggers used in capital markets transactions, data suggests that indemnity triggers continue to gain ground, and this is likely to continue. However, non-indemnity triggers are expected to remain an important niche market. Non-indemnity triggers are of particular interest to supervisors as they pose basis risk, or the risk that due to different bases in the calculation of the claim (ie an indemnity basis for the cedant and a non-indemnity basis for the reinsurers), the cedant faces the risks of having to pay for a claim while not being able to, in turn, claim back from the cover provided by the capital markets. The graph below provides a breakdown of transactions according to the type of triggers used over the period 2004 to 2016.<sup>85</sup>

Figure 27 Alternative risk transfer: transactions by trigger 2004 - 2016 (Q1 & Q2)

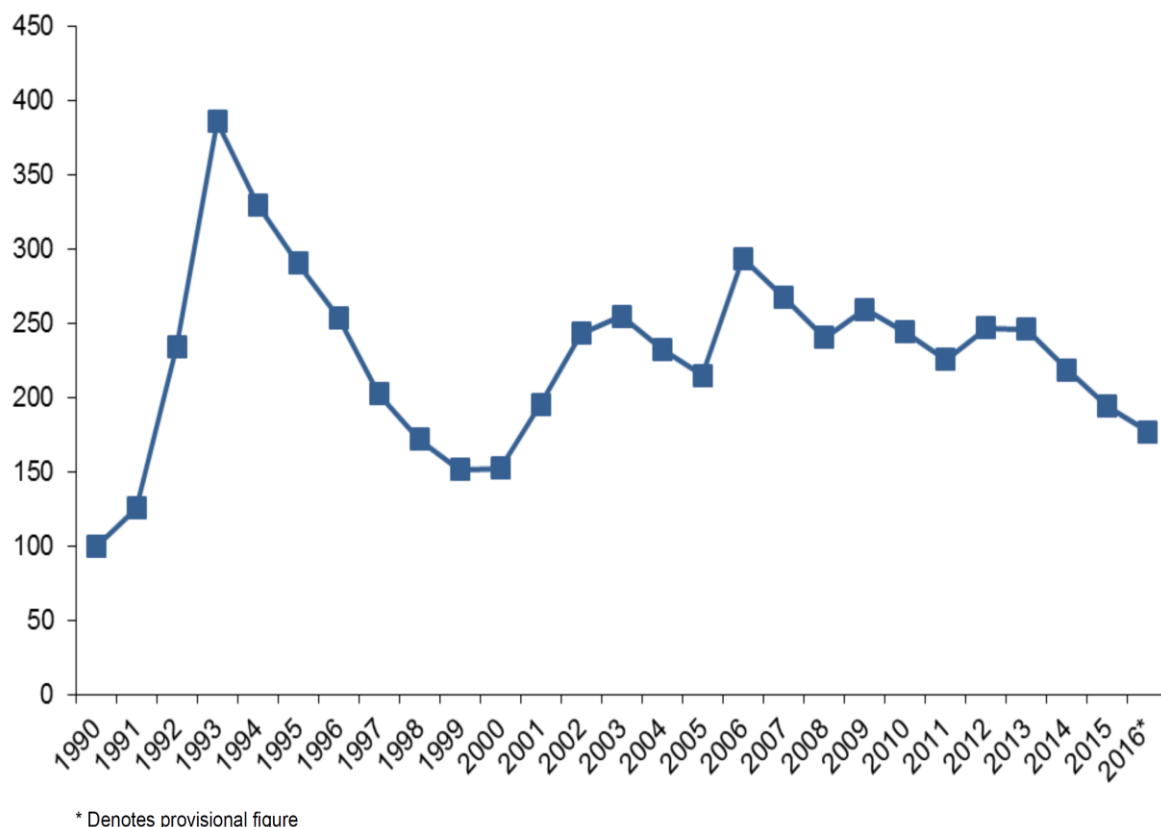


Source: Munich Re (2016)

<sup>85</sup> Munich Re (2016) *Insurance-linked Securities Market Update Q2 2016* (available at [www.munichre.com](http://www.munichre.com)).

The impact of these developments on pricing is also of interest to supervisors. As mentioned above, risk transfer to the capital markets has been growing steadily and now accounts for approximately 15% of global reinsurance capacity. This development is likely to have contributed to the smoothing in the reinsurance pricing cycle observed in the same period. The graph below shows data for the rate on line for catastrophe reinsurance.<sup>86</sup>

*Figure 28 Global property catastrophe reinsurance rate on line index 1990 – 2016 (Q1 & Q2)*



Source: Guy Carpenter (2016)

In conclusion, risk transfer to capital markets has continued on its upward trend and, at end-June 2016, accounted for approximately 15% (or \$75bn) of global reinsurance capacity. Importantly, the types of arrangements used to transfer insurance risk have continued to diversify, with a substantive growth in collateralised reinsurance arrangements which now constitute the largest share of the market. Types of perils covered have also continued to diversify. Further, indemnity-based triggers have continued to grow compared to non-indemnity ones, hence lessening the incidence of basis risk. Finally, the growth in this segment is likely to have contributed to the smoothing of the reinsurance cycle over recent years.

<sup>86</sup> Guy Carpenter (2016). *1 January 2016 Renewals Innovation and Customisation* (available at [www.gccapitalideas.com](http://www.gccapitalideas.com)).

## **D. EIOPA stress test 2016**

### **1. Framework and scenarios**

As a macro-prudential supervisory tool, simultaneous bottom-up stress testing of certain multi-factor stress scenarios for a group of well-defined insurance companies, has known a growing relevance and importance across the supervisory world. Several insurance supervisors have been conducting these types of stress test exercises as comprehensively illustrated in the IMF working paper “Macroprudential solvency stress testing of the insurance sector”.<sup>87</sup> On 24 May 2016, the EIOPA launched their latest stress test for the European insurance sector. The previous EIOPA stress test for the insurance sector dated back to 2014 and, taking into account the particular challenging macro-economic environment for European insurers, it was decided to launch another stress test exercise in 2016. As a supervisory tool, the EIOPA stress test mainly aims at assessing the resilience of the participating insurers to adverse market developments and attempts to identify potential issues relative to the stability of the EU insurance sector as a whole. Much in line with the 2014 stress test exercise, the 2016 EIOPA stress test primarily aimed at identifying vulnerabilities and did not focus on the compliance with the regulatory requirements recalculated post-stress, ie it was not set-up a “pass-or-fail” exercise.

In view of the current challenging macroeconomic environment, the stress test was focused on the most prevailing risks and the part of the industry perceived as most vulnerable. With respect to the start of the new regulatory framework Solvency II in 2016, the focused exercise allowed to avoid overburdening of the participating insurers. Consequently, national supervisors were asked to include mainly insurers exposed to long-term guarantee insurance business in scope of the stress test. It was also decided to only include solo insurers in the scope of the stress test ie no stress test on insurance group level was conducted. In order to include a sufficiently high number of small(er) and medium sized insurers, the target market share, expressed in terms of gross life technical provisions, for each national market was increased from 50% in 2014 to 75% in 2016.

The goal of the 2016 stress test exercise was to assess the participating insurers’ resilience to two bottom-up adverse stress test scenarios, with a particular focus on the market risks:

- A scenario representing a prolonged low yield environment: this scenario aimed at emulating a situation of entrenched secular stagnation where a lack of long term investment opportunities and permanently low productivity growth is combined with an extended scarcity of risk free assets which drives down yields at all maturities. For this purpose, an alternative low(er) risk free discounting curve was developed.<sup>88</sup>
- A scenario representing a so-called “double-hit”: this scenario was set-up in cooperation with the European Systemic Risk Board (later: ESRB) and reflected the ESRB’s assessment of prevailing systemic risks to the European financial system ie a stress on several important financial markets induced by a possible reassessment of

<sup>87</sup> A. Jobst, N. Sugimoto, T. Broszeit (2014): Macroprudential solvency stress testing of the insurance sector, IMF working Paper WP/14/133.

<sup>88</sup> This alternative risk free discounting curve was defined by applying a small negative shock on the euro swap rates as observed at the 20<sup>th</sup> April of 2015. In order to better achieve the goal of creating low long term discounting rates, an ultimate forward rate (UFR) of 2%, instead of the legally applicable 4.2% was applied. For other currencies, a rule of thumb was applied.

risk premia combined with a continuing low yield environment. The idea behind the scenario was to negatively affect both sides of the balance sheet of an insurer simultaneously.

More details relative to the exact set-up and the specifications of the two stress scenarios can be found on EIOPA's website.<sup>89</sup>

## 2. Discussion of the results

In total, 236 solo insurers from 30 EU countries participated to the 2016 EIOPA stress test exercise. The overall Solvency Capital Requirement (=SCR) ratio for this sample of insurers at the reference date<sup>90</sup> of the exercise was 196% and the overall Minimum Capital Requirement (MCR) ratio was 533%. Only two insurers reported an SCR ratio below 100% at the reference date accounting for 0.02% of the total assets in the sample.

In order to “counter”, amongst others, “artificial”<sup>91</sup> balance sheet volatility, Solvency II introduced a set of Long Term Guarantee (LTG) measures. These LTG measures try to mitigate, often upon approval of the supervisor, this volatility by partially reflecting movements in asset prices in the market-consistent valuation of the liabilities. As such, these measures try to incorporate the long-term investment strategies of insurers in the market-consistent valuation framework. Some important examples of these measures are:

- The matching adjustment and the volatility adjustment: these measures aim at reflecting the volatility caused by movements in the spreads of the asset side by adding a part of this spread to the risk free discounting curve of the liabilities. As different conditions exist in order to apply these measures, the magnitude of the adjustments is also determined in a different way for each of them.
- The transitional measures on the risk free rate and the technical provisions: both measures apply a different technique for achieving the goal of introducing a transitional period of 16 years for moving from the current SI valuation to the SII valuation for the technical provisions.

As, starting next year, through the official Solvency II reporting, insurers will have to be transparent about the use and impact of these LTG measures, the 2016 stress test exercise was already designed such that the participating insurers were prompted to show a certain degree of transparency regarding these measures. When now excluding these LTG measures in scope of this stress test exercise, the overall SCR ratios before stress falls to 136% and 14% of the participating insurers, representing 26% of total assets, would show an SCR ratio below 100%.

As explained above, the 2016 EIOPA stress test exercise was run at the start of Solvency II, therefore EIOPA aimed to avoid overburdening of the participants. Hence, the capital requirements were not recalculated after stress and the SCR and MCR ratios after stress could

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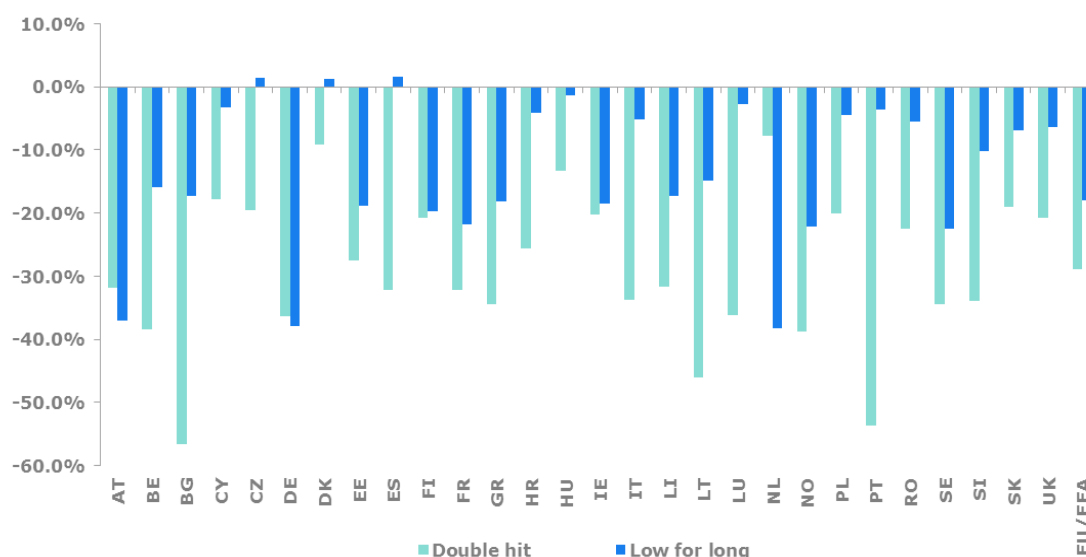
<sup>89</sup> <https://eiopa.europa.eu/Publications/Surveys/EIOPA-BoS-16-109%20ST2016%20Technical%20Specifications%20%2820160601%29.pdf>.

<sup>90</sup> 1 January 2016.

<sup>91</sup> Volatility of technical provisions, capital resources or capital requirements that does not reflect changes in the financial position or risk exposure of the insurers.

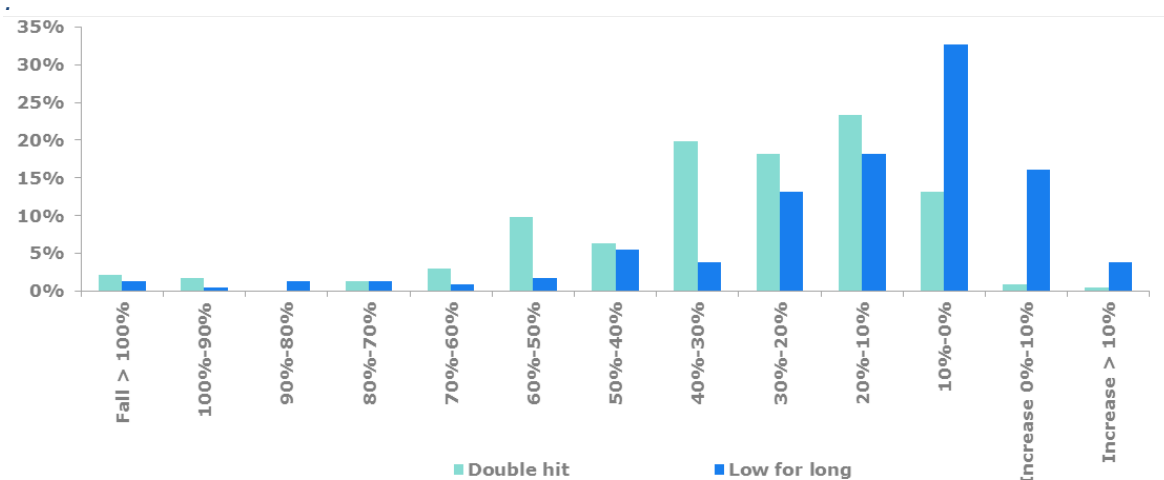
not be reconstructed. With this constraint in mind and in order to be able to identify the vulnerabilities of the participating insurers individually and the EU insurance sector as a whole, EIOPA chose to express the impact of the two stress scenarios in terms of excess of assets over liabilities. The excess of assets over liabilities should, within the Solvency II regulation, be understood as a vital part of the own funds of an insurer but not the whole. In the cases where the excess is positive and even material, it cannot be concluded on whether it is enough to ensure the solvency of the insurers as it does not take account of the risk profile. Therefore, when interpreting the impact on the excess assets over liabilities, it should be recognised that this measure does not take into account other own funds elements (eg subordinated liabilities) nor does it take into account the regulatory limits and eligibility criteria related to the use of certain own funds items, nor the required thresholds for the own funds to meet regulatory requirements (MCR and SCR). Given the non-linearities involved in the Solvency II capital requirements, analysing the impact on the excess assets over liabilities, as such, does not allow directly inferring possible impacts on SCR and MCR ratios after stress (see graphs below).

*Figure 29 Changes in excess of assets over liabilities, in percent.*



Source: 2016 EIOPA Insurance Stress Test Report p 33

Figure 30 Distribution of changes in excess assets of liabilities, in percent



Source: 2016 EIOPA Insurance Stress Test Report p 34

The total excess of assets over liabilities declines by 28.9% in case of the double-hit scenario and 18% for the low-for-long scenario. Not taking into account the LTG measures, would imply a decline in the excess of assets over liabilities of 102.8% for the double-hit scenario and 30.5% for the low-for-long scenario. Following the double-hit scenario, 104 participating insurers would lose more than a third of their excess of assets over liabilities, 42 insurers would lose more than half and five insurers would see their entire excess disappear. In the low-for-long scenario, 38 participating insurers would lose more than a third of their excess of assets over liabilities. In the absence of LTG measures, almost three quarters of the sample of insurers would lose more than a third of their excess in the double-hit scenario, whereas a quarter of the sample shows a similar impact in the low-for-long scenario.

### 3. Main conclusions and EIOPA recommendations

Overall, the 2016 EIOPA stress test exercise confirmed the vulnerability of the EU insurance sector to the low interest rate environment on the one hand and a possible pronounced reassessment of risk premia on the other hand. Consequently, EIOPA recommends the national supervisors to further assess whether the vulnerabilities identified from the exercise pose a threat to the viability of the supervised entity and, collectively, to the system as a whole. Given the high relevance of the low-for-long scenario under the current macro-economic environment, EIOPA prompted the national supervisors as well to consider to which extent further measures need to be taken for those insurers that have shown particular vulnerabilities to this scenario. In both scenarios, LTG measures seem to provide the cushion intended, potentially acting in a counter cyclical manner, but EIOPA recommends supervisory vigilance in order to avoid potential misestimating of risks as several of these measures are characterized by an important set of underlying assumptions .

The stress test exercise also revealed the need to carefully assess the assumptions underlying the calculation of the best estimate of the technical provisions within the Solvency II framework. The analysis of the sensitivity of liabilities to changes in interest rates revealed that a number of assumptions for the valuation of technical provisions were not necessarily consistently applied across companies and countries. Given the potential implications for financial stability and consumer protection, these assumptions require supervisory assessment according to

EIOPA in order to assure their validity and the consistency of results across institutions and countries.

In order to coordinate potential supervisory actions following the stress test exercise on European level, the EIOPA Board of Supervisors issued a set of general recommendations addressing directly the national supervisors. These recommendations are published separately to the stress test report and can be found as well on EIOPA's stress test website.



## **E. First experience with Solvency II framework**

The Solvency II Directive came into force in January 2016. Although Solvency II is an EU regulatory initiative, it has implications for the insurance industry in other parts of the world, eg through group supervision or as a consequence of decisions by the European Commission about the equivalence of a third country's solvency and prudential regime. Moreover, Solvency II is influencing the evolution of solvency regimes in other countries and regions, as the degree of risk sensitivity of regulatory capital requirements is strengthened internationally over time.<sup>92</sup> Against this background, this article reviews some initial findings on current Solvency II figures.<sup>93</sup>

Under the Solvency II regime, total assets and liabilities have to be generally calculated at market consistent values, with a company's own funds in round terms defined as the surplus capital that remains when the liabilities are deducted from the total assets. Insurance companies are required to hold eligible own funds at least equal to their respective SCR (ie the SCR ratio must be higher than 100%). An adequate level of capital is needed by insurance companies to absorb the losses incurred by the risks of their operations. The function of own funds is to serve as a financial buffer.

The initial observations on the introduction of Solvency II are that the insurance industry has adjusted and managed the transition from book value to a market value approach.<sup>94</sup> As of June 2016, all of the insurance companies falling within the scope of Solvency II reported sufficient SCR coverage.<sup>95</sup> The SCR coverage ratio for the median non-life insurance company is 210% and for life insurance companies 209%. For insurers pursuing both life and non-life business, the median SCR ratio was 201%. The boxplot below shows a considerable variation of SCR coverage ratios of individual companies. Moreover, according to EIOPA, while the industry overall seems to be well capitalised, the analysis of solvency margins revealed that some insurance companies, typically smaller ones, were not adequately capitalised.

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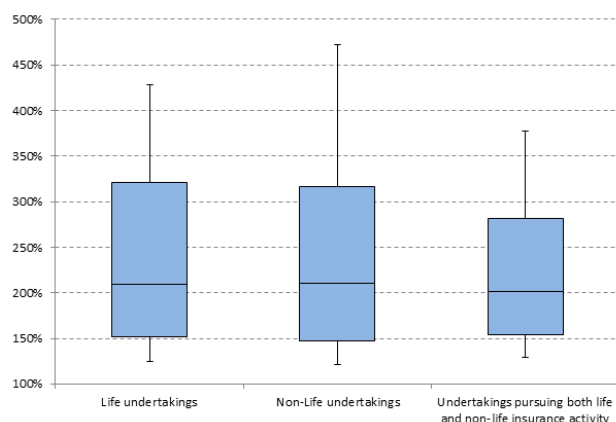
<sup>92</sup> Geneva Association (2016): Modernising insurance solvency regimes – Key features of selected markets.

<sup>93</sup> The European Systemic Risk Board (ESRB) is preparing a detailed report on the market perception of Solvency II, which is expected to be published in 2017.

<sup>94</sup> BaFin (2016a): How do low interest rates affect financial institutions and stability?, Speech by Felix Hufeld on September 28 at the ESMT European School of Management and Technology, Berlin.

<sup>95</sup> EIOPA (2016): Financial Stability Report, December.

*Figure 31 SCR coverage ratio as of 30 June 2016 (in %; median, interquartile range and 10th and 90th percentile)*



*Note: sample based on 2600 solo insurance undertakings in European Economic Area (EEA) member countries  
Source: EIOPA Financial Stability Report, December 2016*

Solvency II includes a number of measures to ensure a smooth transition from Solvency I, including two measures on the valuation of technical provisions, helping the transition to a market-consistent regime over 16 years; a tolerance for insurers breaching the Solvency Capital Requirement within the first two years; grandfathering of existing hybrid own-fund items that are eligible under Solvency I, making it easier to meet the new capital requirements and giving the industry 10 years to adapt the composition of its capital to Solvency II standards; and, finally, longer deadlines to report quarterly and annual information to supervisors and to disclose reports to the public, decreasing gradually from 20 weeks to 14 weeks after the close of the reporting period over the first three financial years.<sup>96</sup>

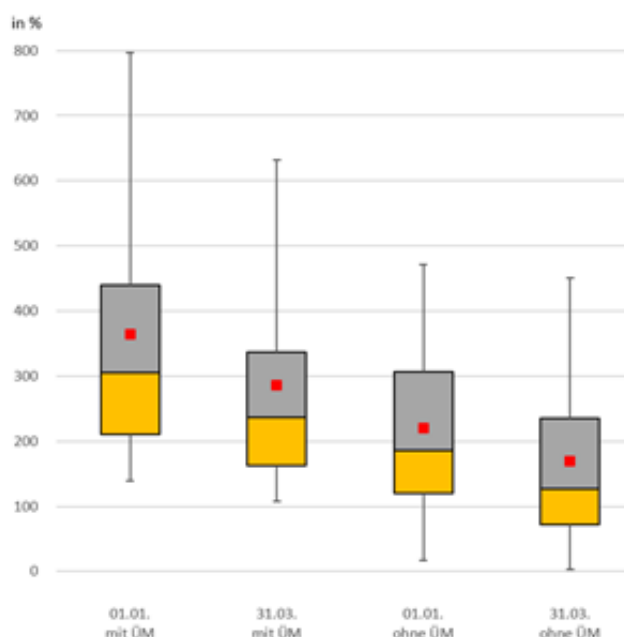
The transitional measures and volatility/matching adjustments stipulated in the regulations are achieving the desired effects. In Germany, for example, nearly half of the life insurers made use of both the volatility adjustment and the transitional measures.<sup>97</sup> These measures give insurers time for adjustments to their business model and changes to the capital position of the business.

A drawback is that the use of these measures reduces the comparability of Solvency II results across companies, as detailed knowledge of the assumptions of the underlying ratios becomes a prerequisite to gauging Solvency II-based financial results. As the use of transitional measures requires approval of the supervisor, Solvency II figures may also be dependent on the insurers' country of operation. Moreover, the transitional measures are not meant to solve or cover-up problems, but to provide insurers with time to adapt. Some insurers will need to make efforts to strengthen their capital base. Supervisors need to pay close attention to those insurers whose performance raises questions over the medium term.

<sup>96</sup> European Commission (2015): Solvency II overview – Frequently asked questions, January.

<sup>97</sup> BaFin (2016b): Erste Erkenntnisse aus den Sparten unter Solvency II, Enclosure to the press release of 09.08.2016.

Figure 32 Distribution of SCR coverage ratios of German life insurers at 1.1.2016 and 31.3.2016 (median, arithmetic average, 5-/25-/75-/95-percentiles)



Notes: sample based on 83 German life insurers. mit UM = with transitional measures; ohne UM = without transitional measures

Source: BaFin

Much has been made of the volatility of the Solvency II balance sheet. Given that assets and liabilities are reported at market consistent values, lower interest rates, for example, raise the value of liabilities and – if assets and liabilities are not duration matched – potentially induce highly volatile evolutions of eligible own funds over time. The results for the first quarter 2016 give a hint of what is to be expected: Over the course of the first quarter of 2016, capital markets and particularly interest rates worsened. As a consequence, the SCR coverage ratio of German life insurers, as an example, deteriorated markedly, with the median declining from 306% to 236%. The maximum quarterly SCR-change of a life insurance company was close to 350 percentage points. This gives a flavour of the volatility under Solvency II, which companies, supervisors, and the public will need to handle adequately in future.<sup>98</sup>

Solvency II reporting requirements dominate the agenda of insurers and asset managers.<sup>99</sup> Overall, the first reporting cycles appear to have progressed as planned without any major incidents. For the most part, supervisory authorities (NCAs) were able to accept the data as reported, although this may have been at the expense of the quality of the data in some cases. A number of insurers reportedly acknowledged the need to improve data quality and accuracy in subsequent reporting cycles. EIOPA decided to temporarily suspend the publication of the Risk Dashboard, a quarterly publication on risks and trends in the European insurance industry, due to the enforcement of Solvency II and the subsequent methodological adjustments needed. On its website, EIOPA states that it is currently designing a new Risk Dashboard based on the Solvency II reporting data and an improved analytical approach.

<sup>98</sup> BaFin (2016b) op. cit.

<sup>99</sup> Solvency II wire (2016a) op.cit.

Under Solvency II, insurers can apply an internal model, if this is approved by supervisors. A combination of standard formula and internal model can also be used (ie partial internal model, or PIM). An industry survey has revealed that as of 1 January 2016 there were only about 95 insurance and reinsurance companies with an approved internal model or PIM across Europe.<sup>100</sup> In the United Kingdom, for example, the vast majority of insurance companies use the standard formula. By end-2015, the Prudential Regulation Authority had approved the use of internal models and PIM for 19 insurance companies.<sup>101</sup>

The first experience with Solvency II also shows some of the benefits of the new regime. According to industry reports, insurance companies are gaining greater awareness or formalisation of thought processes about required capital levels, solvency and risks generally.<sup>102</sup> These were leading to an industry-wide change in both the levels of capital and a more cautious, risk-averse approach to investment. However, as described in the GIMAR report, there is increasing pressure on European insurance companies to invest in riskier assets in a search for yield.

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<sup>100</sup> Solvency II wire (2016a): The Solvency II wire quarterly – 2016 Q2, July.

<sup>101</sup> Bank of England (2015): Solvency II internal model approvals, 5 December.

<sup>102</sup> Solvency II wire (2016b): The Solvency II wire quarterly – 2016 Q3, October.

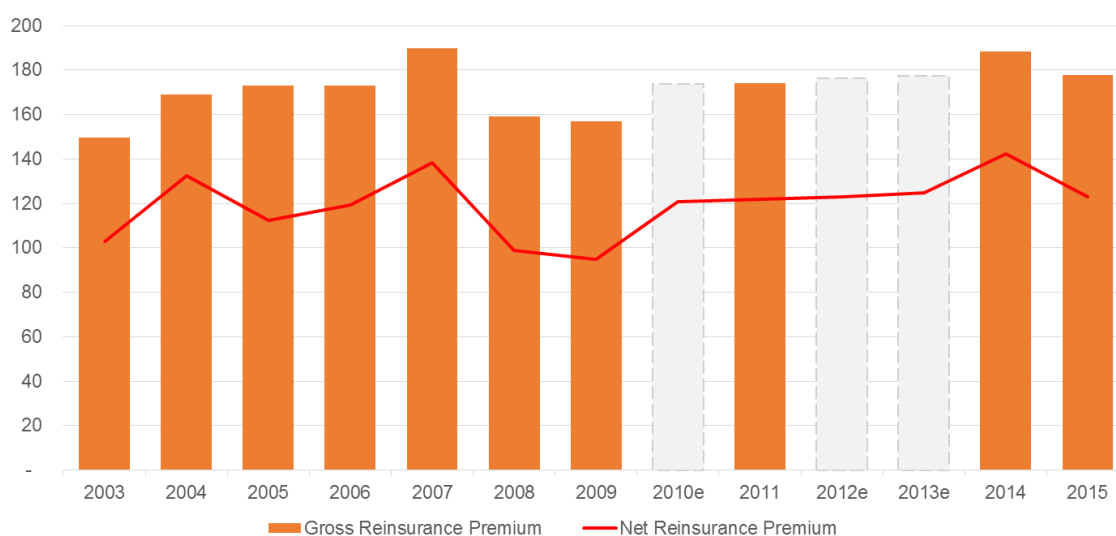
## Chapter 4 - Global Reinsurance Market Survey

Since 2012, the IAIS has gathered international reinsurance data on the insurance sector through the Global Reinsurance Market Statistics (GRMS) survey. The GRMS survey captures data from reinsurers with gross unaffiliated reinsurance premiums in excess of USD 800 million. Data captured from the survey mainly covers gross and net premiums written, claims paid and provisions, investments by asset class, business profitability, shareholders equity and available and minimum capital requirements. In this section of the report, we discuss the analysis completed on the data ascertained from the 2016 GRMS survey.

### A. Reinsurance premiums<sup>103</sup>

Overall, at the end of 2015 the global reinsurance industry experienced a contraction in gross premiums written. According to sample data collected from 44 reinsurers surveyed, reinsurers wrote 6% less gross premium in 2015 than in 2014 (USD 178 billion in 2015; USD 188 billion in 2014). Premiums in life reinsurance were down 12%, to USD 44 billion, while non-life reinsurance premiums decreased slightly by 3% to USD 133 billion. Within non-life reinsurance, liability reinsurance exhibited the greatest change, declining 11% (USD 6 billion) in the period. Property and financial lines of business moved marginally upward to reflect premium growth of 2% respectively.

*Figure 33 Gross & net reinsurance premiums written, year-end , 2003 - 2015 (USD billions)*



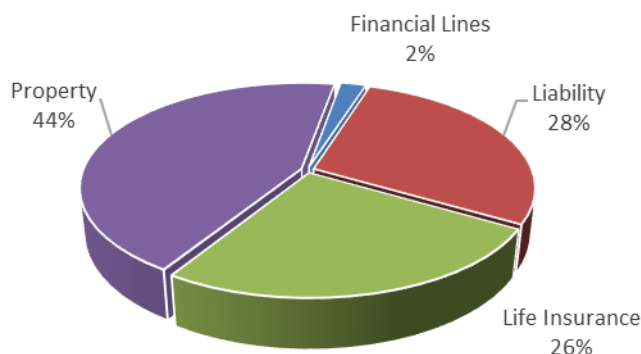
Source: IAIS Survey

As shown in Figure 33, the fall in gross premium written (GPW) in 2015 was accompanied by an even sharper decline in net reinsurance premiums written (NPW). On an NPW basis, reporting entities in 2015 assumed USD 30 billion (down 23%) in life risks and USD 93 billion in non-life risks (down 10%) for total NPW of USD 123 billion.

<sup>103</sup> The charts within this section of the report reflect an analysis performed on the data gathered from the IAIS global reinsurance market statistics surveys conducted from 2003 – 2015. The 2010, 2012 and 2013 periods of the charts were forecast using historical and current reinsurance data of the sample of large reinsurers surveyed.

NPW is derived from GPW less retrocession. Overall, reporting entities for 2015 retroceded 30% (USD 52 billion) of GPW. The majority of the retrocession was for non-life risks, which accounted for 70% (USD 39 billion) of the total recession at the end of the period.

*Figure 34 Distribution of GPW by class of business (%), year-end 2015*



*Source: IAIS Survey*

The class of business relativity of the global reinsurance market has remained static. In 2015, life insurance accounted for one-fourth of GPW and non-life insurance lines of business represented three-fourths of GPW. Within non-life reinsurance lines of business, property reinsurance represented the majority of GPW, accounting for 44% of total premiums. Liability coverage amounted to 28%, and financial lines reflected 2% of total GPW.

## **B. Risk transfer between regions**

Data in the below table shows gross reinsurance premiums grouped and assumed by region of domicile of reporting entities and ceding region. The data has been grouped by the region in which the reporting entities are domiciled. Europe accounted for majority of the risks assumed and ceded by Africa, Near and Middle East or Latin America regions.

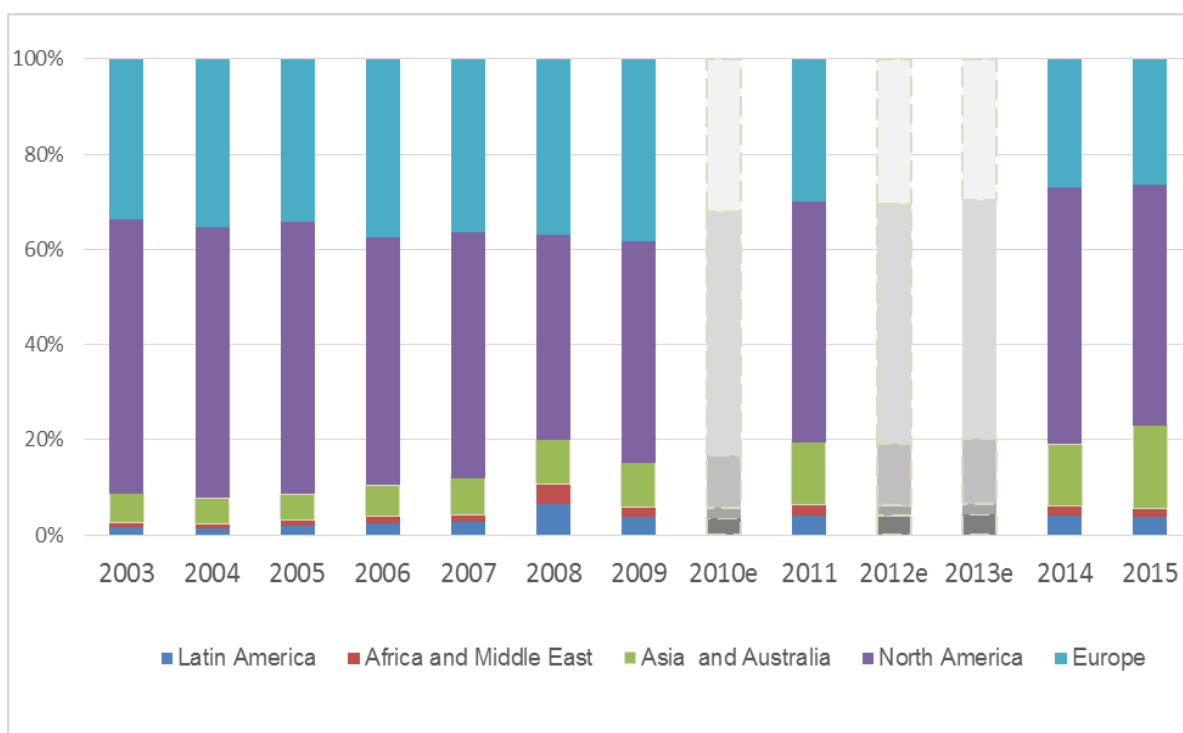
Table 4 Gross premiums assumed by insurers and ceding region, year-end 2015 (USD millions)

<b>Gross Premium Assumed by Insurers</b>			
	<b>North America</b>	<b>Europe</b>	<b>Asia</b>
<b>Ceding Region</b>			
Africa, Near and Middle East	436	2,710	56
Asia and Australia	8,286	20,436	2,212
Europe	4,540	41,854	812
Latin America	1,642	5,110	34
North America	59,595	29,590	686
<b>Total Premium</b>	<b>74,499</b>	<b>99,700</b>	<b>3,800</b>

Source: IAIS Survey

As the data above shows, reinsurers more often than not assume risks from ceding insurers located across borders. This behaviour is driven, among other things, by the nature of reinsurance business, in particular the kind of insurance risks involved (eg catastrophe risk). Geographical diversification of risk is a key element of reinsurers' risk management strategies. By ceding insurance risk across borders, jurisdictions exposed to catastrophe may benefit from a reduced concentration of insurance risk exposures within the borders of the jurisdiction. This can positively contribute to the financial stability of the jurisdiction.<sup>104</sup>

Figure 35 Gross premiums assumed by region, year-end 2015



Source: IAIS Survey

<sup>104</sup> Swiss Re (2016): The benefit of global diversification: how reinsurers create value and manage risk, October.

Figure 35 provides an analysis on gross reinsurance premiums assumed according to the region of the ceding insurer. In 2015, North America accounted for 50% (down from 54% in 2014) of the global reinsurance market, followed by 27% in Europe (unchanged) and 17% in Asia and Australia (versus 13% in 2014). The risks assumed in Latin America and Africa remained unchanged, accounting for 4% and 2% respectively of global risks.

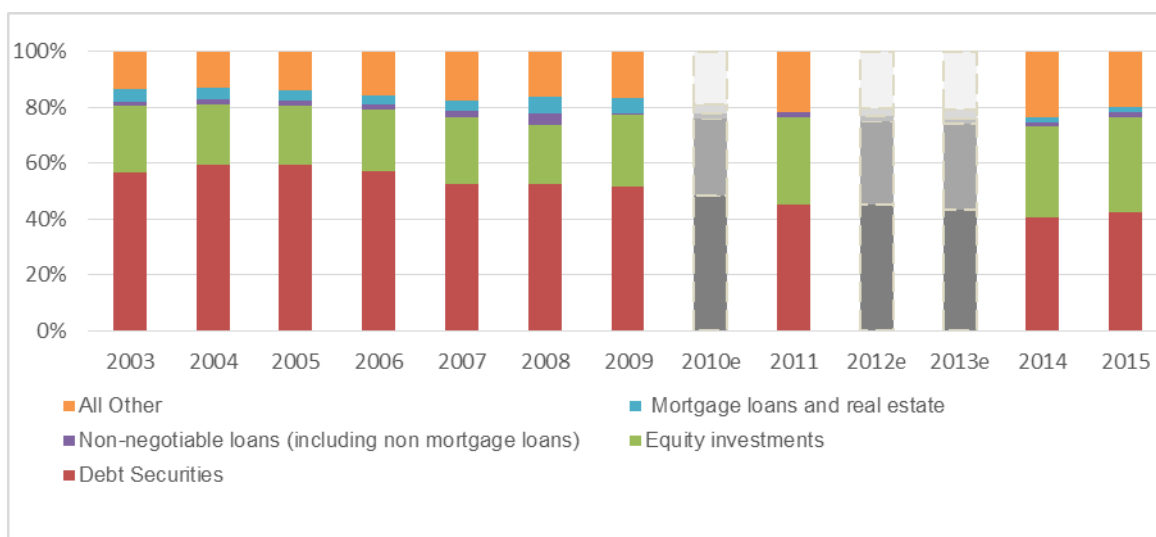
While the majority of the global market slowed down or remained unchanged at the end of the 2015 period, gross reinsurance premiums assumed in Asia & Australia were reported to have risen over the period. Within the Asia and Australia region, GPW amounted to USD 31 billion, marking a 26%, (USD 6 billion) increase from the prior period (2014: USD 25 billion).

### C. Assets

The GRMS survey captures data on financial instruments held by reinsurers at balance sheet value and market value. An analysis of this data shows that total book value of invested assets held by reinsurers, had increased by 2% (USD 16 billion) in 2015. Reinsurers held invested assets totalling USD 717 billion in 2015 compared to total assets of USD 701 billion in 2014. The overall increase in assets was largely attributed to holdings of “Mortgages loans and non-negotiable loans”, which rose by 31% from USD 20 billion in 2014 to USD 26 billion in 2015.

In recent years, the asset composition of reinsurers has exhibited marginal shifts, however fixed income debt securities have remained the largest assets class held by reinsurers. In 2015, debt securities comprised a 42% proportional share of total assets, which reflects a 2% jump over the prior year. In terms of assets on hand, the share of assets invested in fixed income securities rose by 6% from USD 285 billion in 2014 to USD 304 billion in 2015.

*Figure 36 Asset composition (%), year-end 2003 – 2015*



Source: IAIS Survey

### D. Additional movements

Other notable movements for 2015, include a 14% decline (USD 167 billion in 2015; USD 144 billion in 2014) in “all other” assets held by reinsurers. This asset class represents 20% (2014: 24%) of the overall global reinsurance asset base and consists of a wide range of instruments



including derivatives and loans and other alternative investments, cash and cash equivalents. Investments in shares and other equity investments grew by 7% (up USD 15 billion) to an amount of USD 244 billion.

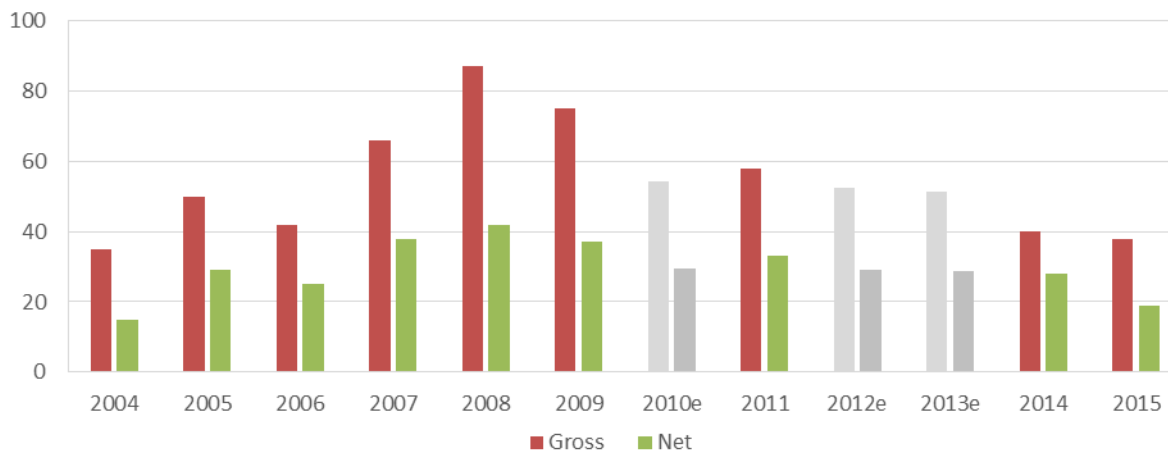
## E. Profitability

The financial performance of the reinsurance industry can be assessed using financial indicators such as gearing and net gearing ratios. As shown in figure 17, gearing ratios reflect on overall capital improvement of reinsurers in the year and measure reinsurer's dependency on reinsurance (for direct business) and retrocession (for assumed reinsurance business), by comparing recoverables to total available capital.

In 2015, reinsurers reported a gearing ratio of 38% and a gearing ratio net of collateral and offsetting items of 19%. Both gearing ratios were the second lowest figures to be recorded since 2004, representing an 11-year low. These recent figures underscores the continuous improvement in the capital base of reinsurers, which has been reflected over the past six years.

As shown in figure 17, the analysis shows that gearing ratios have trended downward since 2009. The movement appears to be largely owed to by an increase in the capital base of reinsurers, which has led to a decrease on the impact of recoverables to reinsurance and retrocessions.

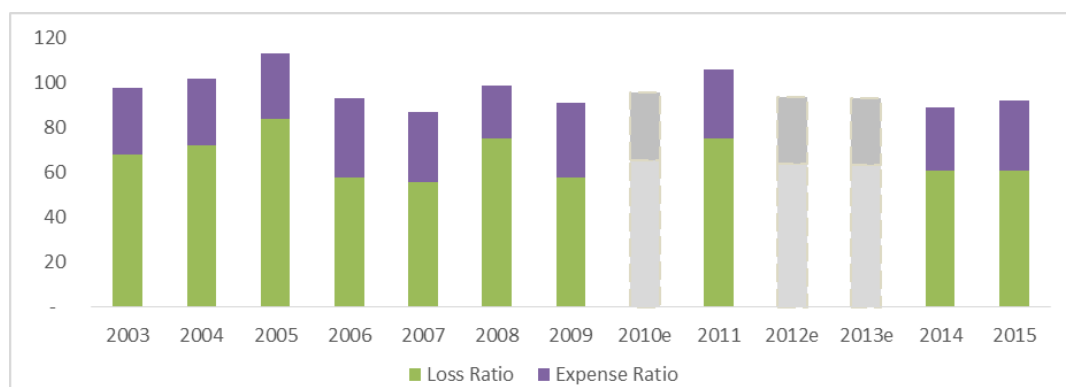
*Figure 37 Gross and net gearing ratio, year-end 2003 – 2015 (%)*



*Source: IAIS Survey*

The combined ratio is a metric used to assess profitability and financial performance. It is a commonly used benchmark for non-life insurers' (expenses plus incurred insurance losses relative to earned premiums) for underwriting performance and measures the amount of earned premiums that an insurance company must pay to cover the claims and expenses generated by the business.

Figure 38 Combined and loss ratio, year-end, 2003 – 2015 (%)



Source: IAIS Survey

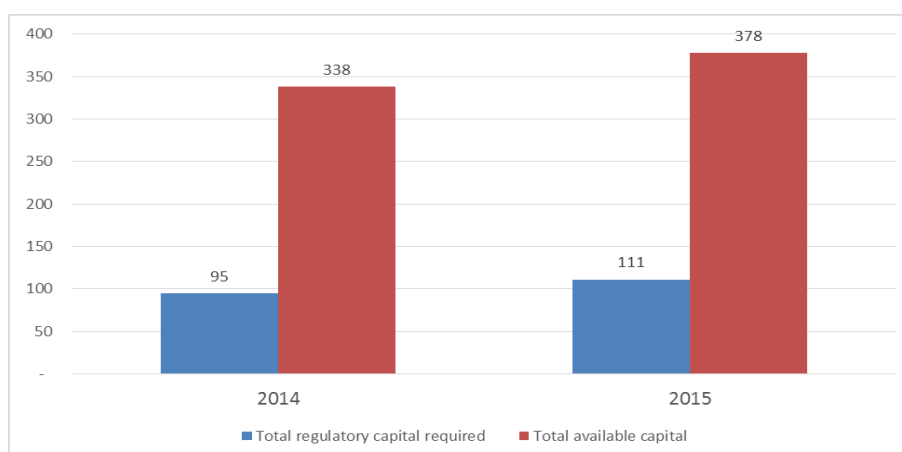
Figure 18 shows the average combined ratio of reinsurers surveyed over a 12-year period. From 2003 – 2015, the average combined ratio is 96%, with 2005 reflecting the highest period (113%) and 2007 reporting the lowest (87%) over the 12-year period. The constant oscillation in the combined ratio is indicative of the volatility in profitability of the reinsurance sector.

In 2015, the average combined ratio grew three percentage points from 89% in 2014 to 92%. The rise in the combined ratio was driven by an increase of the average expense ratio of reinsurers, from 28% in 2014 to 31% in 2015. The expense ratio (net operating expenses to net premiums earned) provides insight on the performance of reinsurers from an operational point of view. The loss ratio, which measures the flow of money from a reinsurance company, remained unchanged at 61% over the same period.

## F. Capital adequacy

In terms of traditional reinsurance, reinsurers maintained a strong capital base for the period. Global reinsurance capital stood at USD 378 billion in 2015, an increase of 12% over the prior year. In the same period, the sector's capital base was well in excess of its regulatory capital requirement by 240% (up USD 267 billion). For 2015, regulatory capital required amounted to USD 111 billion, and increased by 17% over the prior year.

Figure 39 Reinsurance capacity (USD billions), year-end 2014 and 2015



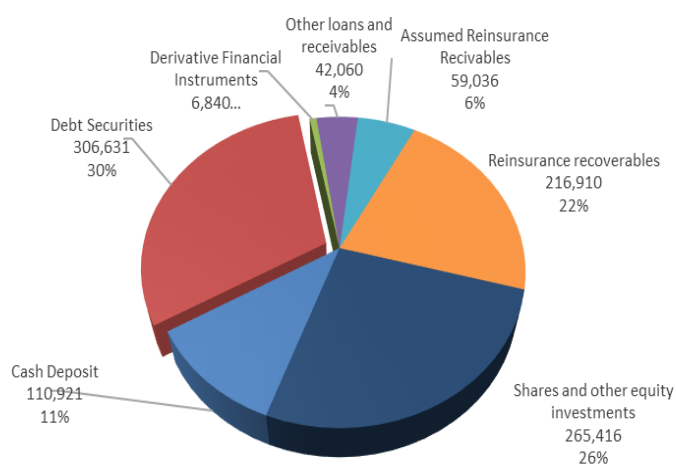
Source: IAIS Survey

## G. Counterparty linkages and exposures

In 2015, total selected assets held with counterparties increased by 8% to USD 1 trillion. This growth was largely due to an increase in reinsurance recoverables (up 17% or USD 31 billion). Debt securities grew by 5% (USD 16 billion) to USD 306 billion, shares and other equity investments rose by 6% (USD 15 billion) to USD 265 billion and other loans and receivables grew to USD 42 billion from USD 30 billion in the prior year.

Less risky assets such as cash deposits fell for the period, down 6% (USD 7 billion) from USD 118 billion in 2014. Other asset classes such as derivative instruments and assumed reinsurance receivables rose slightly, reflecting growth of 29% (USD 6.8 billion in 2015; USD 5.2 billion in 2014) and 10% (USD 59 billion in 2015; USD 54 billion in 2014) respectively.

*Figure 40 Counterparty exposure by asset type (%), year-end 2015*



Source: IAIS Survey